Annual Report

2022-23

Guru Angad Dev Veterinary
and Animal Sciences University

ANNUAL REPORT

2022-2023

GURU ANGAD DEV VETERINARY AND ANIMAL SCIENCES UNIVERSITY
LUDHIANA-141 004

Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana-141 004
(Official publication of GADVASU)

Printed on : March 2024

Citation : GADVASU. 2023. Annual Report: April 2022-March 2023.
Guru Angad Dev Veterinary and Animal Sciences University,
Ludhiana-141 004. 200 p.

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Published by the Vice Chancellor, Guru Angad Dev Veterinary and Animal Sciences University,
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Printed at Foil Printers, Ludhiana.

PREFACE

It gives me an immense pleasure to present before you the Annual Report of Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana for the period 2022-23. Annual Report epitomizes the wide collection of numerous academic, research, extension and co-curricular activities of the university as well as its affiliated colleges. Since its inception in the year 2005, the university, has the history of excellence in education, research and service to the farming communities of Punjab and beyond. The premier veterinary institution in North India was ranked 2nd among the State Veterinary Universities for the year 2023 in NIRF Ranking.

In terms of the student intake, a total 1912 students including 770 females and 1142 males were admitted in various undergraduate, postgraduate, doctoral & diploma programmes offered by the university. The university is equipped with state-of-the-art modernized lecture halls with all the cutting-edge facilities for effective teaching and learning to the students. In research, a total of 73 research and other schemes were operational in the university funded by various funding agencies like Indian Council for Agricultural Research, Department of Science and Technology, Department of Biotechnology, Ministry of Fisheries, Animal Husbandry & Dairying under National Livestock Mission, and many other state, national and international agencies. On animal welfare, treatment and diagnostic front, the university has one of the finest, up-to-date Veterinary Hospital, well equipped with modern, ultra-edge equipments and diagnostic laboratories for rendering services to various stakeholders of the Veterinary Sciences. During the year, 31120 clinical cases of livestock and pet animals were presented and 22741 clinical samples were tested at the University Veterinary Hospital. The proud home of the most innovative veterinary minds made advances in disease prevention, diagnostic techniques and surgical procedures. Our outstanding faculty published groundbreaking research on diseases impacting livestock health and production. During the year 2022-23, the university has developed collaborations with several international institutes and transferred technologies to industry and entrepreneurs.

As far as the co-curricular activities are concerned, our students participated in various activities like Inter University Sports Tournaments, Annual Athletic Meet, Cultural events, Youth Festivals, NCC and NSS camps at university and at all India level and brought laurels. Three NCC cadets participated in various equestrian activities during Republic Day camp and won one Gold Medal, three Bronze Medal and one Runner-up trophy in tent pegging event.

At our university, we have always stressed upon student-ready entrepreneurship approach, where we provide job-oriented quality education, carrying need and issue-based research projects, establishing new and strengthening the existing linkages with various stakeholders of the Veterinary, Dairy, Fisheries and Animal Sciences. We also develop linkages with the relevant industries for increasing the income through productivity enhancement, value addition and ensuring quality and safety of animal-based foods while at the same time ensuring environment protection by using sustainable production systems.

All of our accomplishments would not have been possible without the committed & professional approach, expertise, hard ships and passion of my staff. I hope that Annual Report 2022-23 would serve as a valuable source of information to various professionals employed in different organizations and working in the area of livestock, dairy and fishery development as well as for other Institutions of Higher Learning in the country.

Vice-Chancellor

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ABOUT THE UNIVERSITY

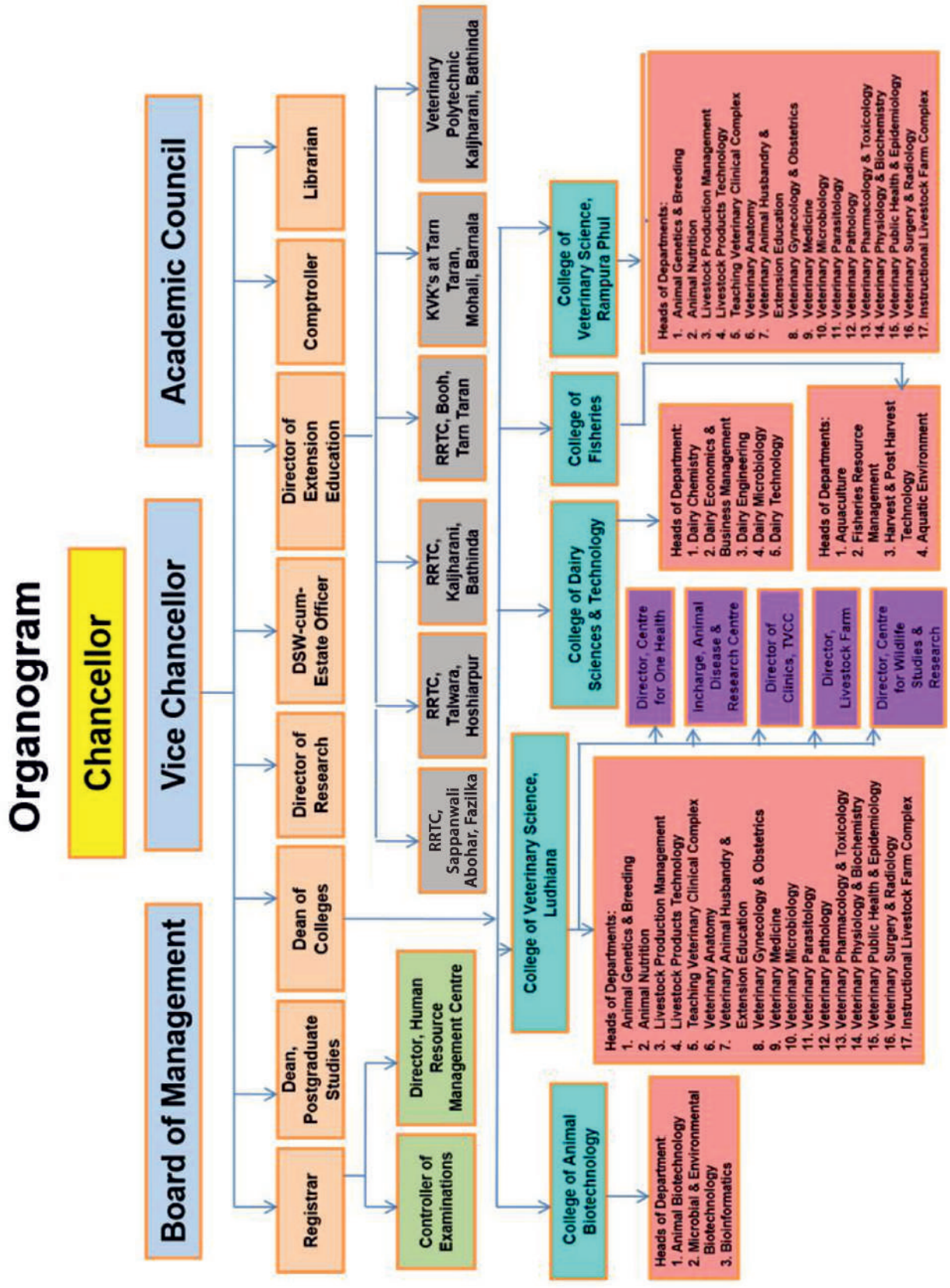
Guru Angad Dev Veterinary and Animal Sciences University was established on 9th August 2005 through Punjab Act No. 16 of 2005 and started functioning from 21st April 2006 at Ludhiana initially with only College of Veterinary Science which was established in the year 1969 and shifted from Punjab Agricultural University. Since its inception, the university has grown remarkably and is already amongst the top-ranked Veterinary and Agricultural Universities across of the country. With the objective to produce highly efficient, trained and skilled human resources with an ultimate aim to give boost to various activities of livestock, dairy and fishery sectors of Punjab, College of Dairy Science and Technology, College of Fisheries, College of Animal Biotechnology and Veterinary Polytechnic for teaching, research and extension in the respective fields were established by the university. A new constituent veterinary college at Rampura Phul, Bathinda has also become functional from the academic session 2019-20 to cater for the ever-increasing demands of professionally qualified veterinary graduates in the state. Furthermore, Regional Livestock Research and Training Centres at Kaljharani (Bathinda), Talwara (Hoshiarpur) Booh (Tarn Taran) and Sappanwali (Fazilka) were established for catering the region-specific needs of the stakeholders. Three Krishi Vigyan Kendras were established at Tarn Taran, Barnala and Mohali districts of Punjab for the technology assessment, dissemination, refinement and demonstration. The university has two affiliated private colleges imparting education for veterinary graduation and paravet diploma.

The University has been recognized by the University Grants Commission (UGC) to receive central assistance under the section 12(B) of UGC Act, 1956. The vet varsity has also got accreditation from the UGC and Indian Council for Agricultural Research (ICAR) and has been admitted as a regular member of the Association of Indian Agricultural Universities (AIAU) and Association of Indian Universities (AIU). The ICAR has accredited the university and its four constituent colleges *viz*., College of Veterinary Science, College of Dairy Science and Technology, College of Fisheries, and College of Animal Biotechnology for a period of 5 years (up to 31.03.2023) with grade 'A'. The School of Animal Biotechnology was upgraded to College of Animal Biotechnology & School of Public Health and Zoonoses to Centre for One Health in the year 2019 and 2021, respectively. Besides, in the year 2021, the Directorate of Human Resource Management was established, with the main motive to process with accelerated emphasis on harnessing of various activities for the continuous growth and development of human resources of the university with greater zeal embarking upon both managerial and operational activities. The university was ranked 2nd among the State Veterinary Universities of India for the year 2023 by NIRF and 2nd by research.com for research output in veterinary and animal science sector in the country for the year 2023.

The University was established with the following goals and objectives:

- ✓ To provide adequate supply of well-trained universally competent veterinary, animal husbandry, dairy and fishery professionals including Master's and Doctorate level specialists capable of handling animal health and production aspects according to the needs of the State.
- ✓ To undertake multi-disciplinary research in priority areas to address the problems of veterinary, animal husbandry, dairy and fishery sectors.
- ✓ To foster faculty development by providing them opportunities to participate in appropriate training programs, conferences, workshops, seminars, symposia, etc. and avail opportunities in exchange programs.
- ✓ To provide continuing professional education in veterinary, animal, dairy and fishery sciences.
- ✓ To provide consultancy, expert opinion and specialist services to livestock owners, government, and other agencies for Livestock Policy Formation.
- ✓ To run Multi-specialty Veterinary Hospital for treatment of animals and to provide clinical training to the students.
- ✓ To encourage cooperation and collaboration with other departments, colleges, universities, and industries, both at national and international levels.
- ✓ To undertake extension education activities to extend the knowledge and technology to the end users, i.e., farmers, industry, government, marketing sector, etc.

ORGANIZATIONAL SETUP

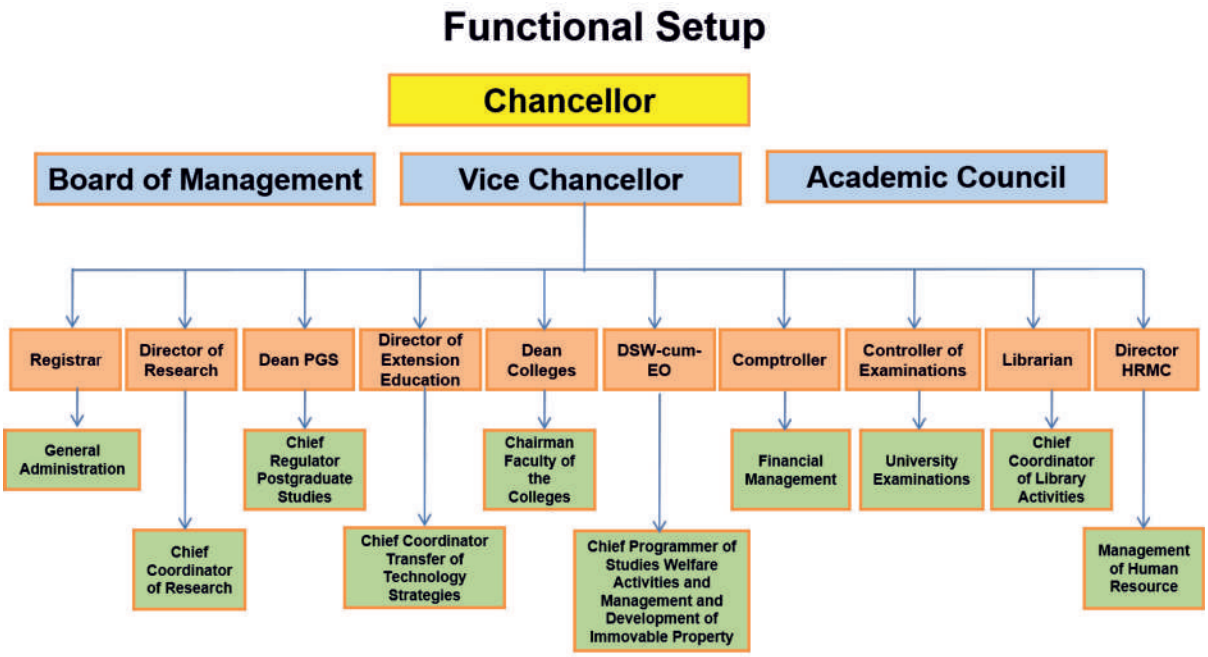


FUNCTIONAL SETUP

The functioning of Guru Angad Dev Veterinary and Animal Sciences University is governed by the following bodies primarily focussing the education, research and extension activities:

- Board of Management
- Academic Council
- Committee on Students' Welfare
- Research Advisory Committee
- Extension Education Advisory Committee
- Resident Instruction Committee
- Postgraduate Committee
- Board of Studies

The Board of Management is the highest administrative body that controls the finances and assets of the university, appointments of all officers and teachers & provides an overall guidance on running of the university. The Academic Council administers the academic functions of the university and is responsible for maintenance of standards of the institution, education and examination. Committee on Students' Welfare regulates various activities related to the students. The Research Advisory Committee regulates the allocation of funds for research, conditions for accepting the grants and other matters regarding research programmes of the university. The Extension Education Advisory Committee coordinates extension programmes of the institute with the state and centre and devises ways and means to implement the extension education programmes run by the university. The Resident Instruction Committee makes recommendations to the Academic Council concerning the new curricula and arrangement, alteration and abolition of existing curricula. The Postgraduate Committee examines the courses and curricula for postgraduate students recommended by the Board of Studies before submission to the Academic Council. The Board of Studies proposes to the Academic Council through the Resident Instruction Committee, the courses of study and curricula for various teaching programmes. The Board also reviews from time to time the standards of teaching and evaluation of students.



ADMINISTRATION

BOARD OF MANAGEMENT

S. No.	Member of the Board of Management	Designation
1.	Shri. Banwari Lal Purohit Hon'ble Governor Punjab & Chancellor, Guru Angad Dev Veterinary and Animal Science University Ludhiana, Punjab Raj Bhawan, Chandigarh	Honorary Chairman
2.	Dr. Inderjeet Singh Vice-Chancellor, Guru Angad Dev Veterinary & Animal Sciences University Ludhiana	Working Chairman
3.	Shri. V. K. Janjua IAS, Chief Secretary to Government of Punjab, Room No. 26, 6th Floor, Punjab Civil Secretariat, Sector-1, Chandigarh	Ex-officio Member
4.	Shri Sarvjit Singh IAS, Additional Chief Secretary, Department of Agriculture and Farmers Welfare, Punjab, Chandigarh.	Ex-officio Member
5.	Shri Vikas Partap IAS, Principal Secretary, Department of Animal Husbandry, Dairy Development & Fisheries, Punjab, Room No. 327, 3rd Floor, Punjab Civil Secretariat-2, Sector-9, Chandigarh	Ex-officio Member
6.	Shri. Ajay Kumar Sinha IAS, Principal Secretary, Department of Finance Punjab, Room no. 10, 8th Floor, Punjab Civil Secretariat-1, Sector-1, Chandigarh	Ex-officio Member
7.	Dr. B.N. Tripathi Deputy Director General (Animal Sciences), Division of Animal Science, Krishi Bhawan, ICAR, New Delhi	Ex-officio Member
8.	Dr. Subhash Chander Goel Director of Animal Husbandry, Punjab, Livestock Complex, 2nd Floor, Sector-68, Near Army Law College, SAS Nagar, Mohali	Ex-officio Member
9.	Shri. Kuldeep Singh Director, Dairy Development, Punjab, Livestock Complex, 4th Floor, Sector-68, Near Army Law College, SAS Nagar, Mohali	Ex-officio Member
10.	Dr. Jasvir Singh Director and Warden of Fisheries, Punjab, Livestock Complex, 4th Floor, Sector-68, Near Army Law College, SAS Nagar, Mohali	Ex-officio Member
11.	Dr. J.P.S. Gill Director of Research, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana	Ex-officio Member
12.	Dr. Harmanjit Singh Banga Registrar, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana	Secretary
13.	Dr. Satbir Singh Gosal Vice-Chancellor, PAU, Ludhiana	Special Invitee

ACADEMIC COUNCIL

S. No.	Member of Academic Council	Designation
1.	Dr. Inderjeet Singh Vice-Chancellor	Chairman
2.	Dr. J.P.S. Gill Director of Research	Member
3.	Dr. Sanjeev Kumar Uppal Dean Postgraduate Studies	Member
4.	Dr. Parkash Singh Brar Director of Extension Education	Member
5.	Dr. Sarvpreet Singh Ghuman Dean, College of Veterinary Science, Ludhiana	Member
6.	Dr. Ram Saran Sethi Dean, College of Dairy Science & Technology	Member
7.	Dr. Meera D. Ansal Dean, College of Fisheries	Member
8.	Dr. Yashpal Singh Malik Dean, College of Animal Biotechnology	Member
9.	Dr. Baljinder Kumar Bansal Dean, College of Veterinary Science, Rampura Phul, Bathinda	Member
10.	Dr. Vaneet Inder Kaur Principal Scientist (Fisheries), Department of Aquaculture	Member
11.	Dr. (Mrs.) Varinder Pal Uppal Head, Department of Veterinary Anatomy	Member
12.	Dr. Digvijay Singh Head, Department of Veterinary Physiology & Biochemistry	Member
13.	Dr. Swaran Singh Randhawa Director of Clinics (TVCC)	Member
14.	Dr. Navdeep Singh Head, Department of Veterinary Surgery & Radiology	Member
15.	Dr. Satyavan Rampal Director of Students Welfare-cum-Estate Officer	Special Invitee
16.	Dr. A.K. Arora Controller of Examinations	Special Invitee

Secretary: Dr. Harmanjit Singh Banga, Registrar

OFFICERS OF THE UNIVERSITY

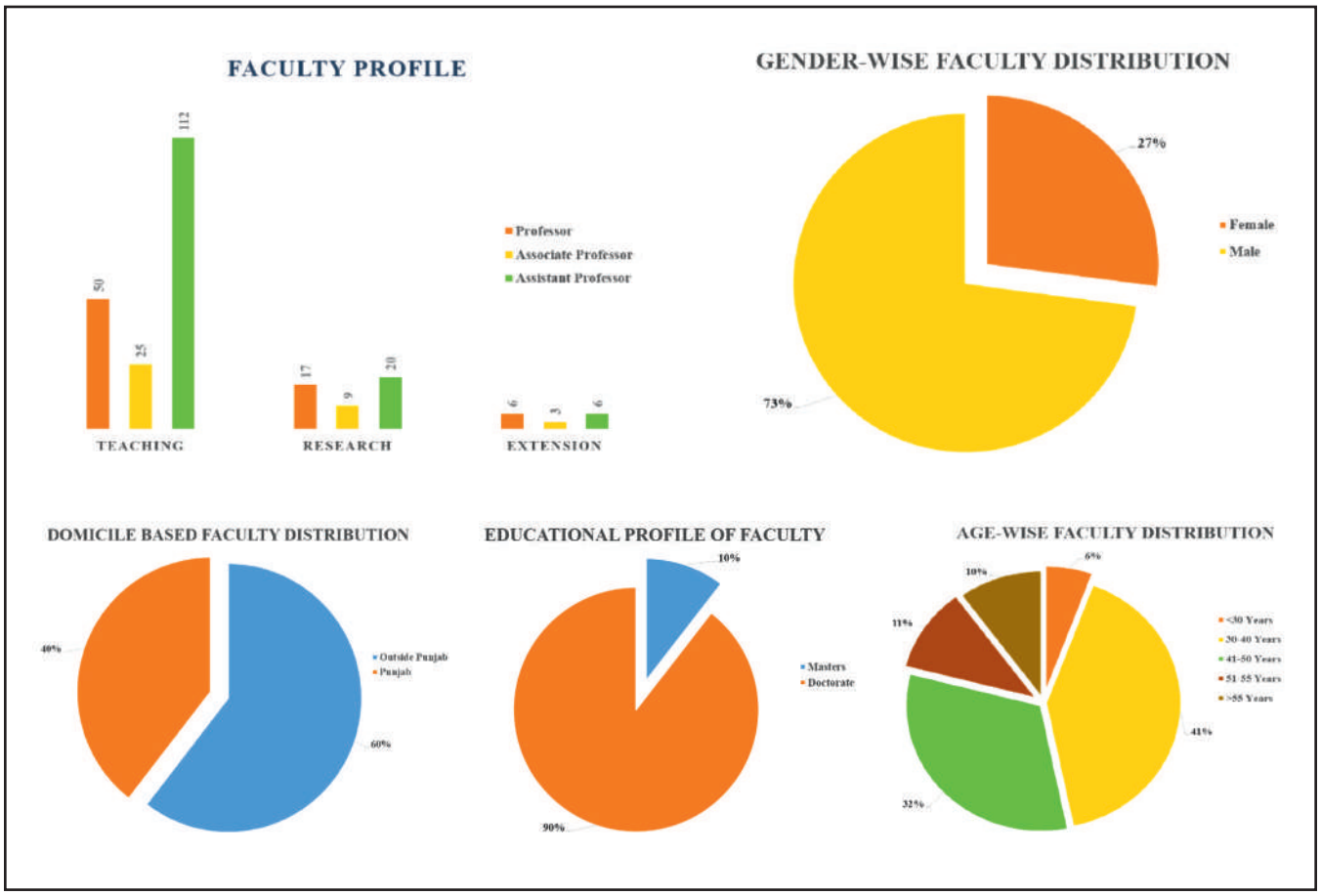
S. No.	Name	Designation
1.	Dr. Inderjeet Singh	Vice-Chancellor
2.	Dr. Harmanjit Singh Banga	Registrar
3.	Dr. Jatinder Paul Singh Gill	Director of Research
4.	Dr. Sanjeev Kumar Uppal	Dean Postgraduate Studies
5.	Dr. Parkash Singh Brar	Director of Extension Education
6.	Dr. Satyavan Rampal	Director Students' Welfare-cum-Estate Officer
7.	Dr. Sarvpreet Singh Ghuman	Dean, College of Veterinary Science, Ludhiana
8.	Dr. Baljinder Kumar Bansal	Dean, College of Veterinary Science, Rampura Phul
9.	Dr. Meera D. Ansal	Dean, College of Fisheries
10.	Dr. Ram Saran Sethi	Dean, College of Dairy Science and Technology
11.	Dr. Yashpal Singh Malik	Dean, College of Animal Biotechnology
12.	Dr. Tejinder Singh Rai	University Librarian
13.	Dr. Amarjit Singh	Comptroller
14.	Dr. Anil Kumar Arora	Controller of Examinations
15.	Dr. L.D. Singla	Director, Human Resource Management Centre

FACULTY PROFILE

A total of 248 faculty members along with 18 subject matter specialists and 05 veterinary officers are on the rolls of the university. Among the faculty members, 73 are Professors or equivalent (one on contract), 37 Associate Professors or equivalent and 138 Assistant Professors or equivalent. One hundred and eighty-seven faculty members (one on contract) are working in teaching schemes, 46 in research schemes and 15 in extension schemes. Among the faculty, 27% are females, 40% are of Punjab domicile and 90% hold doctoral degree. The university had 47% faculty below 40 years of age.

FACULTY STRENGTH

Scheme	Professor	Associate Professor	Assistant Professor	Total
Teaching	50	25	112	187
Research	17	09	20	46
Extension	06	03	06	15
Total	73	37	138	248



STUDENTS' PROFILE

The total strength of students for the year 2022-23 and their gender wise distribution in various degree/diploma programs offered by various colleges of the university is as under:

College	Degree/Diploma Programs	Male	Female	Total
COVS, Ludhiana	B.V.Sc. & A.H.	360	255	615
	M.V.Sc. (Veterinary Science)	115	113	228
	Ph.D. (Veterinary Science)	41	51	92
COVS, Rampura Phul	B.V.Sc. & A.H.	163	139	302
	Diploma in Veterinary Pharmacy	112	26	138
COF	B.F.Sc.	35	44	79
	M.F.Sc.	10	11	21
	Ph.D. (Fisheries)	04	06	10
CODST	B.Tech. (Dairy Technology)	93	49	142
	M.Tech. (Dairy Technology)	08	07	15
	Ph.D. (Dairy Technology)	02	04	06
COABT	B.Tech. (Biotechnology)	23	33	56
	M.Sc. (Animal Biotechnology)	05	08	13
	Ph.D. (Animal Biotechnology)	00	12	12
VP, Kaljharani	Diploma in Veterinary Pharmacy	171	12	183
TOTAL		1142	770	1912

Apart from these students, a total of 423 students were also admitted at Khalsa College of Veterinary & Animal Sciences, Amritsar in the B.V.Sc. & A.H. degree program and 118 students in the Diploma in Veterinary Pharmacy at Veterinary Polytechnic, Baba Hira Das Ji College of Veterinary Pharmacy, Badal, Sri Muktsar Sahib, affiliated with the university.

FINANCIAL REPORT

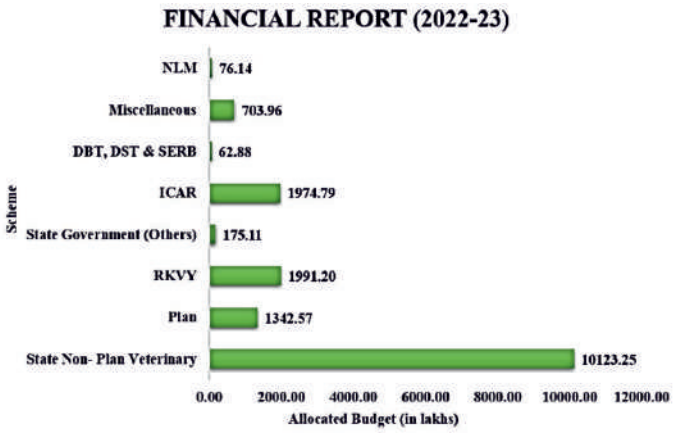
In the financial year 2022-23, the university was allocated a total grant of Rs. 16449.90 lakhs comprising Rs. 10123.25 lakhs under State Non-Plan Veterinary Schemes, Rs. 1342.57 lakhs under Plan Schemes, Rs. 1991.20 lakhs under RKVY Schemes and Rs. 175.11 lakhs under Other State Government Schemes. In addition, the university also received Rs. 1974.79 lakhs under ICAR Schemes/ Projects, Rs. 76.14 lakhs from NLM Schemes, Rs. 62.88 lakhs from DBT, DST & SERB Schemes and Rs. 703.96 lakhs from Miscellaneous funding agencies.

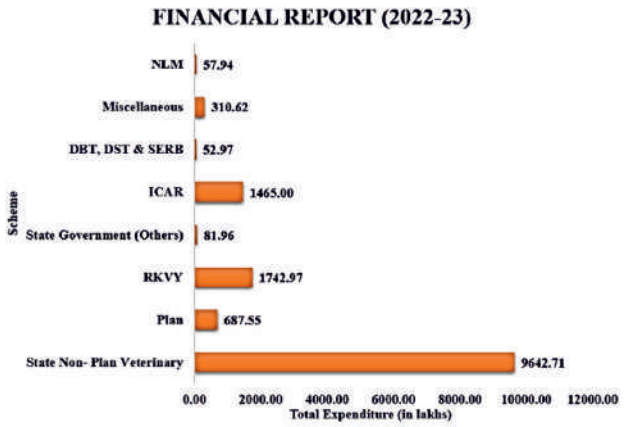
The total expenditure of the university for the year 2022-23 was Rs. 14041.71 lakhs, which included Rs. 9642.71 lakhs under State Non-Plan Veterinary Schemes, Rs. 687.55 lakhs under Plan Schemes, Rs. 1742.97 lakhs under RKVY schemes, Rs. 81.96 lakhs under Other State Government Schemes, Rs. 1465.00 lakhs under ICAR Schemes/Projects, Rs. 57.94 lakhs under NLM Schemes, Rs. 52.97 lakhs under DBT, DST & SERB schemes and Rs. 310.62 lakhs under Miscellaneous schemes.

Financial statement indicating budget allocated and amount spent (rupees in lakhs) under various schemes/projects during financial year 2022-23

S. No.	Scheme	Total Budget Allocated*	Expenditure
1.	State Non- Plan Veterinary	10123.25	9642.71
2.	Plan	1342.57	687.55
3.	RKVY	1991.20	1742.97
4.	State Government (Others)	175.11	81.96
5.	ICAR	1974.79	1465.00
6.	NLM	76.14	57.94
7.	DBT, DST & SERB	62.88	52.97
8.	Miscellaneous	703.96	310.62
	TOTAL	**16449.90**	**14041.71**

*Allocated budget includes the budget revalidated, grant received, and income generated





ACADEMIC UNITS

Guru Angad Dev Veterinary and Animal Sciences University was established on 9th August, 2005 at Ludhiana through Punjab Act no. 16 of 2005. Initially, the College of Veterinary Science (established in 1969), was shifted from Punjab Agricultural University to Guru Angad Dev Veterinary and Animal Sciences University. After starting functioning on 21st April, 2006, the university has achieved remarkable milestones in academics as well as research and development (R&D); and has been placed among the top Veterinary and Agricultural Universities in the country since 2017, with international brand value. With an excellent organizational set up as below, GADVASU is playing an instrumental role in holistic development of animal husbandry, dairy and fisheries sectors of the State through an integrated 3-tier approach including human resource development, R&D and technology transfer.

The University has been accredited and recognized by the University Grants Commission (UGC) to receive central assistance under section 12(B) of UGC Act, 1956. The University got accreditation from UGC and ICAR and has been admitted as a regular member of the Association of Indian Agricultural Universities (AIAU) and Association of Indian Universities (AIU). Indian Council of Agricultural Research (ICAR) has accredited the University and its four constituent colleges viz. College of Veterinary Science, College of Dairy Science and Technology, College of Fisheries, and College of Animal Biotechnology with grade 'A'.

The University is committed to produce world class professionals (graduates and postgraduates) to serve the livestock and fisheries sectors; and its alma matter is well settled with nationally/ internationally recognized excellence in academics, research, administration and policy making in India and abroad. Further, in order to promote self reliance among the passing out professional in veterinary, dairy and fisheries sciences, special initiatives have also been taken up by the university to inculcate entrepreneurial skills among the students through various innovative capacity development programs, as per regional, national and international needs.

There are six constituent colleges of Guru Angad Dev Veterinary and Animal Sciences University *viz*. College of Veterinary Science, Ludhiana; College of Dairy Science & Technology; College of Fisheries; College of Animal Biotechnology; College of Veterinary Science, Rampura Phul and Veterinary Polytechnic College, Kaljharani (Bathinda). Besides, the University has also established 'Centre for One Health' for carrying out multi-disciplinary research at the national and international arena. Four Regional Research & Training Centres at Kaljharani (Bathinda), Talwara (Hoshiarpur), Booh (Taran Taran) and Sappanwali (Fazilka), as well as three Krishi Vigyan Kendras at Booh (Taran Taran), Handiya (Barnala) and Majri (SAS Nagar, Mohali) caters the area specific requirements of the livestock owners. Apart from that, the university also has two affiliated colleges *viz*. Khalsa College of Veterinary & Animal Sciences, Amritsar, and Baba Hira Das ji College of Veterinary Pharmacy, Badal, Sri Muktsar Sahib.

College of Veterinary Science, Ludhiana

The College of Veterinary Science was set up in 1969 as a constituent college of the Punjab Agricultural University, Ludhiana. With the formation of new university, it became a part of the Guru Angad Dev Veterinary and Animal Sciences University in 2006. The college has 17 departments with excellent laboratory facilities and infrastructure for undergraduate (UG) and postgraduate (PG) teaching and research, along with a well-equipped Veterinary Teaching Hospital to cater to the demands of large and small animal health care. The college owns a well-established Livestock Farm Complex comprising of an elite dairy herd, a poultry farm, a goat farm and a piggery unit. Multi-Speciality Veterinary Hospital caters to the need of large and small animal healthcare. The college has distinction of having three ICAR

Centers of Advance Faculty Training in Veterinary Surgery and Radiology, Veterinary Gynaecology and Obstetrics, and Veterinary Pathology. In addition, the departments of Teaching Veterinary Clinical Complex, Veterinary Medicine, Livestock Products Technology and Livestock Production Management have experiential learning projects.

Bachelor of Veterinary Science (B.V.Sc. & A.H.) degree is designed to equip the graduates with the knowledge and skills essential for a career in Veterinary Science and Animal Husbandry as per Veterinary Council of India (VCI) norms. The programme is divided into three phases: the pre-clinical phase to provide education in basic aspects such as Veterinary Anatomy, Physiology, Biochemistry, Genetics, Breeding and Extension. The para-clinical phase includes bridging subjects between the pre-clinical and clinical phases such as Veterinary Pathology, Microbiology, Public Health, Epidemiology, Parasitology, Pharmacology, Toxicology, Nutrition, Livestock Farm Practices and Livestock Products Technology. The clinical phase includes Veterinary Surgery & Radiology, Medicine, Gynaecology and Obstetrics. At the end of the course work, the students undergo a compulsory rotational internship programme. Successful completion of B.V.Sc. & A.H. programme entitles the graduates to seek mandatory registration with Punjab State Veterinary Council/Veterinary Council of India as a Registered Veterinary Practitioner. The college is recognized by VCI and all the ongoing UG and PG programmes in the college have been accredited by the ICAR with 'A' grade.

The mission of the college is to produce quality veterinary graduates, scientists and extension workers for promoting livestock health, by prevention of diseases, increasing production and reproduction; thereby improving the quality of rural life in Punjab. Under the mission, the college carries out undergraduate and postgraduate teaching, research and extension education programmes in various disciplines pertaining to livestock production and health. It is recognized by the VCI and has been accredited by the ICAR with an overall score of five. The College is an epi centre of regional, national and international excellence in research and learning in animal health and production. It caters to the needs of not only Punjab but its adjoining states as well by carrying out teaching, research and extension education programmes pertaining to livestock production and health and has been instrumental in ushering an era of 'White Revolution' in the state.

The college also has an Animal Disease Research Centre to provide quick and reliable disease diagnosis and advise treatment to the livestock owners, and Directorate Livestock Farms that has an elite dairy herd and poultry farm which provide adequate facilities for teaching and research. In addition, the college also has the first Collaborative Research Centre of India for Veterinary Ayurveda, established in the year 2017 by the Central Council of Research in Ayurvedic Sciences (CCRAS), Ministry of AYUSH, Government of India. In 2018, an intramural research project with a budget of Rs. 40 lakhs was awarded by the Ministry of AYUSH to establish a Medicinal Plant Garden at the university for demonstration and to create awareness among farmers and general public about the use and application of medicinal plants. The college was also granted a DBT-GADVASU Canine Research Centre and Networks project in the year 2018 in collaboration with TANUVAS with a Project Monitoring Unit at the institute with a budget of approx. Rs. 1.38 crores.

The university has bagged a prestigious Institutional Development Plan (IDP) project entitled "Institutional Development Plan for Improved Learning Outcome, Skill and Entrepreneurship at the Institute" worth Rs. 2447.48 Lakh starting from August 2019. It is an ICAR and World Bank sponsored project, under National Agricultural Higher Education Project (NAHEP). The NAHEP has been formulated by ICAR with a total cost of Rs 1100 crores for five years starting from 2017-18. The project is on 50:50 cost sharing basis between the World Bank and Government of India.

The college offers the following academic programmes in veterinary science:

- B.V.Sc. & A.H. (5½ years)
- M.V.Sc. (2 years) in 15 disciplines
- Ph.D. (3 years) in 15 disciplines

Student intake capacity

Programme of Study	Number of Seats
B.V. Sc & A.H (5½ years)	• 75 – For residents of Punjab State and Union Territory of Chandigarh through merit of NEET (UG) • 15 - Candidates nominated by the VCI • 10 - Self financed seats • Additional NRI seats • 01 – Kashmiri migrants • 01 additional seat for the wards of permanent employee
M.V.Sc. (2 years)	• 44 - For residents of Punjab State and Union Territory of Chandigarh • 30- ICAR nominee • Additional NRI seats • 02 - Self-financed seats in each discipline • 01 - Kashmiri migrants
Ph.D. (3 years)	• 23 - For residents of Punjab State and Union Territory of Chandigarh. • 17 - ICAR nominee • Additional NRI seats • 01 - Self-financed seats in each discipline

Further, the College of Veterinary Science, Ludhiana also offers Post Graduate Diploma and Short & Certificate Courses, as per the details below:

Name of Postgraduate Diploma (PGD)	No. of seats	Eligibility Qualifications*	Course Duration
PGD in Large Animal Reproduction	5+1#	B.V.Sc. & A.H	01 year (02 Semesters)
PGD in Small Animal Clinical Practice	5+1#	B.V.Sc. & A.H	01 year (02 Semesters)
PGD in Bovine Clinical Practices	5+1#	B.V.Sc. & A.H	01 year (02 Semesters)
PGD in Equine Clinical Practices	5+1#	B.V.Sc. & A.H	01 year (02 Semesters)
PGD in One Health (Distance Learning Programme).	20	Graduate/ Post Graduate in any science, preferably health sciences (Veterinary, Medicine, Dentistry, Alternative Medicine, Nursing, Pharmacy) and Forestry and Environmental Science	01 year (02 Semesters)

Name of course	No. of seats	Eligibility Qualifications*	Course Duration
Online short course in Extension and Entrepreneurship Management	10	B.V. Sc& A.H./B.F.Sc./B. Sc (Agric/Med./Zool/ Fisheries/ Home Science)/B. Tech. (Biotechnology/Dairy Technology/ Food Technology)	6 weeks (5 days on-campus training)
Online short course in Feed and Fodder Technology	10	Any Graduate	6 weeks (5 days on-campus training)
Online short course in Poultry Science	10	Any Graduate	6 weeks (5 days on-campus training)
Online short course in Ethno-veterinary practices	10	Veterinary graduates/ Veterinary Diploma Holder or Farmer with minimum matriculation qualification	2 week (1-2 day on-campus visit)
Short Course in Veterinary Diagnostic Imaging	3+1#	B.V.Sc. & A.H	6 Weeks
Short Course in Small Animal Anaesthesia	3+1#	B.V.Sc. & A.H	6 Weeks
CC in Veterinary Diagonistic imaging	3+1#	B.V.Sc. & A.H	6 months (1 week/ month on campus)
CC in small Animal Anaesthesia	3+1#	B.V.Sc. & A.H	6 months (1 week/ month on campus)
CC in Embryo transfer technology in farm animal	3+1#	B.V.Sc. & A.H	6 months (3 month on campus)
CC in Veterinary Forensic Science	10	B.V.Sc. & A.H	6 months (1 week/ month on campus)
CC ion Semen Handling and Artificial insemination	3+1#	B.V.Sc. & A.H	6 months (3 month on campus)
CC in Laboratory Diagonstic	10	Graduate	6 months

Foreign students, in case it remains vacant, it will be filled from national candidates as per merit.

College of Veterinary Science, Rampura Phul, Bathinda

The foundation stone of the College was laid on 30th October, 2014 by the Hon'ble Chief Minister of Punjab as a constituent college of Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana. The college became functional from the academic session 2019-20 with the approval of VCI and initiated first batch of B.V.Sc & A.H programme. The mandate of the college is to produce veterinary graduates, para-professionals and trained personnel to serve the animal husbandry sector in the state. In addition, its endeavor will be to implement the research outputs and extension education programmes for better livestock health and production, especially in the South Western zone of Punjab. The college campus is spread over an area of 67 acres comprising of College Buildings, hospital, animal farms, and fodder production area. The residential complex comprises of hostels, guest house and staff quarters. There is a well-equipped Teaching Veterinary Hospital to cater the needs of large and small animal health care. The

latest diagnostic equipments including X-ray machines, ultrasounds etc. are available. The college has a well-established diagnostic laboratory for the examination of blood, urine, faeces and tissues etc. The college offers the following academic programmes:

Programme of Study	Duration	Number of seats
B.V. Sc & A.H	5½ years	68- for residents of Punjab State and Union Territory of Chandigarh through merit of NEET 12- Self financed seats 01 - Kashmiri migrants 01 additional seat for the wards of permanent employees
Diploma in Veterinary Science and Animal Health Technology	4 semesters	40 Seats for resident of Punjab state and Chandigarh 40 Self financed

Further, the College of veterinary Science, Rampura Phul also offers certificate and short courses, as per details given below:

Name of Certificate Course (CC)/Short Course (SC)	Duration	Number of seats	Eligibility Qualification
CC in Artificial Insemination Technician	**3 months**	20	10+2 with Science Stream
SC in Scientific Dairy Farming	6 weeks	20	Minimum 10th Standard
SC in Backyard Poultry Farming	6 weeks	20	
SC in Veterinary Laboratory Techniques	6 weeks	20	Diploma in Veterinary Science & Animal Health Technology
SC in Health Care and Management of Dogs	6 weeks	20	
SC in Feed Processing Technology	6 weeks	10	

Centre for One Health

The Centre for One Health was established with prime mandate of teaching, research and extension activities in the field of zoonoses, milk and meat hygiene, food safety, environmental hygiene and epidemiology. The Centre is working with many prestigious research agencies, including, DBT, UGC, Gates Foundation, ICAR, ICMR in projects on Zoonoses, Food Safety and Environmental Health. The Centre has many past and ongoing collaboration(s) with reputed foreign institutes like Royal Veterinary College, London; University of Sydney, Australia; University of Saskatchewan, Canada. There are also active ongoing collaborations with medical colleges and hospital(s) to generate evidence-based data for endemic zoonoses and food safety related issues. The Centre is associated with epidemiological research and awareness drives on many important zoonoses, including brucellosis, tuberculosis, rabies, cysticercosis, hydatidosis, food safety organisms, environment contaminants etc. The Centre for One Health also offers one-year Post-graduate Diploma program in 'One Health' for capacity building amongst the professional(s) of various health sector(s).

College of Dairy Science and Technology, Ludhiana

College of Dairy Science & Technology, Ludhiana is one of leading institution of dairy education and research at national level. It was established in the year 2008 as one of the constituent colleges of the university, to meet the trained manpower requirements of dairy and food processing industries, government departments and R&D organizations. To impart the quality education and training of students it is equipped with excellent infrastructure in terms of state-of-the-art classrooms and laboratories with

advanced analytical instruments facilities.

Moreover, the college also has an Experimental Dairy Plant which is working round the year and facilitates hand on training of students. Development of new technologies in the field of milk processing and dairy products development as well as their transfer to end users is another important objective of the college. Besides physical infrastructures, college is also blessed with a pool of young and dynamic faculty with an exposure of working at premier institutes of international repute. Accreditation of our academic programs by ICAR, New Delhi with 'A' grade in itself reflects the quality of education and training imparted at this college.

Job oriented undergraduate program of B.Tech. (Dairy Technology) is one of the most sought after and flagship program of the college. It is a four-year degree program during which students are trained in such way so that they fit in for both technical and managerial jobs in dairy and food industry. The college also offers Masters and PhD degree in following five disciplines i.e Dairy Technology, Dairy Engineering, Dairy Chemistry, Dairy Microbiology, Dairy Economics & Business management. During their degree program Masters and PhD students are exposed conduct theme specific research, generate data and documentation in the form of thesis, research papers, patent etc. The college has number of active collaborations with industry and academic/ research institutes at national and international level which gives our students an opportunity to work and learn under dynamic research environment. Besides working in different dairy and food industries in India our students are also spread across the world in countries like USA, New Zealand, Canada, Australia etc. for their higher education and jobs.

The courses offered at the college ensure overall development of students as highly professional dairy specialists through modern education, research and training in dairy science and technology. The college also provides facility of Campus Placement and most of our students get placed through campus placements. Industries like Verka, Amul, Nestle, Baani etc. have previously visited our campus to hire our students through campus placement.

Student intake capacity

Programme	Available seats
B. Tech. (Dairy Technology) (4 years)	40- for residents of Punjab State and Union Territory of Chandigarh 07- for candidates nominated by the ICAR 03- for self-financed seats 01- for Kashmiri Migrants 01- for ward of the university employees 05- for candidates from other states Additional seats: for NRI/OCI/Nominees from Foreign Countries
M. Tech. (Dairy Technology, Dairy Engineering, Dairy Microbiology and Dairy Chemistry)	09- for residents of Punjab State and Chandigarh 04- for nominees of the ICAR
M.Sc. Agricultural Economics (Animal Husbandry)	02- for residents of Punjab State and Chandigarh 01- seat for nominee of the ICAR
Ph.D. (Dairy Technology, Dairy Engineering, Dairy Microbiology)	03- for residents of Punjab State and Chandigarh 03- for nominees of the ICAR
Ph.D. Agricultural Economics (Animal Husbandry)	01- for residents of Punjab State and Chandigarh 01- for nominee of the ICAR

To meet the requirements of skilled floor level workers in dairy and food industries from current academic session the college has started two new short courses of 8 weeks duration with intake capacity of 10 candidates per batch.

College of Fisheries, Ludhiana

To provide an effective human resource and technical and outreach backup to the fisheries sector of the state for further expansion and development in terms of productivity and sustainability, College of Fisheries, GADVASU, spread over 6 ha area, was established in April, 2008 to develop qualified human resource in fisheries, to carry out basic, applied and adaptive research for higher fish productivity and to disseminate the developed technologies to farmers and entrepreneurs for commercial adoption. The College of Fisheries has five departments, namely Aquaculture, Fisheries Resource Management, Aquatic Environment, Fish Processing Technology and Fish Engineering. College has competent and experienced faculty and is well equipped with both laboratory and farm facilities, including instructional cum research farm for experiential learning, trainings and demonstrations, to carry out teaching, research and extension activities efficiently. The college offers the following academic programmes:

Programme	Available seats
Bachelor of Fisheries science (B.F. Sc) – 4 yrs	22- for residents of Punjab State and Union Territory of Chandigarh 06- for candidates nominated by the ICAR 02- for self-financed seats 10- for candidates from other states 01- for Kashmiri Migrants 01- for ward of the university employees Additional seats: for NRI/OCI/Nominees from Foreign Countries
M.F.Sc.	
Aquaculture	04- for residents of Punjab State and Chandigarh 01- for nominees of the ICAR
Fisheries Resource Management	02- for residents of Punjab State and Chandigarh 01- seat for nominee of the ICAR
Aquatic Environment Management	02- for residents of Punjab State and Chandigarh 01- for nominees of the ICAR
Fish Processing Technology	02- for residents of Punjab State and Chandigarh 01- for nominee of the ICAR
Ph.D	
Aquaculture	02- for residents of Punjab State and Chandigarh 01- seat for nominee of the ICAR
Fisheries Resource Management	02- for residents of Punjab State and Chandigarh 01- for nominees of the ICAR
Aquatic Environment Management	02- for residents of Punjab State and Chandigarh 01- for nominee of the ICAR

Certificate courses

Name of Certificate Course (CC)/ Short Course (SC)	Duration	Number of seats	Eligibility Qualification
CC in Fish Hatchery Management	6 months	05	Graduate in Any Science Discipline
CC in Aquarium Sciences	6 months	05	Graduate in Any Science Discipline
CC in Fish Processing Technology	6 months	05	Graduate in Any Science Discipline
CC in Aqua-Clinics	6 months	05	Graduate in Any Science Discipline
SC in Fish feed formulation and manufacturing	4 weeks	05	10+2 Science
SC in Aquarium fabrication and maintenance	4 weeks	05	10+2 Science

Over a short span of 15 years, since its establishment in 2008, the College of Fisheries, has registered commendable academic growth and has made significant contributions in the development of the fisheries sector of the state through producing quality skilled fisheries graduates and postgraduates, generating need based technologies for vertical as well as horizontal expansion of aquaculture sector and transfer of technologies to the farmers through an efficient 'Lab to Land' extension programme.

The curriculum of the four-year UG degree programme (B.F.Sc.) has been adopted as per recommendations of the 5th Deans' Committee of the Indian Council of Agricultural Research (ICAR) from academic session 2016-17 and is divided into eight semesters. During the first six semesters, courses (theory and practical) cover taxonomy, anatomy, physiology, biology, biochemistry, culture techniques, nutrition, breeding, disease management, aquatic ecology, genetics, biotechnology, culture and capture fisheries resources and their management, post-harvest technology/fish processing, marketing and trading, economics and statistical methods and extension education. Under STUDENT READY PROGRAM, the students take up 'In-Plant Training Program' during the 7th semester, which includes practical training at aqua-farms, hatcheries, feed industry, fish markets and processing/value addition units etc., while during the 8th semester students undergo on-campus 'Experiential Learning, Skill Development and Project Development Programs'. The curriculum of M.F.Sc (Aquaculture, Fisheries Resource Management, Aquatic Environment Management and Fish Processing Technology) and Ph.D. (Aquaculture, Fisheries Resource Management and Aquatic Environment management) is also based on ICAR regulations covering both theory and research in the field of advanced technologies. One year Diploma in Inland Fisheries is offered to the sponsored in-service candidates of the State Fisheries Department.

Tailor-made six-month certificate courses have also been initiated by the college during academic year 2020-21 in industry-oriented fields, to instil entrepreneurial skills among fishery and other aspiring graduates/youth/stakeholders, so as to promote fisheries as a potential sector for entrepreneurship/ career advancement at regional, national and international levels. Fishery professionals i.e., graduates (B.F.Sc.) and postgraduates (M.F.Sc. and Ph.D.) and certificate holders are eligible to seek promising job opportunities in public /private sector in India i.e., State Fisheries Department, Fish Farmers Development Agencies (FFDAs), Colleges, Agricultural/Veterinary/Central Universities, Krishi Vigyan Kendra's (KVKs), Fisheries Institute/Agencies, Banking Sector, Hatcheries, Aquaculture Farms, Feed Mills, Pharmaceuticals, Processing Plants, Trading, Export etc. Further, Fisheries professional also possess great scope for higher studies and placement overseas. Nevertheless, there are vast opportunities for self-employment/entrepreneurship development in fisheries sector.

College of Animal Biotechnology, Ludhiana

During the last three decades, molecular biology and biotechnology have emerged with extensive applications in animal husbandry, medicine, industry and environmental sciences. Recognizing the immense potential of biotechnology in animal sector, the Guru Angad Dev Veterinary and Animal Sciences University established the Department of Animal Biotechnology in 2008. It was designated as School of Animal Biotechnology in 2010 and upgraded to College of Animal Biotechnology in 2019. The mandate of the college is to generate scientific expertise, human resource in various facets of animal biotechnology and to develop specialized facilities for research in cutting-edge fields of biotechnology. The college is also involved in basic and applied research spanning a wide-spectrum of areas like genomics, molecular diagnostics, vaccinology, stem cell biology, cancer biology, proteomics, and bioinformatics. To cater the needs of undergraduate and postgraduate teaching and research, three departments viz., Animal Biotechnology, Microbial & Environmental Biotechnology and Bioinformatics have been created with excellent infrastructure and laboratory facilities. For the UG and PG teaching, the college is following the course curriculum are commended by the ICAR. The college has been accredited by the ICAR with 'A' grade. Presently the college is offering B. Tech. (Biotechnology), M.V.Sc./ M.Sc. (Animal Biotechnology) and Ph.D. (Animal Biotechnology). The M.V.Sc./M.Sc. and Ph.D. programs in Animal Biotechnology follow the course curriculum as recommended by the Indian Council of Agricultural Research for the Animal Biotechnology group. In May 2021, the College of Animal Biotechnology received ISO 9001 (for demonstration of international requirement for quality management system for providing products and services consistently to the customers) and ISO 45001 (International standard for the protection of employees and visitors from occupational health and safety work-related accidents) certificates, demonstrating recognition of the college at global level. The College offers following programs:

Programme	Available seats
B. Tech. (Biotechnology) (4 Years)	25- for residents of Punjab State and Union Territory of Chandigarh 05- for Candidates from other states 01- for Kashmiri Migrants 01- for ward of the university employees Additional seats: for NRI/OCI/Nominees from Foreign Countries
M.V.Sc. (Veterinary Biotechnology) M.Sc. (Molecular Biology and Biotechnology) (2 Year Programs)	1 seat for veterinary graduates 2 seats for Nominee of the ICAR 4 seats for non-veterinary graduates
M.Sc. (Molecular Biology and Biotechnology) with specialization in Animal Biotechnology (DBT sponsored 2 Year Programs)	10 seats under DBT-Postgraduate teaching programme through GAT-B
Ph.D. (Veterinary Biotechnology) Ph.D. (Molecular Biology and Biotechnology (3-year Programs)	2 - Preference to candidates with Master's in Veterinary/ Animal Biotechnology 2 seats for Nominee of the ICAR

Veterinary Polytechnic, Kaljharani (Bathinda)

The university established a Veterinary Polytechnic at Kaljharani, Bathinda in the year 2010 as a constituent institute of Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana to impart education of Diploma in Veterinary Science and Animal Health Technology to support the veterinary

services through trained para-veterinary staff. The polytechnic has its own well developed teaching infrastructure, a large Sahiwal cattle dairy farm and a Beetal Goat farm with a view to impart good practical training to the students. The institute also has a well-furnished hostel with all the latest facilities like gym and playground. The students after completing the diploma course get the excellent opportunities to work in Veterinary Hospitals, Veterinary Colleges, Research and Training Institutes, Cooperative Sector and Non- Government Organizations etc. Majority of the pass out students have been appointed in the Department of Animal Husbandry, Cooperative Sector, GADVASU and some Non-Government organizations. Recently, the job avenues for diploma holders are also opening in abroad. The polytechnic offers the following academic programme.

Student intake capacity

Programme	Available seats
Diploma in Veterinary Science& Animal Health Technology (2 years)	• 70 seats for residents of Punjab State and Union Territory of Chandigarh • 10 self-financed seats for residents of Punjab State and Union Territory of Chandigarh/ Other states • 10 seats reserved for candidates from other states • 2 seats for residents of Kaljharani, Bathinda

Placement Cell

The Placement cell was established by the university on 5th December, 2006 and is located in the College of Veterinary Science, Guru Angad Dev Veterinary & Animal Sciences University, Ludhiana. It is a centralized facility for the students of all colleges/institutes of the university. The placement cell acts as a liaison unit between the interests of the students and the recruiting agencies. The role of placement cell starts as early as organizing the resume of the students and providing the technical guidance according to their interest and talent of the student to choose the area of work. The Placement and Counselling cells at the College level are working in co-ordination with the Placement Cell at the University level to provide training about personality development and for competitive examinations. It also guides students for higher studies and helps in their job placement. The major placement areas are Government sector, industry/ private sector, self-employment, higher education and settlement abroad

Mode and Mechanism of Placement and Counseling:

- Placement cell contacts various prospective organizations for recruitment of the university graduates. At the same time, it is also a single window system for contacting the organizations and for placement of the graduates.
- The students are being informed about various vacancies and placements through university website/ WhatsApp messages, email and displaying the information on the notice boards in the college, library and hostels.
- Time to time seminars for personality development, career opportunities in higher education in India and abroad are being conducted by respective colleges. Besides this, subject-wise adjunct faculty is being invited to galvanize and apprise the students about the ongoing industrial scenario and apprise them about future prospects of higher education as well as job after completion of the respective degrees.
- The placement cell is actively engaged in developing linkages between different veterinary pharmaceuticals, Banks, Insurance firms and feed/dairy/meat industries for conducting on-campus as well as off-campus recruitments of university graduates and post-graduates. Such linkages are being built through emails, phone calls and various social media platforms.

- For on campus placement, different agencies visit the university campus and hire the students through group discussion and personal interview of the candidates while in off-campus placement, usually companies ask for the biodata and call the shortlisted candidates to their headquarter for interview

Placement Cell Information for the year 2022-23

During the 2022-23 year, the placement cell organized offline and one online campus placements for undergraduate and postgraduate students of College of Veterinary Science, College of Fisheries and College of Dairy Science and Technology. The recruiting agencies who participated were Milked, Verka, Nestle, Amul, Bani Milk, IDBI Bank, etc. In addition, various vacancies advertised by recruiting agencies were circulated among the eligible candidates using university website and social media. The placement committee also organized placement awareness camps during Pashu Palan Melas of the university. The details of placements of passed out students during 2022-23 are as follow:

SN	Name of the University/ College/Faculty	Location/ District	No. of students passed out	CAU/ SAU	Central Govt.	State Govt./ Corporate	PDF/ Foreign	Pvt/ Others*
1	College of Veterinary Science	Ludhiana	202	11	02	81	37	41
2	College of Fisheries	Ludhiana	30	05	-	02	03	03
3	College of Dairy Science& technology	Ludhiana	38	-	-	22	-	-
4	College of Animal Biotechnology	Ludhiana	23	-	-	-	02	03
5	Veterinary Polytechnic	Kaljharani, Bathinda	85	-	-	-	08	77
	Total		378	16	02	105	50	124

IPR cell

The IPR Cell is the entity within the University that provides the day-to-day management of the University owned intellectual property and implementation of these regulations with tasks such as but not limited to receiving and maintaining disclosure if invention files, interfacing with the external agency in the patent application process, and encouraging the faculty to file disclosures of invention. Additionally, the IPR Cell is the entity primarily responsible for technology transfer tasks, such as' negotiating license agreements with prospective commercialization partners. The objectives of the IPR Cell are:

- To access and facilitate the inventive work for creation of intellectual property.
- To generate awareness among the faculty, students, creator/group of creators and societies regarding the value of their ideas/IPK/Genetic wealth.
- To help such group/groups for submission of proposals for creation and protection of IP.

Nodal Cell, ICAR

The university has established a Nodal Cell to coordinate various activities of the Education Division of the ICAR and the university under the scheme "Strengthening and Development of Higher Education in India." The ICAR Nodal Cell functions as a Single Window System and provides all the requisite information to the Agricultural Education Division of ICAR. The Dean, Postgraduate Studies, Dr. Sanjeev Kumar Uppal has been designated as the Nodal Officer.

Human Resource Management Centre

Human Resource Management Centre (HRMC) was established in 2021. Human Resource Management Centre came into existence after the approval of the recommendations of the academic council made in 61st meeting and during the 49th meeting of Board of management held on 19.02.2021. The main motive of setting up of HRM centre is to process with accelerated emphasis on harnessing of various activities with greater zeal embarking upon both Managerial and Operational activities.

During the 2022-23 year the HRMC organized various Trainings/workshops for officers, faculty, students and non-teaching employees. One training workshop of two days on 'Hygienic Practices at Work Place for class IV employees of the University' was organized in collaboration with Centre for One health, Guru Angad Dev Veterinary and Animal Sciences University on 22-23 November 2022. Workshops on 'Important tips to write synopsis, thesis and dissertation' on 14.07.2022 and 'How to write a perfect research article for submitting in high impact journal' on 15.07.2022 were organized for postgraduate students and faculty. One day ICAR-NAARM sponsored workshop on 'Development of soft skills for Entrepreneurship among agri-graduates'on 18.02.2023 was also arranged for undergraduate students. Guest lectures for PG students and Interns of the University on "Basic Life Support Training Program & All you need to Know: Advancement in Medical Sciences" were organized from Dr Venus Bansal, Dr Mehak Bansal, Dr. Vikas Bansal and Dr. Gurpreet Kochar as resource persons on 07.02.2023. Prepared a report on analyses of the data of faculty and students of the University in different categories with special emphasis on data of students belonging to rural and urban area students and analyzed the faculty positions designation wise with special emphasis on Inbreeding.

TEACHING

Admissions in undergraduate and postgraduate programmes in academic session 2022-23

Programme	Boys	Girls	Total
B.V.Sc. & A.H. (COVS, Ludhiana)	59	51	110
B.V.Sc. & A.H. (COVS, Rampura Phul)	39	38	77
B.V. Sc & A.H. (KCVAS, Amritsar) *	58	36	94
B.F.Sc.	12	11	23
B.Tech.(Dairy Tech)	17	08	25
B. Tech. (Biotechnology)	03	07	10
M.V.Sc./M.F.Sc./M.Sc./M. Tech.	53	41	94
Ph.D.	05	10	15
Diploma in Veterinary Science & Animal Health Technology (Veterinary Polytechnic, Kaljharani)	84	08	92
Diploma in Veterinary Science & Animal Health Technology, (Rampura Phul)	68	12	80
Diploma in Veterinary Science & Animal Health Technology (Baba Hira Ji Das, College of Veterinary Polytechnic, Badal) *	72	06	78
Any other Degree/Diploma	17	05	22
Total	487	233	720

* Affiliated private colleges of the university

Passed out students in academic session 2022-23

Programme	Boys	Girls	Total
B.V.Sc. & A.H. (COVS, Ludhiana)	-	-	-
B.V.Sc. & A.H. (COVS, Rampura Phul)	-	-	-
B.V.Sc & A.H. (KCVAS, Amritsar)*	01	-	01
B.F.Sc.	08	12	20
B.Tech.(Dairy Tech)	28	01	29
B. Tech. (Biotechnology)	03	08	11
M.V.Sc./M.F.Sc./M.Sc./M.Tech.	56	56	112
Ph.D.	09	27	36
Diploma in Veterinary Science & Animal Health Technology (Veterinary Polytechnic, Kaljharani)	78	02	80
Diploma in Veterinary Science & Animal Health Technology (Baba Hira Ji Das, College of Veterinary Polytechnic, Badal)*	53	02	55
Any other Degree/Diploma	13	06	19
Total	249	114	363

* Affiliated private colleges of the university

College of Veterinary Science, Ludhiana

Academics and Teaching:

The total number of students admitted in the College of Veterinary Science for the session 2022-23 was 225 which included 110 in B.V.Sc. and A.H., 78 in M.V.Sc., 15 in Ph.D and 22 in short and certificate courses. During the period under report, 136 students passed out from the college which included 88 M.V.Sc., 29 Ph. D and 19 students in short/certificate courses.

Courses taught

The students graduating for B.V.Sc. & A.H. programme were offered courses as per Minimum Standards of Veterinary Education Degree Course (B.V. Sc & A.H.) Regulations 2016 of Veterinary Council of India. Postgraduate students were offered courses in their respective major, minor and supporting fields as approved by the Dean, Post Graduate Studies.

Scholarships / Fellowships

Scholarship	Undergraduate Students	Postgraduate Students	Doctorate Students
University Merit Scholarship	50	42	28
Post Matric scholarship for UG & PG	22	-	-
National Talent Scholarship	24	36	-
Dr G S Khush Foundation Scholarship	08	-	-
ICAR- PG Scholarship	-	09	-
ICAR-Senior Research Fellowship	-	-	03
ICMR-JRF	-	-	03
India Afghanistan Fellowship	-	-	-
India- Africa Fellowship	-	-	03

Internship Programme

There are currently 91 internship students (Male 57 & Female 34) undergoing one year internship program in the Department of Teaching Veterinary Clinical Complex. The interns are posted at various departments of the college such as Veterinary Medicine, Veterinary Surgery Radiology, Veterinary Gynaecology & Obstetrics, Animal Disease Research Centre, Directorate Livestock Farms and Teaching Veterinary Clinical Complex. In addition, students are also getting hands-on-training in the field of Dairy Technology, Fisheries, Poultry, NCC and Punjab Veterinary Vaccination Institute. Students are also posted at Veterinary Colleges of other states and at Govt. Veterinary Hospitals of Punjab. Exposure visits are also made to the Punjab Home Guard Canine Training & Breeding Institute, Dera Bassi and Punjab Police Academy (Equestrian wing), Phillaur.

All India Study Tour

A total of 91 internship students of batch 2018 underwent compulsory education tour for two weeks in January- February 2023 in two groups to college and institutes located at Mumbai, Goa, Bengaluru, Chennai and Hyderabad.

Teaching Veterinary Clinical Complex

The college has a well-established Teaching Veterinary Hospital Complex. The hospital complex has a Primary Unit and Specialized Unit to treat animals. A new Multispecialty Veterinary Hospital has been established for small animals with state-of-the-art facilities. The hospital has the facility for indoor

wards for small and large animals and separate rooms for the attendants. The hospital is being supported by clinical diagnostic laboratory and radiographic unit. There are also advance diagnostic treatment facilities such as endoscopy, echocardiography, dermatology unit, dialysis unit and blood bank present in the hospital.

The number of clinical cases registered for treatment and clinical samples examined in the Hospital as follows

Number of Clinical Cases Presented from April 2022 to March 2023	
Small Animals	24421
Large Animals	6699
Total	31120

Clinical Samples Examined from April 2022 to March 2023	
Pathology	12936
Biochemistry	7039
Parasitology	2769
Total	22741

Thesis/Dissertation awarded to Postgraduate students (2022-23)

	College of Veterinary Science		College of Fisheries		College of Dairy Science & Technology		College of Animal Biotechnology	
Degree	Ph.D	M.V. Sc	Ph.D	M.F. Sc	Ph.D	M.Tech	Ph.D	M.Sc/M.Tech
No.	29	88	02	08	01	08	04	08
Total	117		10		09		12	

Department (Year)	Name of the student (Major Advisor)	Thesis /Dissertation Title
COVSc, Ph. D		
Animal Genetics & Breeding (2022)	Shende Tejas Chandrakant (Dr Simerjeet Kaur)	Study on association of differential genome wide DNA methylation pattern with gene expression profile in Nili Ravi buffaloes.
	Gurpreet Kour Tulla (Dr. P. P. Dubey)	Genetic analysis of performance traits and hatchability of different Rhode Island Red crosses.
Livestock Production Technology (2022)	Jyoti (Dr. Rajesh V. Wagh)	Species identification of milk of cattle, buffalo, sheep and goat origin using various molecular techniques targeting mitochondrial gene sequences.
	Mehak Jandyal (Dr. O. P. Malav)	Studies on combination of different phyto-extracts to improve the storage quality of functional pork sausages.
Livestock Production Technology (2023)	Ranade Ashlesha Sudhir (Dr. O. P. Malav)	Development of extended shelf-life spent hen meat spread using hurdle technology.

Veterinary Anatomy (2022)	Samikshya Sarangi (Dr. Neelam Bansal)	Age related gross, histomorphochemical, ultrastructural and immunohistochemical studies on mammary gland of buffalo (*Bubalus bubalis*).
	Devendra Saran (Dr. Opinder Singh)	Histomorphochemical and ultrastructural studies on oro-pharyngeal tonsils of goat.
Veterinary Microbiology (2022)	Pallvi Slathia (Dr. Deepti Narang)	Studies on cellular and humoral immune responses against mycobacterial infections in cattle and buffaloes.
	Shalini Sharma (Dr. A. K. Arora)	Studies on cytokines expression in animals affected with bovine tuberculosis.
	Jasleen Kour (Dr. T. S. Rai)	Evaluation of recombinant OmpL and Dnak of *Salmonella typhimurium* as subunit vaccine candidates in mice.
Veterinary Microbiology (2023)	Hansmeet Kour (Dr. Gurpreet Kaur)	Studies on evolutionary and antigenic relationship of various variants of Parvovirus of canines in India
Veterinary Pathology (2022)	Sameeksha (Dr. Kuldip Gupta)	Diagnostic and prognostic studies on abdominal affections in dogs.
	Navrose Sangha (Dr. C. K. Singh)	Foldscope based diagnosis of tumors in animals in comparison with conventional microscope.
Veterinary Pathology (2023)	Avantika Sharma (Dr. A.P.S. Brar)	Studies on correlation of platelet indices with molecular diagnosis of *Ehrlichia canis* and *Babesia gibsoni* in dogs.
Veterinary Pharmacology & Toxicology (2023)	Lonare Snehal Madhukar (Dr. S.P.S. Saini)	Pharmacokinetic-pharmacodynamic integration of cefovecin in goats (*Capra hirus*)
Vety. Public Health & Epidemiology (2022)	Rashmi Sharma (Dr. R. S. Aulakh)	Genetic variation and health impact of *Taenia solium* cysticercosis in Punjab.
Vety. Public Health & Epidemiology (2023)	Hina Malik (Dr. Randhir Singh)	Situation analysis of antibiotic usage and metagenomic profiling of antimicrobial resistance genes in cattle and poultry in India.
	Nitasha Sambyal (Dr. J. S. Bedi)	Study on hazard identification and microbial risk assessment in dairy sector of Punjab.
Veterinary Medicine (2022)	Anshu Anarjit Chauhan (Dr. B. K. Bansal)	Morphometric evaluation of udder and teat in Sahiwal dairy cows and its relation to udder health and milk quality.
Veterinary Medicine (2023)	Smriti Kapoor (Dr. D. K. Gupta)	Assessment of mastitis control program, udder immunity, resistance against post milking teat dips and herbal teat disinfectant.
Veterinary Surgery & Radiology (2022)	Richa Gaur (Dr. Tarunbir Singh)	Arthroscopic and surgical management of hip and stifle arthropathies in dogs.

	Chikkala Prem Sairam (Dr. S. K. Mahajan)	Surgical management of humerus fractures and elbow joint arthropathies in canines.
	Deepshikha Singh (Dr. Navdeep Singh)	Clinical studies on laproscopic aided diagnostic and surgical interventions for abdominal affections in canine with special reference to ovariectomy.
	Vora Shrutiben Dineshbhai (Dr Ashwani Kumar)	Biomechanical and clinical evaluation of indigenously designed double threaded intramedullary pin for the stabilization of canine tibial and femoral fractures.
Veterinary Surgery & Radiology (2023)	Kalpana Jaiswal (Dr. Tarunbir Singh)	Studies on diagnostic and therapeutic protocols for management of thoracolumbar spine injuries in canine.
Veterinary Gynaecology & Obstetrics (2022)	K. Lalchhanhima (Dr. M. Honparkhe)	Effect of fsh type and dosage on super stimulatory response, oocyte maturation and embryo recovery in Sahiwal cows.
Veterinary Gynaecology & Obstetrics (2023)	Abhishek Bhardwaj (Dr. Prahlad Singh)	Developmental competence of oocytes vis-à-vis culture media, antioxidant supplementation and semen preparation in Sahiwal cattle.
Veterinary & Animal Husbandry Extension Education (2022)	Parteek Singh (Dr. Rajesh Kasrija)	A study on the inputs procurement behaviour of dairy farmers in Punjab.
	Rahul Choudhary (Dr. Jaswinder Singh)	A study on occupational hazards and health status of dairy farm workers under different milk production system in Punjab.
	COVS, Master's Program	
Animal Genetics & Breeding (2022)	Anika Sharma (Dr. Simarjeet Kaur)	Genetic variability in milk composition traits and its association with STAT1 and STAT5A genes in H*olstein friesian* crossbred cattle
	Waghmare Vijay Kumar (Dr. P. P. Dubey)	Studies on association of morphometric and performance traits *vis-à-vis* sire evaluation in crossbred cattle under field condition.
	Deesha Gupta (Dr. Raman Narang)	Identification of SNPs in HSPB6 gene and their association with heat tolerance traits in buffaloes.
Livestock Production Management (2022)	Harpreet Kaur (Dr. Mandeep Singla)	Evaluation of beetal goats' performance under stall-fed conditions; a retrospective study.
	Rudra Narayan Babu (Dr. Daljeet Kaur)	Impact assessment of alternative litter treatments and their reusage on the broiler house environment.
	Sonu (Dr. Yashpal Singh)	Impact of feed particle size on the performance and gastrointestinal tract development in layers.
	Aditi Gupta (Dr. Ravikant Gupta)	Comparative analysis of whole milk and milk replacer feeding on growth, performance and health status of Murrah buffalo calves.

Livestock Products Technology (2022)	Sahil Rajdev (Dr. Wagh Rajesh Vishwanath)	Development and quality evaluation of low-fat chicken nuggets incorporated with egg shell powder.
	Wajeeha Naaz (Dr. Nitin Mehta)	Development and characterization of oregano essential oil loaded chitosan nanoparticles for storage stability of chevon nuggets.
Livestock Products Technology (2023)	Raj Kamal (Dr. O. P. Malav)	Development and quality evaluation of calcium enriched extruded chicken meat puffs.
	Enamika Rani (Dr. Rajesh V Wagh)	Development and quality assessment of shelf stable chicken sev snacks incorporated with *Syzygium cumini* extracts.
	Neetu Rewaria (Dr. Nitin Mehta)	Encapsulation of thyme (*Thymus vulgaris*) essential oil and its incorporation in chevon nuggets for extension of shelf life.
	Umesh Sharma (Dr. Nitin Mehta)	Development and quality assessment of shelf stable chicken mathri snacks incorporated with natural antioxidants.
Veterinary Animal Nutrition (2022)	Gourav Biswas (Dr. Udeybir Singh)	Development and evaluation of extruded dog food for adult dog.
	Gaikwad Vishal Pandurang (Dr. Amit Kumar)	Nutritional potential of hatchery discarded whole infertile egg meal as non-conventional feed resource in poultry.
	Madhumeet Kour (Dr. J. S. Lamba)	Effect of urea, biological inoculant, fiber degrading enzymes and molasses on ensiling paddy straw and on productivity of lactating buffaloes.
	Onkar Jindal (Dr. J. S. Hundal)	Effect of turmeric processing waste on growth and immunity of growing buffaloes.
	Ravneet Kaur (Dr. Jasmine Kaur)	Effect of supplementation of giloy on nutrient utilization and growth performance of goats.
	Gurslamat Singh (Dr. Sandeep Uniyal)	Evaluation of nutritional potential of infertile eggs meal in the ration of Labrador puppies.
Veterinary Animal Nutrition (2023)	Kamalpreet Singh (Dr. R. S. Grewal)	Effect of supplementation of methionine in transition buffaloes.
	Sachin Kumar (Dr. Udeybir Singh)	Evaluation of nutritional potential of chia seeds in the diet of pug puppies.
Veterinary Anatomy (2022)	Vipul Kumar (Dr. Neelam Bansal)	Age related histomorphological and histochemical studies on mammary gland of goat.
Veterinary Anatomy (2023)	Abishek Verma (Dr. Varinder Uppal)	Histomorphochemical study on intra and inter lobular hepatic architecture of goat.
Veterinary Physiology & Biochemistry (2022)	Mohamed Hasif G (Dr. Digvijay Singh)	Growth pattern, differentiation and cellular senescence of adipose tissue derived stem cells from young and adult buffaloes.

Veterinary Physiology & Biochemistry (2023)	Simran Jot (Dr. Shashi Nayyar)	Effect of supplementing lysine and butyric acid on metabolic profile and growth performance of buffalo calves during winter.
Veterinary Microbiology (2022)	Sheetal Sharma (Dr. A. K. Arora)	Prevalence and antimicrobial resistance of *Enterococcus* spp and *Acinetobacter* spp in pet animals.
	Ipsita Kar (Dr. Paviter Kaur)	Studies on coagulase negative *Staphylococci* associated with pigs and their environment.
	Bavadharani M (Dr. T. S. Rai)	Studies on some common bacterial and viral pathogens associated with respiratory tract in poultry
	Haspinderjit Kaur Saini (Dr. Gurpreet Kaur)	Studies on the viral etiologies of canine gastroenteritis and their molecular characterization.
	Dimalie Michui (Dr. Mudit Chandra)	Comparative studies on antimicrobial resistance in *Escherichia coli* from healthy and diseased poultry birds.
	Lumin Nyra Benny (Dr. Gurpreet Kaur)	Studies on the molecular typing of canine parvovirus using tetra-ARMS PCR.
	Anvesha Bhan (Dr. A. K. Arora)	Isolation, Characterization and activity of bacteriophage against extended spectrum beta-lactamase producing *Escherichia coli*.
	Tikute Prerna Sanjaykumar (Dr. Deepti Narang)	Detection of *Mycobacterium avium* complex organism (MAC) from cases of lymphadenopathies in dogs
Veterinary Pathology (2022)	Gavade Sangram Bhagavat (Dr.L. Geeta Devi)	Pulmonary fibrosis and its amelioration with P-coumaric acid: a study in experimental mouse model
	Ankita Saini (Dr. Vishal Mahajan)	Comparison of diagnostic tests for detection of canine parvo viral enteritis
Veterinary Pathology (2023)	Mandeep Kaur (Dr. Nitin Dev Singh)	Pathology of lipopolysaccharide induced acute lung injury in mice with special reference to its amelioration with chlorogenic acid and baicalein.
	Arshpreet Kaur (Dr. Kuldip Gupta)	Cytopathological studies on reproductive tract affections in dogs.
	Harikrishnan M P (Dr. Amarjit Singh)	Cytopathological and immunohistochemical studies on naturally occurring co-infection of avian oncogenic viruses with chicken anaemia virus in poultry.
	Rajat Kamra (Dr. A.P.S. Brar)	Evaluation of neutrophil and platelet kinetics/ morphology vis-à-vis diagnosis and prognosis of canine diseases.

Veterinary Parasitology (2022)	Farhan (Dr. M. S. Bal)	Haemoparasitic diseases in dogs in relation to associated risk factors with special emphasis on immuno-molecular diagnosis of ehrlichiosis and dirofilariosis.
	Harkirat Kaur (Dr. Harkirat Singh)	Molecular detection and characterization of *Trypanosoma evansi* infection in dogs.
Veterinary Pharmacology & Toxicology (2022)	Chahat Mahajan (Dr. Saloni Singla)	Efficacy of polyherbal formulation supplementation on production performance in dairy cattle.
	Surbhi Jain (Dr. M. K. Lonare)	Safety assessment of a polyherbal formulation in dairy cattle.
Veterinary Pharmacology & Toxicology (2023)	Anshita Sinha (Dr. S. K. Sharma)	Toxicological evaluation of indoxacarb and its amelioration with *Cassia fistula* in rats.
	Suriya Pathania (Dr. S. K. Sharma)	Evaluation of sub-acute oral toxicity of indoxacarb in rats.
Veterinary Public Health & Epidemiology (2022)	Navtej Singh Bhullar (Dr. Rajnish Sharma)	Prevalence and molecular characterization of *Ascaris* spp. in pigs in Punjab.
	Manjeet Sharan (Dr. Pankaj Dhaka)	Studies on biofilms of multidrug resistant *Escherichia coli* and *Staphylococcus* aureus from foods of animal origin and their control strategy.
Veterinary Public Health & Epidemiology (2023)	Deepak Kumar (Dr. B. B. Singh)	Evaluation on the parasitic causes of condemnation of carcass of slaughtered sheep, goat and pigs and associated economic losses.
	Shikha (Dr. Simranpreet Kaur)	Bacterial & parasitic enteric pathogens of public health significance in companion animals in Punjab.
Veterinary Medicine (2022)	Jaspreet Kaur (Dr. Sikh Tejinder Singh)	Studies on haemato-biochemical and immunological changes in stored blood and it's transfusion efficacy in dogs.
	A Ragini (Dr. Sujata Turkar)	Clinico-therapeutic study on lymphadenopathies in dogs.
	Priyanka (Dr. Raj Sukhbir Singh)	Retrospective and clinico-therapeutic studies on canine demodicosis.
	Tanvika (Dr. Neetu Saini)	Cardiac assessment of dogs with systemic hypertension
	Sarthak Choudhary (Dr. Neetu Saini)	Studies on prevalence and diagnosis of cardiac arrhythmias in dogs.
Veterinary Medicine (2023)	Akashpreet Singh (Dr. Randhir Singh)	Study on efficacy of high-flux and low-flux membranes during hemodialysis in dogs.
	Maryann Binoy Mathew (Dr. Sujata Turkar)	Study on hospital prevalence and therapeutic management of urinary tract infections in dogs.

	Chandan Kataria (Dr. Ashwani Kumar Sharma)	Studies on nutritional hemoglobinuria in cattle and buffaloes.
	Sanjeev Kumar (Dr. Sukriti Sharma)	Evaluation of blood component therapy in canine parvoviral enteritis and canine ehrlichiosis.
	Shivani Chhabra (Dr. B. K. Bansal)	Bovine mastitis- retrospective drug resistance pattern and clinical evaluation of a herbal therapy.
	Gourav Kumar (Dr. D. K. Gupta)	Study on neurological diseases of goats.
	Manpreet Kaur (Dr. Sushma Chhabra)	Studies on prevalence, diagnosis and management of aural affections in dogs.
	Navleen Kaur (Dr. Swaran Singh Randhawa)	Clinical studies on hepatobiliary diseases in dairy animals.
Veterinary Surgery & Radiology (2022)	Mithrrajit Asok Kumar (Dr. Navdeep Singh)	Evaluation of guaifenesin as an adjunct to midazolam preanaesthesia for general anesthesia in buffaloes undergoing diaphragmatic herniorrhaphy.
	Balagoni Hanuman (Dr. Tarunbir Singh)	Studies on radiographic morphometry and surgical approaches to the hip joint in dogs.
	Kanwararshjot Singh (Dr. Navdeep Singh)	Clinical study on wound healing ability of povidone iodine in comparison to a new herbal drug in dogs.
	Nima Wangdi (Dr. Tarunbir Singh)	Comparative evaluation of tiletamine-zolazepam and ketamine-diazepam combinations for induction of general anesthesia in dogs undergoing musculoskeletal surgical procedures
	Chimi Jamtsho (Dr. Ashwani Kumar)	Clinical study on the development of ultrasonographic screening protocol for the assessment of small intestine in cows and buffaloes.
	Alisagar Mohammed Kapi (Dr. Pallavi Verma)	Triplex doppler studies on hepatic and splenic vasculature in canine health.
	Sradha Nair (Dr. Arun Anand)	Clinical study on co-occurrence of genital organ pathology with canine mammary tumour.
	Reshma Sebi (Dr. S. K. Mahajan)	Clinical studies on role of ultrasound and ultrasound guided biopsy in diagnosis of canine hepatic disease.
	Akashdeep Singh Hundal (Dr. Vandana Sangwan)	Clinical study on the use of external coaptation for the management of radius, ulna and tibia fractures in bovines.

	Ankita Dhuria (Dr. Pallavi Verma)	Evaluation of radiography and ultrasonography as diagnostic and prognostic tools for surgical affections of gastrointestinal tract in canine.
	Baltej Singh (Dr. J. Mohindroo)	Merphometric evaluation of liver size using ultrasonography and radiography in healthy and diseased dogs.
	Vikas Garg (Dr. N. Umeshwori Devi)	Enzymatic evaluation of aqueous humor in diabetic and non-diabetic cataractous dog.
	Aseem Goyal (Dr. Umeshwari Devi)	Studies on circulating cell free DNA in dogs with skin tumors and its correlation with wide surgical resection and skin reconstruction.
	Harsimran Kaur (Dr. Jasmeet Singh Khosa)	Clinical studies on diagnostic exploration and management of ear canal affections in dogs.
	Nitika Gupta (Dr. Ashwani Kumar)	Stainless steel versus titanium elastic nails for the stabilization of femoral fracture in growing dogs.
	Gaurav Chadha (Dr. Arun Anand)	Clinical studies on surgical management of canine hip dysplasia and its coherence with stifle related arthropathies.
Veterinary Gynaecology & Obstetrics (2022)	Preeti (Dr. Prahlad Singh)	Effect of cysteamine IGF-1 and EGF on in vitro developmental competence of Sahiwal oocytes.
	Sagar Ranjan (Dr. Prahlad Singh)	Effect of rumen protected methionine supplementation on postpartum fertility in dairy buffaloes.
Veterinary Gynaecology & Obstetrics (2023)	Salil Monga (Dr. Narinder Singh)	Fertility assessment following progesterone based modified G6G and heatsynch protocols in postpartum buffaloes.
	Abhi Kamra (Dr. M. Homparkhe)	Fertility response following GnRH and eCG based oestrus synchronization protocols with or without short term progesterone in anoestrous beetal goats.
Veterinary & Animal Husbandry Extension Education (2022)	Pinky Preety (Dr. R. K. Sharma)	Subscription pattern and reading behaviour of Vigiyanak Pashu Palan magazine respondents.
	Vimla Saran (Dr. Y. S. Jadoon)	An exploratory study on farm waste management practices followed by dairy farmers of Punjab
Veterinary & Animal Husbandry Extension Education (2023)	Gurkaranbir Singh (Dr. Jaswinder Singh)	Value chain analysis of commercial pig farming in Punjab.
	Sahildeep Singh Bhinder (Dr. Y. S. Jadoun)	Management of stray cattle in Punjab: a critical appraisal.
	Devansh (Dr. Rajesh Kasrija)	Designing and evaluation of need based instructional material for dairy farmers for prevention and management of pregnancy related disorders.
	Navroop Randhawa (Dr. S. K. Kansal)	Study on the allied farming practices and marketing constraints of dairy farmers in Punjab.

College of Dairy Science and Technology

During the session 2022-23, the total numbers of students admitted in various programmes were 30 that included 25 in B. Tech. (Dairy Technology), 05 in M. Tech. (Dairy Technology) and 06 in Ph.D. Among all the students, male and female were 20 and 10, respectively. During this period 29 students successfully completed their graduation and eight students passed in post graduation degree.

Courses Taught

The undergraduate students were offered courses as per the recommendations of 5th Deans' Committee constituted by ICAR, New Delhi. The B. Tech. students were offered 137 credits of teaching courses and 35 credits of Practical training/ Field work. Postgraduate students were offered courses in their respective major, minor and supporting fields as approved by the Dean, Post Graduate Studies.

Scholarships/Fellowships

Scholarship	Undergraduate Students	Postgraduate Students	Doctorate Students
University merit scholarship	22	-	-
National Talent Scholarship	09	06	-
IIT Ropar Ph.D. Fellowship under DST-AWaDH	-	-	02

All India Study Tour:

College of Diary science and Technology successfully conducted an all-India study tour for B. tech final year students in January 2023. Dr Narender, Dr Gajanan and Dr Anuradha were the tour in charges for the tour.

Internship/ other training Programmes:

Total 10 students of B. Tech (Dairy Technology) from College of Dairy Science and Technology (CODST) attended an international training programme at University of South Australia (UniSA), Adelaide, Australia. The training was commenced from 08 to 22nd March and was sponsored by World Bank and NAHEP, ICAR funded Institutional Development Plan (IDP). The training aimed at providing them exposure to the facilities and techniques at reputed institutes in developed countries

Theses / Dissertations Details

Department (Year)	Name of the student (Major Advisor)	Thesis /Dissertation Title
Ph.D. Programme		
Dairy Technology (2022)	Viji P. C. (Dr. Rekha Chawla)	Formulation and characterization of functional pizza cheese with vital ingredients.
Master's Programme (M. Tech)		
Dairy Microbiology (2022)	Devsimran Kaur (Dr. Santosh Mishra)	Comparative evaluation of extraction methods for crude β-galactosidase from lactobacilli for lactose reduction in milk.
	Wandhare Arundhati Ganesh (Dr. Harsh Panwar)	Development of customized media for selective isolation of *Staphylococcus aureus* from milk.
	Lakhwinder Singh (Dr. Namita Rokana)	Bioprocessing of whey based media for the production of biopolyesters.

Dairy Technology (2022)	Ashritha B (Dr. S. Siva Kumar)	Quality enhancement of *Chhana podo* (baked sweet cottage cheese) with application of antioxidant and antimicrobial based film.
	Avinash Chandra Gautam (Dr. Nitika Goel)	Technological interventions in formulation and development of Ricotta cheese spread using hydrocolloids and preservatives.
	Shubham Kumar (Dr. Rekha Chawala)	Development of ultrasonication assisted functional milk-based smoothie.
Dairy Engineering (2022)	Ankit Bishnoi (Dr. Narindra Kumar)	Impact of hydrocolloids on engineering properties of composite bio-polymeric films.
	Gaurav Sharma (Dr. Amandeep Sharma)	Study on open refrigeration system for milk cooling using double cavity insulated can.

College of Fisheries

Academics and Teaching:

During the academic session 2022-23, thirty-four students were enrolled to the degree programmes included twenty-three students in B.F.Sc., eleven in M.F.Sc. During this period twenty undergraduate students and ten postgraduate students successfully attained their degrees.

Courses Taught

The undergraduate students were offered courses as per the recommendations of 5th Deans Committee constituted by ICAR, New Delhi. A total of 70 courses were offered to B. F. Sc. students. Postgraduate students were offered courses in their respective major, minor and supporting fields as approved by the Dean, Post Graduate Studies.

New/Revised Courses, if any

PG Courses revised as per ICAR BSMA - Fisheries Sciences (2021)

Scholarships / Fellowships

Scholarship	Undergraduate Students	Postgraduate Students	Doctorate Students
University merit scholarship	16	5	04
National Talent Scholarship	03	02	-
Dr G S Khush Foundation Scholarship	02	-	-
Mata Ind Kaur Award	03	-	-

All India Study Tour:

Final year B.F. Sc students of College of Fisheries (COF), completed an All-India Study Tour successfully under 'Student Ready Program', supported by Institutional Development Plan (IDP), National Agricultural Higher Education Project (NAHEP), Indian Council of Agricultural Research (ICAR).

The students visited ICAR- Central Institute of Freshwater Aquaculture (CIFA), Bhubaneshwar, Dr. MGR Fisheries College and Research Institute (Ponneri), TNJ Fisheries University, Feed Industry- C P Aquaculture (India) Pvt. Ltd., Muttukadu Experimental Station of ICAR-Central Institute of Brackishwater Aquaculture (CIBA), Tamilnadu, ICAR- Central Institute of Fisheries Technology (CIFT), ICAR- Central Marine Fisheries Research Institute (CMFRI), Central Institute of Fisheries Nautical and Engineering Training (CIFNET), Processing Plant-Geo Aquatic Products Pvt. Ltd., Marine Products

Export Development Authority (MPEDA) and fish landing harbors in Kochi, Kerala. The students got an opportunity to experience sport fisheries and visit cold water lakes in Uttarakhand, with an educating excursion to GB Pant University of Agriculture and Technology, Pantnagar and ICAR- Directorate of Coldwater Fisheries Research (DCFR), Bhimtal.

Theses / Dissertations Details:

Department (Year)	Name of the student (Major Advisor)	Thesis /Dissertation Title
Ph.D. Programme		
Aquaculture (2022)	Ranjeet Singh (Dr. Meera D. Ansal)	Efficacy of *Asparagus racemosus* (Shatavari) root powder as growth promoting, immunomodulatory and aphrodisiac feed additive in common carp, *Cyprinus carpio* (linn.)
Aquaculture (2023)	Deepa Bhatt (Dr. Abhed Pandey)	Efficacy of turmeric and quercetin in *Labeo rohita* challenged with aflatoxin B_1-potential alternatives for fungal control in aquaculture.
M.F. Sc Program		
Aquaculture (2022)	Prabhdial Singh (Dr. Abhishek Srivastava)	Efficacy of dietary supplementation of kinnow peel powder on survival, growth and health status of common carp, *Cyprinus carpio* (L.) fingerlings.
	Rathod Rupesh Gajanan (Dr. Meera D. Ansal)	Efficacy of duckweed (*Spirodela polyrhiza* L. schleiden) paste as binder in fish pelleted feed-water stability, storage life and growth of economically important carp species.
	Arockia Sharmila S (Dr. Abhishek Srivastava)	Feasibility assessment of rearing an Indian major carp, *Cirrhinus mrigala* (Ham) in inland saline water.
	Mohit Kamboj (Dr. S. O. Khairnar)	Salinity tolerance and physiological responses of swordtail *(Xiphophorus helleri)* reared in inland saline water.
	Lovepreet Singh (Dr. S. O. Khairnar)	Ecophysiological responses of black molly, *Poecilia sphenops* in inland saline waters of Punjab.
	Thakur Satyam Singh (Dr. Abhed Pandey)	Effect of dietary supplementation of probiotic bacteria *(Lactobacillus plantarum)* on survival, growth and health status of mrigal (*Cirrhinus mrigala* Hamilton)
	Taranpreet Singh (Dr. Amit Mandal)	Environmental management and production potential of striped catfish, *Pangasianodon hypophthalmus* in biofloc system.
Aquatic Environment Management (2022)	Simran Kaur (Dr. Anuj Tyagi)	Isolation and characterization of autochthonous quorum-quenching probiotics from Indian major carps for biocontrol of *Aeromonas hydrophila*.

College of Animal Biotechnology

Academics and Teaching:

Total number of students enrolled for the session 2022-23 was ten in B. Tech (Biotechnology). During this academic year 11 students graduated in B. Tech., while 08 and 04 students successfully completed their Master's and Ph.D. program. A total of 62 courses were offered during the year which included 50 courses for undergraduates, eight courses for postgraduates and four courses for doctorate students.

New/Revised Courses, if any

Six Weeks Short Course on Bioinformatics organized in hybrid mode by the Department of Bioinformatics of the College of Animal Biotechnology during 17 May to 27 June, 2022.

Scholarships / Fellowships

Scholarship	Undergraduate Students	Postgraduate Students	Doctorate Students
University merit scholarship	18	02	02
DST inspire fellowship	-	02	01
DBT-Postgraduate teaching programme scholarship	-	09	-
Post matric scholarship	10	-	-

All India Study Tour:

The educational tour for fourth year B.Tech. (Biotechnology) students was conducted from 12th February, 2023 to 22nd February, 2023 The Students visited P. V. Narsimha Rao Telangana Veterinary University Rajendra Nagar, Hyderabad; National Academy of Agricultural Research Management (NAARM), Hyderabad, ICAR-Indian Veterinary Research Institute, Bengaluru station, ICAR-National Institute of Veterinary Epidemiology and Disease Informatics (ICAR-NIVEDI), Bengaluru and Madras Veterinary College, TANUVAS.

Theses / Dissertations

Department (Year)	Name of the student (Major Advisor)	Thesis /Dissertation Title
Ph.D. Programme		
Animal Biotechnology (2022)	Prakriti Sharma (Dr. R. S. Sethi)	Studies on nuclear factor of activated T-cell signalling during deltamethrin induced lung damage.
	Srishti Prashar (Dr. R. S. Sethi)	Studies on phosphatidylinositol 3'-kinase signalling during 2, 4-dichlrophenoxyacetic (2, 4-D) induced lung damage.
	Parminder Kaur (Dr. Y P S Malik)	Molecular characterization of Porcine Parvovirus (PPV) field isolates by cloning and sequencing of CAPSID (VP2) coding gene.
	Kanwaljit Rana (Dr. C. S. Mukhopadhyay)	Molecular characterization of indigenous dogs through whole genome analysis.

Master's Programme (M.V. Sc/ M. Sc)		
Animal Biotechnology (Biotechnology) (2022)	Simran Attri (Dr. Yashpal Singh Malik)	Development of recombinant protein based indirect ELISA for serodiagnosis of bovine Herpesvirus-1infection.
	Upasana (Dr. Satparkash Singh)	Molecular cloning of HSP15 gene of *Leptospira interrogans* serovar canicola and analysis of comparative gene expression under stress by real time PCR.
	Dalbir Singh (Dr. S. S. Sodhi)	Comparative expression analysis of differentially expressed genes (DEGs) related to metabolic response, skeletal system and body growth in fat tissue of large white yorkshire (LWY) and non-descript pig breed of Punjab.
	Manjot Kaur (Dr. Satparkash Singh)	Molecular characterization and expression profiling of *lipL46* gene of *Leptospira interrogans* under stress conditions.
	Piyush Kumar (Dr. S. S. Sodhi)	Differential expression of myogenic regulatory factors (MRFs) in piglets and adult pigs of indigenous and large white yorkshire (LMY) breeds.
Animal Biotechnology (Animal Biotechnology) (2022)	Shubhanshi Ranjan (Dr. S. S. Sodhi)	Relative expression of key genes of myogenic pathway in *Longissimus dorsi* muscle of large White Yorkshire and non-descript pig.
Animal Biotechnology (Biotechnology) (2023)	Paramjeet Sharma (Dr. Ratan K. Chaudhary)	Development and evaluation of conceptus stimulated genes expression profiling based early pregnancy detection in buffalo.
Animal Biotechnology (Animal Biotechnology) (2023)	Priyanka (Dr. Ratan K. Chaudhary)	Investigation of fine needle aspirates from canine mammary tumors-a translational model for diagnosing human breast cancer.

College of Veterinary Science, Rampura Phul

It is a newly established, constituent college of the university, started functioning from October 1, 2019.

Academics and Teaching:

The total number of students admitted in the College of Veterinary Science, Rampura Phul for the session 2022-23 was 157 including 77 in B.V. Sc. and AH programme and 80 in Diploma in Veterinary Science & Animal Health Technology (D.V. Sc & A.H.T.). Total 107 male and 50 female students were admitted to B.V.Sc & A.H and diploma program of the college.

Courses taught

The students graduating for B.V.Sc. & A.H. programme were offered courses as per Minimum Standards of Veterinary Education Degree Course (B.V. Sc. & A.H.) Regulations, 2016 of Veterinary Council of India. To the 1st, 2nd and 3rd professional of B.V.Sc. & A.H. students, total 19 courses of 81 credit hours were offered. In D.V. Sc. & A.H.T., first year and second year diploma course, a total of 19

courses of 47 credit hours and 15 non credit hours were offered.

Veterinary Polytechnic Kaljharani, Bathinda

The university established Veterinary Polytechnic & Regional Research and Training Centre (VP & RRTC) at Village Kaljharani, District Bathinda in the year 2010. Veterinary Polytechnic was established to impart education in Diploma in Veterinary Science and Animal Health Technology to support the veterinary services through trained para-veterinary staff. The trainees after completing diploma course become eligible to coordinate and work under the supervision of registered veterinary practitioners to provide better healthcare to animals in Veterinary Hospitals, Veterinary Colleges, Research and Training Institutes, Cooperative Sector and Non-Government Organizations. Majority of pass out students have been appointed in the Department of Animal Husbandry. The remaining is absorbed in Cooperative Sector, Veterinary university Ludhiana, Private sector and some Non-Government Organizations.

Academics and Teaching:

During the session 2022-23, a total of 92 students (84 male and 08 female) admitted in Diploma in Veterinary Science and Animal Health Technology and 80 students (78 boys & 02 girls) were passed out.

Courses Taught:

A total 19 course with 47 credit hours of theory and 15 non credit hours of practical training were offered in diploma programme.

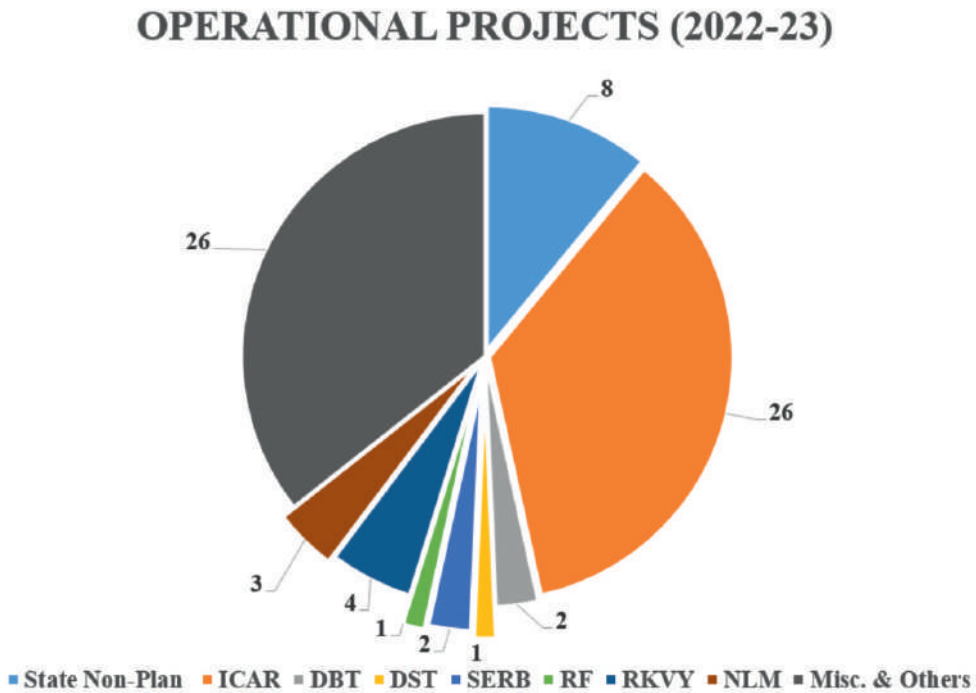
Scholarships / Fellowships:

Scholarship	Diploma students
Post Matric Scholarship	30: SC

RESEARCH

The institute carries out research on the issues/ aspects predominantly related to health and production of various species of livestock, poultry, companion animals and fisheries as per the research mandate. During the year 2022-23, a total of 123 research project proposals were submitted to various funding agencies, like Department of Biotechnology including Indo Australian Biotechnology Fund, Department of Science and Technology including SERB, National Horticulture Board, National Fisheries Development Board, Indian Institute for Science Central Council for Research in Ayurvedic Sciences, National Bank for Agriculture and Rural Development, Ministry of Animal Husbandry, Dairying & Fisheries under National Livestock Mission, University Grants Commission and many other state, national and international agencies. During the year 2022-23, a total of 73 research schemes were operational in the university as detailed below:

S. No.	Funding agency	Number
1.	State non-plan	08
2.	ICAR	26
3.	DBT	02
4.	DST	01
5.	SERB	02
6.	RF	01
7.	RKVY	04
8.	NLM	03
9.	Miscellaneous & Others	26
	TOTAL	73



Research Highlights

A. College of Veterinary Science

I. Animal Disease Research Center (ADRC)

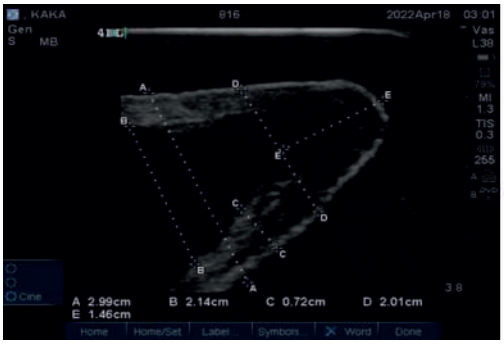
- During 2022-23, 344 farm animals were secerned for brucellosis, tuberculosis and paratuberculosis.
- In the clinical diagnostic lab, 10564 samples were processed for hematological, 1126 samples for cytological, 1246 samples for urine analysis, 7036 for biochemical analysis and 1750 samples for parasitological examination.
- In the clinical microbiology lab of the department, 1485 samples were tested for brucellosis by RBPT, 368 faecal samples for JD by acid fast staining, 174 samples for culture sensitivity testing and 116 samples for dermatophytes/ fungal examination during last year.
- A total of 16 outbreaks of different bacterial, viral, parasitic diseases and toxicities were attended and successfully controlled during 2022-23.
- Disease data from the state was provided to ICAR-NIVEDI for developing database for forecasting of infectious diseases.

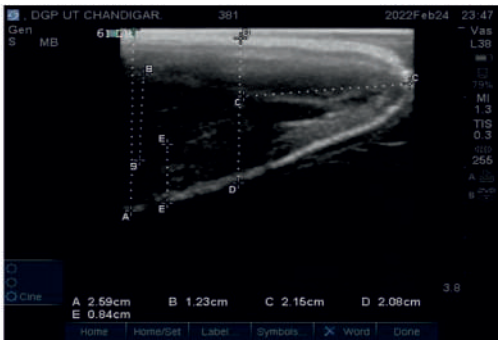
II. Veterinary Anatomy

- Morphological, Anatomical and Ultrasonographic study of organs:

a. Mammary Glands of goat

The investigation was conducted on gross, ultrasonographic, histomorphological, histochemical and histoenzymic studies on mammary gland of goat during pre-pubertal, lactating and non-lactating stages. The study revealed difference in lactating and non-lactating animals in different components of teat which may be used to detect any abnormality in the teat. Histological observations showed that the ratio of glandular parenchyma to stroma was maximum at lactation stage which decreased in non-lactating and prepubertal animals. Corpora amylacea was present mostly in the alveoli, but occasionally seen in the duct system in non-lactating animals. Rete ridges were pointed and elongated in the non-lactating animals, flattened and blunt in lactating animals and less prominent in prepubertal animals. More number of Marksaulchen cells (reported first time) present in teat canal epithelium of lactating animals are responsible to increase the elasticity in teat canal due to its contractile nature. Thickness of epidermis increased from udder skin to the tip of teat and was maximum in teat canal which is important to prevent intramammary infections. The activity of neutral mucopolysaccharides, basic proteins, lipids and was greater in lactating animals, but acidic mucopolysaccharides were higher in the non-lactating animals. Lactating goat showed comparatively more enzymatic reaction followed by non- lactating than prepubertal animals.

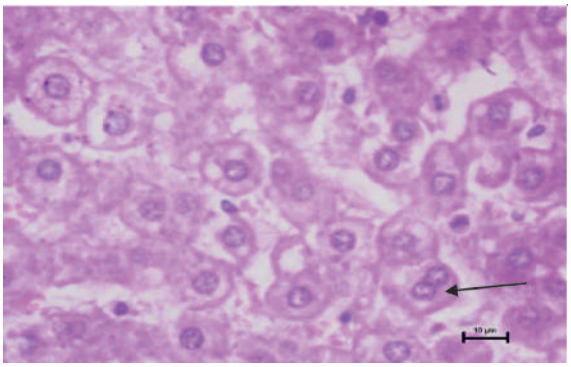




Ultrasonograph of lactating animals Ultrasonograph of non-lactating animals

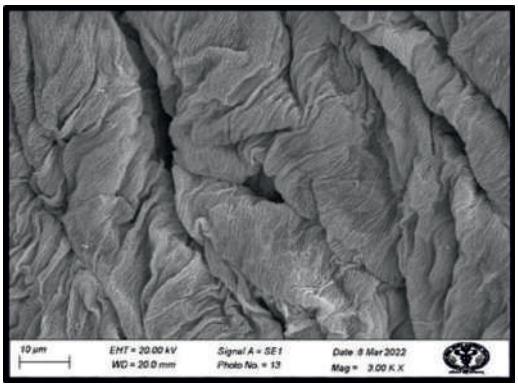
b. Liver of goat

A Histomorphochemical study on male and female goat liver revealed that number of binucleated hepatocytes was significantly ($p<0.05$) more in periportal area and also significantly ($p<0.05$) more in females suggestive of more regenerative power in females. The number of Kupffer cells was significantly ($p<0.05$) more in females which may be suggestive of better immune response in females. The number of Ito cells was significantly ($p<0.05$) more in females which may be suggestive of more accumulation of fat in female and Histoenzymic activity of most of enzymes was more in periportal hepatocytes.

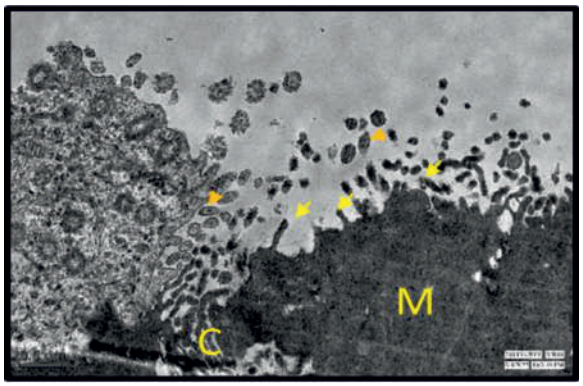


Paraffin section of female liver showing binucleated hepatocytes (arrow). Hematoxylin and eosin X 1000

- **Scanning and Transmission Electron microscopic study:** Gross, Histomorphological, hisochemical, immunohistochemical and ultrastructural studies were conducted on oropharyngeal tonsils of goat. The five tonsils were grossly observed viz., palatine, para-epiglottic, tonsil of soft palate, pharyngeal and tubal tonsils; however lingual tonsil was not observed grossly. Histomorphologically surface epithelium of palatine, para-epiglottic tonsils varied from stratified squamous non keratinized to partly keratinized epithelium, whereas epithelium was pseudostratified columnar ciliated in pharyngeal, tubal and rostral part of soft palate. The caudal part of soft palate was lined by stratified squamous non keratinized epithelium. The primary and secondary lymphoid follicles were observed in all the tonsils except lingual tonsil. The maximum development of lymphoid tissue was observed in palatine and pharyngeal tonsils with deep crypts.



Scanning electron micrograph of para-epiglottic tonsil showing the surface of the para-epiglottic tonsil with mucosal folds/ ridges and crypts X3000

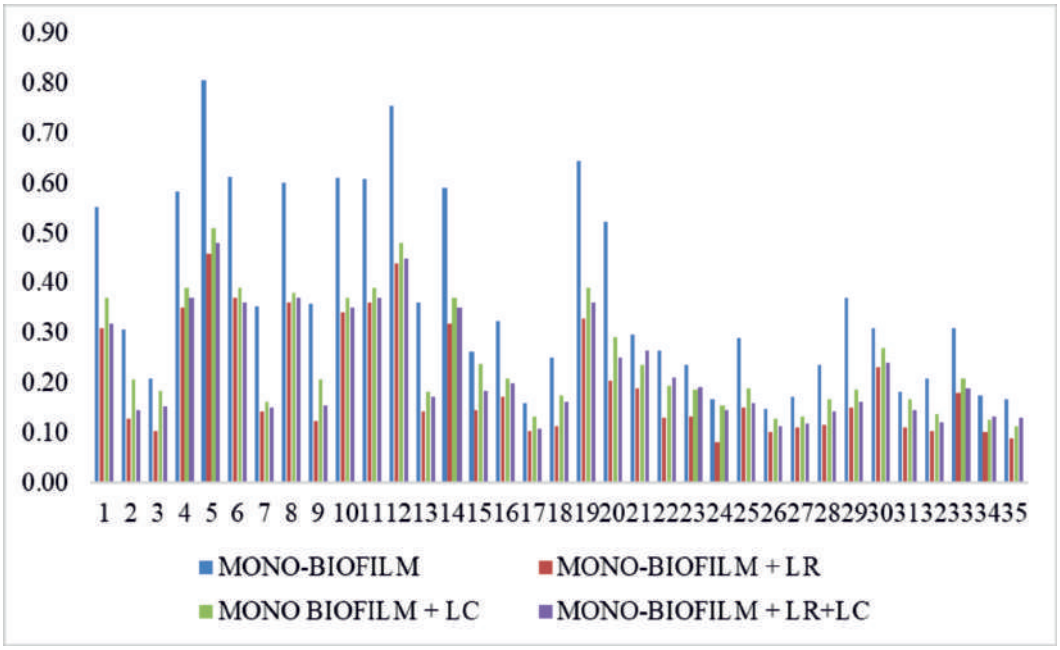


Transmission electron micrograph of pharyngeal tonsil showing two distinct cell types, viz., microvillus cells (M) and ciliated cells (C).

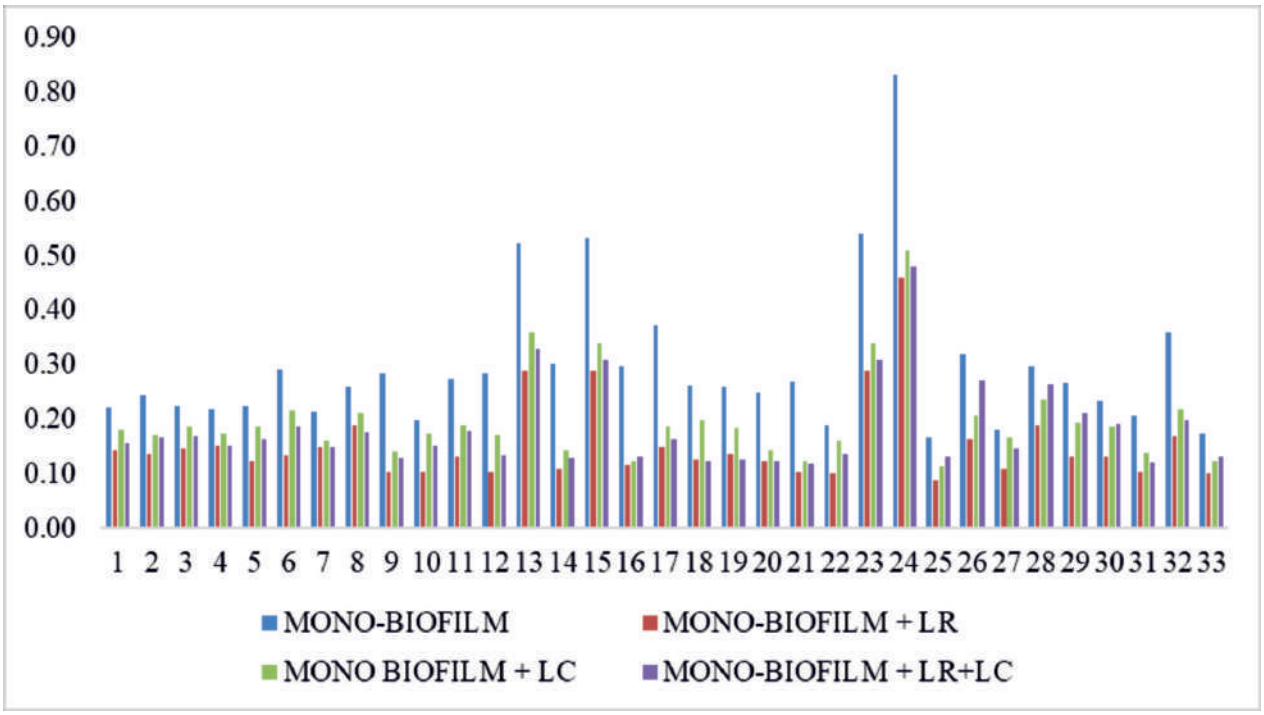
The histoenzymic activity of phosphatases, oxidoreductases and esterases were recorded in all the tonsils. B lymphocytes were the predominant cell type in lymphoid area of majority of tonsils. In ultrastructural studies the surface of majority of tonsils were divided into ridges and troughs with plica like pattern. The surfaces of tonsils of soft palate in rostral half, pharyngeal tonsils and tubal tonsils were lined by ciliated and microvillous cells along with few secretory cells. Gross localization and histomorphochemical features indicated major role of palatine tonsil and pharyngeal tonsils in providing immunological response against antigens

III. Centre for One Health

- **Antimicrobial usage and resistance in the dairy Chain: a situation analysis and solutions by stakeholders from Punjab:** Focus group discussions (FGDs) and key informant interviews (KIIs) were conducted with a strategic sample of four stakeholder groups (114 participants) associated with antibiotic usage in the dairy sector of Punjab. The FGDs were conducted among veterinarians (n = 56), para-veterinarians (n = 28), and KIIs were conducted among chemists (n = 18) and dairy quality managers (n = 12) during 2020–2021. FGDs and qualitative interviews of various stakeholders depict existing risk practices in the fields that may promote antimicrobial resistance. The present study revealed that widely prevalent quackery (treatment practices carried out by unauthorized persons without any recognized diploma/degree) and self-treatment by farmers, over-the-counter availability of antibiotics, low veterinarian per animal ratio, and lack of awareness among the society about the potential public health effects of antimicrobial resistance were the main risk factors for injudicious antibiotic use in the dairy sector.
- **Characterization of chicken eggs associated *Escherichia coli* and *Staphylococcus aureus* for biofilm production and antimicrobial resistance traits:** The biofilm-forming ability of *Escherichia coli* and *Staphylococcus aureus* from milk, meat, and eggs was assessed and correlated with multidrug resistance. LAB strains were used to reduce mono and mixed-species E. coli and S. aureus biofilms. Among the isolates recovered, a significant percentage of E. coli carried the fimA and aggR genes, while S. aureus carried the coa gene. A high proportion of both E. coli and S. aureus isolates exhibited multidrug resistance. Biofilm assays revealed that most isolates were weak biofilm formers but had strong metabolic activity. MDR isolates showed a higher frequency of biofilm-associated genes compared to non-MDR isolates. Mixed-species biofilms showed antagonistic interaction and the predominance of E. coli. LAB strains demonstrated antibacterial and anti-biofilm activity, suggesting their potential use in preventing biofilm growth.



Effect of lactic acid bacteria (LAB) strains on biofilm formation of milk E. coli isolates



Effect of LAB strains on biofilm formation of chicken meat E. coli isolates

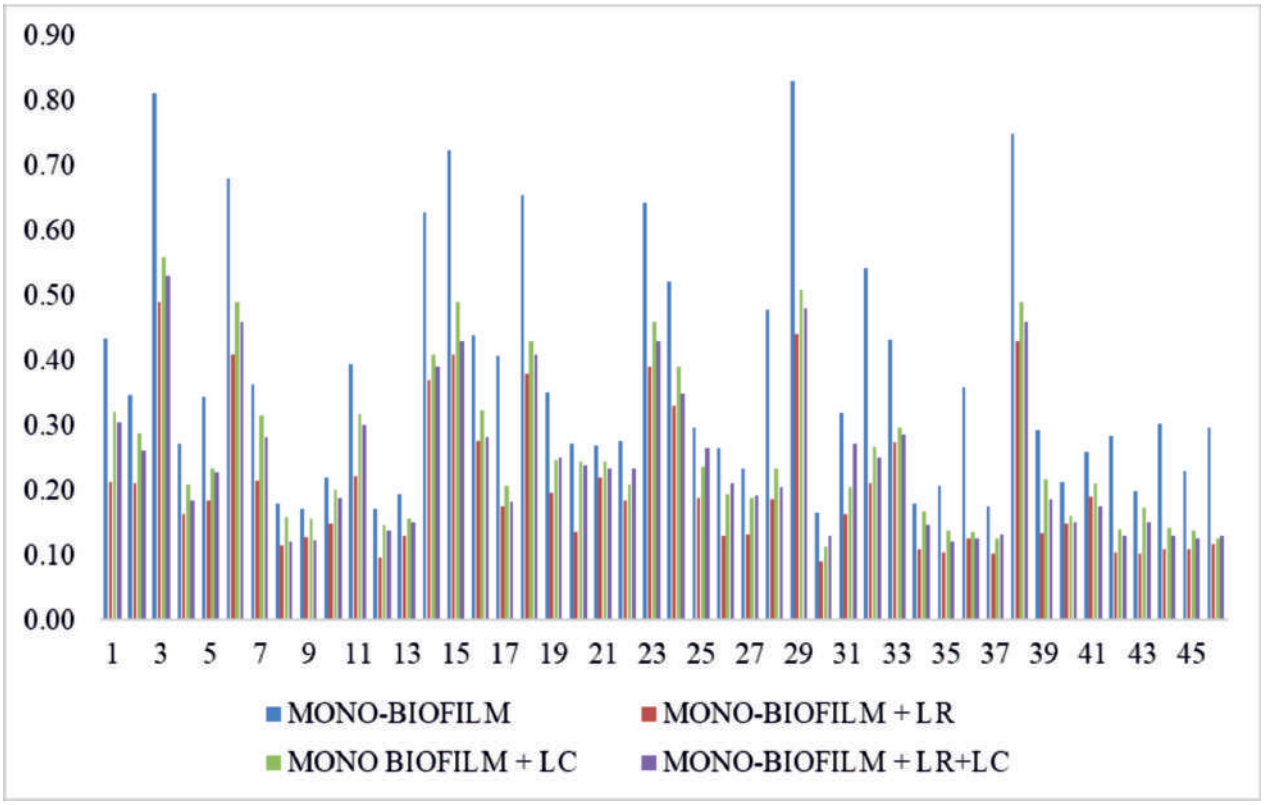
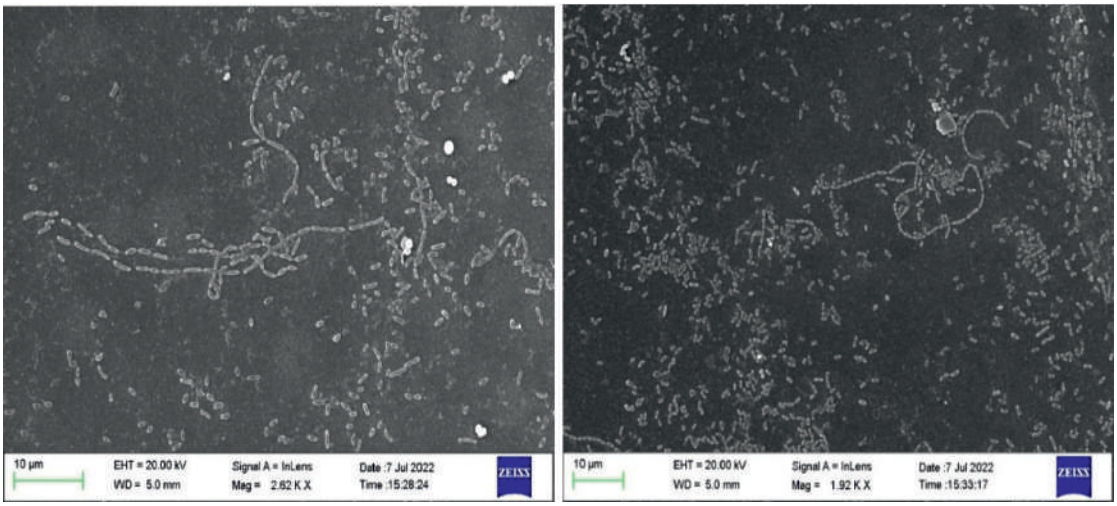


Figure: Effect of LAB strains on biofilm formation of egg E. coli isolates



Scanning electron microscope (SEM) images of mixed species biofilm (E. coli and S. aureus) after co-incubating with LAB strains (L. rhamnosus and L. casei)

- **Molecular Characterization and Genetic Relatedness of Antimicrobial Resistant Organisms from Farmed Poultry Eggs, Environment and Farm Handlers of Punjab:** The poultry production environment is regarded as a reservoir of antibiotic resistant organisms. The eggshells from deep litter system had significantly high total bacterial count 5.4 $\log_{10}$ cfu/mm^2), total *Enterobacteriaceae* count (2.71 $\log_{10}$ cfu/mm^2). The eggs from deep litter system were found to be contaminated more with *K. pneumoniae* (4.58%) and *Enterococcus* spp. (25%) than the eggs from cage system. Around 7.9% of the eggs were contaminated with MRSA and *SCCmec* type V was the predominant type in deep litter (34.4%) and cage farms (33.3%). The isolates with MDR phenotype were also higher in eggs and environment of deep litter system. The ESBL (61.3%), AmpC (44.5%) and ESBL-AmpC (29.9%) *E. coli* were also present. *Enterococcus* isolates resistant to vancomycin were also present in eggs of deep litter system poultry farms. The isolates were found resistant to antibiotics reserved for human use from WHO critically important category. The multi-locus sequence typing of MDR *E. coli* isolates revealed presence of multiple sequence types (STs), while ST10 has been documented to be associated with clinical infections. The study highlighted the need for effective surveillance of the poultry products to address the problem of AMR.
- **Whole Genome Sequence Comparison of *Klebsiella pneumoniae* and *Enterococcus* spp. Isolates from Cattle and Poultry for Antimicrobial Gene Abundance:** Based on the analysis of published information antibiotic usage in animals for growth promotion was documented mainly in the poultry sector. Quinolones, penicillin, sulphonamide, and tetracycline were frequently used antibiotics. There was high resistance and residues of antibiotics in the animal products. Occurrence of ESBL producing *E. coli* was higher prevalence in poultry (63.5%), followed by cattle (46%) and farmworkers (12.5%). Majority of ESBL *E. coli* (86.5%) were multidrug resistant, high in poultry farms. Metagenomic analysis revealed that the ARG abundance and diversity was highest in poultry gut, followed by cattle handler, poultry handler, and cattle in metagenomic analysis. Sharing of resistome was higher in poultry and poultry handlers as compared to cattle and cattle handlers. These results highlight the need for monitoring and documentation of antibiotic usage and resistance in the animal husbandry sector. Animals are reservoirs of microorganisms' resistant to critically important antibiotics, which warrants attention before it leads to a major public health problem.

IV. Directorate of Livestock Farms (DLF)

ALL INDIA COORDINATED RESEARCH PROJECT (AICRP) POULTRY (ICAR-7) AND LAYER POULTRY PROJECT:

- ✓ Centre evaluated the S-15, S-47 and S-7 generations of PB1, PB2 and native (Punjab Brown) germplasm, respectively.
- ✓ The average body weight at 5 weeks of age was 1228g and 1121g in PB-1 and PB-2 lines, respectively. The egg production up to 40 weeks and 52 weeks of age in PB-1 line was 65 and 117 eggs and in PB-2 line 70 and 121 eggs, respectively.
- ✓ The egg production up to 36 and 52 weeks of age in the native birds was 55 and 110 no of eggs, respectively. Whereas, in the PB2×Punjab Brown crosses, 36- and 52-weeks egg production were 57 and 145 eggs, respectively. The average 16-week body weight in the native and cross were 1455g and 1711g, respectively.
- ✓ 87364 no. of improved poultry germplasm supplied to 363 farmers and revenue of Rs. 29, 11,415/- was generated.
- ✓ Among the three genetic groups (Line1 as Desi crossbred1, Line 2 as Desi crossbred 2 and Punjab Red) Line1 depicted higher egg production 40 week and 50 week of age and Line2 showed appreciable weight gain over the growth period in both generations.
- ✓ Negative and desirable trend was obtained in ASM (age at sexual Maturity) over the two generations in all the genetic groups.
- ✓ Differential expression profiling of mRNA repertoire in hatchling and unhatched live embryos revealed 891DEGs (272 upregulated and 619 down regulated). The validation of top 6 differentially expressed genes proves the involvement of genetic mechanism with related genes responsible for hatchability of live embryos.

EMBRYO TRANSFER TECHNOLOGY LABORATORY:

- ✓ *In vitro* embryo production using ovum pick up and *in vitro* fertilization (OPU-IVF) technique successfully established.
- ✓ First time live calves of Sahiwal, Jersey and buffaloes produced using OPU-IVF technique in Punjab:
- ✓ Successfully established pregnancies from *in vitro* produced embryos in buffaloes, HF cross and Jersey following standardization of OPU IVF technique at university farm and at farmer's level.

Elite Sahiwal calves produced by ovum pick up & in vitro embryo production technique

- ✓ ET-IVF Lab at university has been selected as one of the out of six OPU-IVF training centres for imparting training at national level by the Government of India.

- **CATTLE BREEDING:** The average 305-day milk yield and average peak yield of HF crossbred cows were recorded at 4957 kg and 24.25 kg, respectively, whereas the average total lactation yield was 5309 kg. The maximum 305- day milk yield for a cow was 6919 kg. The average age at first calving (AFC) in crossbred cattle herd was 26.24 months. Last year, 15 bull/bull calves and 29177 doses of crossbred cattle semen (frozen and liquid) semen were supplied to the Gaushalas, farmers and other dairy development agencies of the state during last year for breeding purposes

- **CATTLE- FIELD PROGENY TESTING:**

- ✓ Under AICRP on a field progeny testing, a total of 168606 AI has been done using 362 test bulls with an average conception of 45% since the inception of the project (1994).
- ✓ A total of 138 villages have been covered by 33 artificial insemination centers in Ludhiana district of Punjab in the project. During the year (2022-23) a total of 6289 AI has been done using 24 test bulls, and conception rate was 51.9%.
- ✓ Under the project 2234 no's of successful calving was recorded out of which 1094 female progenies were registered in the database for future performance recording.
- ✓ The average first lactation 305 days milk yields of the crossbred progenies in the adopted villages increased from about 3000 Kg in the year 2006 to 3899 kg in 2022-23 by supplying high-quality semen of test bulls (about 27% improvement).
- ✓ The project has helped to improve tremendously lowering the age at first calving of the crossbred animal in the area.
- ✓ The Field Progeny Testing Project has a major contribution in changing the scenario of dairy farming in the adopted villages in Ludhiana district by providing technical knowhow, germplasm and motivation to farmers.
- ✓ An increasing trend in milk yield and decreasing trend of age at first calving (AFC)from set 5 to set 14 was observed. In set 5 first lactation milk yield (FLMY) was 3424.7 kg with the lowest AFC of 1074.14 days while in set 17 FLMY was 4072 kg and the lowest AFC was 896 days under field condition. Over the period there has been improvement in the production performance of the (HF X Sahiwal) crossbred cattle under field condition.
- ✓ Five Principal Components (PCs) have been extracted to explain maximum variability among the traits (73%). PC1contributed 34% variability with Body length (BL), Heart girth (HG), Body depth (BD), Shoulder width (SW) and Body weight at 1st calving (WC) traits.

- **NILI RAVI BUFFALO BREEDING:** Nili Ravi breed of buffalo is evolved in Punjab state and considered as one of the major milch breed of buffalo. Under the ongoing conservation plan adopted by the Ministry of Animal Husbandry and dairying, Government of India, a Network Project on Nili Ravi buffalo has been allotted to the university in 2017 by the Indian Council of Agricultural Research. The institute is continuously working on to improve the performance of herd, to produce quality germplasm and dissemination of quality germplasm to the farmers of Punjab. The average 305-day milk yield, total milk yield and peak yield of the herd were recorded as 2135 kg, 2198 kg, and 17.30 kg, respectively. The highest 305 day milk production was recorded as 3612 kg in the herd. The dissemination of superior germplasm is one of the foremost priorities of the project. Last

year,10Nili-Ravi bull/bull calves and 10931 semen doses of Nili Ravi were supplied to the dairy farmers.

- **MURRAH BUFFALO BREEDING:** The genetic improvement of buffaloes is being done through progeny testing of bulls. The AICRP/Network Project on buffalo breeding is in operation at the dairy farm, since 1971. The best buffalo bulls are selected based on the performance of daughters produced at GADVASU Ludhiana; NDRI Karnal; CIRB Hisar; LUVAS Hisar and IVRI Izatnagar and in the villages around Hisar, Ludhiana, and Karnal. The average 305 day, complete lactation milk yield and average peak yield of the university herd were recorded as 2564.15 kg, 2642.84 kg and 14.78 kg, respectively. The highest peak yield record set by an elite buffalo is 28.7 kg in a day. The average age at first calving of the herd is 39.28 months. Seven bulls have been selected from this centre for 21st set to be progeny tested. The project has supplied 1021 bulls/male calves and 10.67 lac doses of high genetic merit semen to farmers and other dairy development agencies to date. Semen doses of 25 progeny tested and 27 under various stages of progeny testing Murrah buffalo bulls are available for supply to farmers and Dairy Development agencies. Last year, 28 Murrah bull/bull calves and 50965 frozen semen doses were supplied to the farmers for breeding purposes.
- **DAIRY FARM:**
- The Gross income of Directorate of Livestock Farm was Rs. 32130892,Rs. 35047697 and 3,29,07152during year 2020-21, 2021-22 and 2022-23, respectively. The income from milk was Rs 19591762.00 during year 2021-22 which was increased to approx. to Rs.2.62 cr (Rs 1,72,48233 from sale of milk + Rs.90,000,00/- from sale of dairy products from CoDST) during year 2022-23. This increase in come was in spite of the fact that milk used for making milk products was given free of cost to College of dairy Science and Technology
- The annual milk production was 502868, 635487 and 638075 kg during year 2020-21, 2021-22 and 2022-23,respectively.
- The wet average of cattle herd was 12.79,16.42 and 17.56 kg/d during year 2020-21, 2021-22 and 2022-23,respectively.
- The wet average ofMurrah buffaloes was 8.22 8.42and 8.45 kg/d during year 2020-21, 2021-22 and 2022-23,respectively.
- The wet average of Nili-Ravi buffaloes was 7.73, 8.21 and 8.28 kg/d during year 2020-21, 2021-22 and 2022-23, respectively.
- Fodder harvesting has been mechanized to large extent by using harvester cum chopper and 90 HP Tractor

Harvestor –cum-Chaff cutter

- ✓ Rs 22 lacs apx saved by collection of 6500 qnts paddy straw from farmer fields
- ✓ First time attempt has been made to prepare Lucerne hay to augment calf growth
- ✓ Approx 10000 qtl of silage was prepared by growing &purchasing grain maize crop
- ✓ Area of drip irrigation has been increased from 1.75 acre (2021-22) to 5.75 acre in 2022-23.

Paddy Straw Bailing

Lucerene hay

- **GOAT FARM:**

✓ To improve the variability, the existing nucleus stock of Beetal goats at University Goat Farm is strengthened.

✓ The opening Beetal goat stock of the GADVASU farm was 165, to which 111 animals were added by births and one animal was purchased. Out of these, 90 goats as Beetal germplasm were given to the farmers. Mortality of 19 animals was recorded. The closing stock of the farm is 168.

✓ Due to these, the performance of breeding efficiency on the basis of doesbred was improved to 92% from 78%. The percent multiple and single births were 81 and 19 in 2022-23, against 64 and 36 in 2021-22, respectively. The fecundity rate was also improved to 1.9 (2022-23) over 1.8 (2021-22). The overall fecundity of Beetal farm is 1.8. The female to male ratio of the born kids in 2022-23 was 0.9.

✓ The mean adult body weight was also improved from 48 to 49 and 70 to 71 kg in females and males, respectively during the last two years. The live body weight (kg) in females and males at birth, 3, 6 and 12 months of age was reported as 3.6, 12.4, 20.3, 37.7 and 3.8, 12.9, 21.1 and 45.1, respectively. The overall ADG (g/day) during 12 months of age was 94.7.

✓ A total of 6352.4 kg of goat milk was also supplied to College of Dairy Science and Technology. The mean total milk yield of 138 kg (Average Daily Milk Yield of 1.781 kg) was recorded in 90 days of lactation in Beetal goats during 2022-23 in comparison of 132 kg (Average Daily Milk Yield of 1.519kg) in 2021-22.

Beetal Goat

Avishaan Sheep

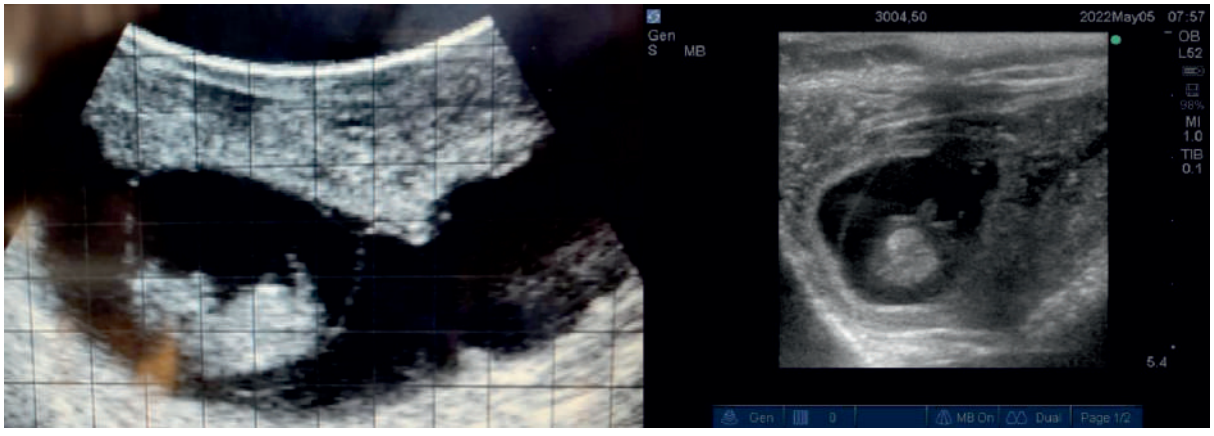
✓ The sheep farm is also strengthened by procuring 11 Avishaan sheep from Central Sheep and Wool Reseach Institute, Avikanagar.

V. Veterinary Gynaecology & Obstetrics

- **Fertility assessment following progesterone based modified G6G and heatsynch protocols in postpartum buffaloes:** Study was conducted to evaluate the inclusion of G6G presynchronization and P4 implant on fertility response to the Heatsynch protocols in postpartum buffaloes. Ovarian response following Modified G6G and heatsynch protocols, ovulation and pregnancy rate were evaluated. Healthy Lactating buffaloes (n=30; >45 days in milk) were randomly divided into 2 groups (Group I: Modified G6G-Heasynch, n=15; Group II: Modified Heatsynch, n=15). In the group I, the buffaloes was administered PGFα (Cloprostenol sodium, 500 mcg. IM) injection on day 8 followed by GnRH (Buserelin acetate, 10 mcg. IM) injection 48 hours later i.e., on day 6. On day 0, first GnRH injection was given and progesterone source (CIDR, 1.38 g, manufactured by Zoetis) was placed vaginally. $PGF_{2\alpha}$ and Estradiol (Estradiol benzoate, 1 mg. IM) injections were administered on day 7 and 8, respectively. CIDR was removed on day 7 and FTAI was performed on day 10. In the Group II (Modified Heatsynch), no treatment was given on day -8 and -6, however rest of the treatment from day 0 onwards was similar as explained in the group I. The results showed that diameter of dominant follicle was significantly ($P<0.05$) larger in the group I than group II on day -6 (9.48±0.37 vs. 7.80±0.44 mm), day 0 (8.85±0.30 vs. 6.87±0.56 mm), day 7 (9.81±0.32 vs. 8.46±0.57 mm), day 8 (11.00±0.34 vs. 9.62±0.60 mm) and day 10 (13.21±0.38 vs. 11.10±0.46 mm). Dominant follicle diameter was also significantly ($P<0.05$) greater in pregnant than non-pregnant buffaloes on the day of FTAI in the group I. Estradiol concentrations were higher ($P<0.05$) in the group I than the group II on the day of FTAI (40.28±0.90 vs. 37.28-0.82 pg/ml, respectively). The progesterone concentrations differed significantly ($P<0.05$) on day -6 and 7 in the group I vs. group II (0.73±0.13 vs. 1.94±0.23 and 4.86±0.22 vs. 3.36±0.31 ng/ml, respectively). On the day of FTAI, progesterone concentrations were significantly ($P<0.05$) higher in non-pregnant than pregnant buffaloes in both groups. The overall conception rate was 60 and 40 percent in Modified G6G Heatsynch and Modified Heatsynch groups, respectively. It was concluded that modified G6G-Heatsynch protocol significantly increased the size of corpus luteum and dominant follicle on day 7 and ovulatory follicle on day 10 as compared to Modified Heatsynch protocol in buffaloes. Ovulation and pregnancy rates were higher in Modified G6G-Heatsynch group as compared to Modified Heatsynch (93.3% vs. 73.3% & 60% vs. 40%, respectively).
- **Effect of rumen-protected Methionine feeding on the growth of ovarian structures, blood and biochemical profile and Double synch protocol on postpartum buffaloes:** Maximum concentration of Progesterone in Group 1 was 3.85 ± 0.44 ng ml^{-1} on day 21 prepartum and the lowest was 0.32 ± 0.06 ng ml^{-1} on day 57 post-partum. Buffaloes in Group 2 revealed the highest progesterone concentration 2.03 ± 0.12 ng ml^{-1} on day 21 prepartum and the lowest on the day of parturition 0.41 ± 0.05 ng ml^{-1}. In control group, highest progesterone concentration was 1.82±0.11 ng ml^{-1} on day 21 prepartum and the lowest 0.35±0.08 ng ml^{-1} on day 45 postpartum. Estradiol levels were highest 243.16 ± 4.67 pg ml^{-1} on day of calving and lowest 16.00 ± 1.09 pg ml^{-1} on day 45 postpartum. In Group 2 highest was 228 ± 5.06 pg ml^{-1} on the day of parturition and lowest 13.16 ± 0.60 pg ml^{-1} on day 45 postpartum. IGF-1 was highest 131.33± 6.30 ng ml^{-1} on 54-day post-partum and lowest 77.33 ± 2.95 ng ml^{-1} on the day of parturition in Group 2 fed 10g RPM. In control group IGF-1 was highest 124.50 ± 5.57 ng ml^{-1} on 7-day prepartum and lowest 62.66 ± 2.20 ng ml^{-1} on the day of parturition. Dominant follicle size ranged from 7.5 ± 0.38 mm to 13.22 ± 0.57 mm. In group 1 Dominant follicle size varied over the period of ultrasonography examination from day 20 to day

57 postpartum and ranged from 13.22 ± 0.57 mm on day 57 (on the day of AI) to 8.5 ± 0.58 mm on day 20 postpartum. In group 2 dominant follicle size varied from 12.50 ± 0.34 mm on day 57 of calving to 8.1 ± 0.58 mm on day 41 postpartum. In group 3, dominant follicle size varied from 12.3 ± 1.02 mm on day 45 to 7.5 ± 0.38 mm on day 54 postpartum. Corpus luteum size ranged from 3.40 ± 0.72 mm to 14.10 ± 0.54 mm across the days of observation. In Group 1 CL size over the period of ultrasonography examination from day 20 to day 57 postpartum varied from 3.8 ± 0.36 mm on day 57 postpartum to 12.6 ± 0.39 mm on day 37 postpartum. In group 2, CL size ranged from 3.6 ± 0.35 mm on day 57 of calving to 13.53 ± 0.34 mm on day 37 of calving. In control group 3, CL size ranged from 3.40 ± 0.72 mm on day 27 of calving to 14.10 ± 0.54 mm on day 37 of calving. Conception rate was 83.33 percent, 50 per cent and 33.33 per cent in group 1, group 2 and group 3, respectively.

- **Evaluation of cryosurvival of beetal buck sperm by modulating freezing rate in critical temperature range:** Processing and freezing of buck semen were standardized. Ejaculates (144) from Beetal bucks (1–3 years old) were used to assess the freezability of buck sperm in experiment 1 at various concentrations of glycerol (6%, 7%, 7.5%, 8%, 8.5%, and 9%) using Tris buffer having 20% (v/v) egg yolk. 15 ejaculates from 3 bucks were taken for experiment 2 for optimizing Bio-freezing protocol in 4 to -15°C temperature range (phase I) and remaining were used in -15 to -60°C temperature range (phase II). The semen collection was done using artificial vagina. After optimization, the harvesting of seminal plasma was done at 4000 RPM for 3 minutes, which gave best results in ejaculates having sperm concentration within a range of 2500-3500 million/ml. Vapor freezing of straws was done in experiment 1 and biofreezing was done in experiment 2. Buck semen was frozen both with, and without seminal plasma. Each protocol had 40°C /min cooling rate from -15 to -60°C temperature range and 50°C/min cooling rate in -60 to -140°C temperature range. Traditional vapor freezing was also done. Phase II was having six protocols viz. P21, P22, P23, P24, P25, and P26 having cooling rates of -10°C/min, -20°C/min, -30°C/min, -40°C/min, -50°C/min and -60°C/ min cooling rate, respectively in temperature range -15°C to – 60°C. Each protocol had 30°C /min cooling rate in 4°C to -15°C temperature range and 50°C/min cooling rate in -60 to -140°C temperature range respectively. Post-thaw sperm motion traits were measured using CASA (Androvision, Minitube, Germany). The CASA based post-thaw total motility of 50.43 ± 1.81 seen at 8% glycerol was highest among all the glycerol concentrations. So, Tris egg yolk extender with 8% glycerol was considered as the best for the cryopreservation of Beetal buck semen. It was found that changing the cooling rates between -15 to -60°C affected the post thaw total motility. So, -30°C/min (4 to -15°C), -60°C/min (-15 to -60°C), and -50°C/min (-60 to -140°C) cooling rate was selected as the best protocol.



- **Factors associated with lameness in relation to libido, semen quality and freezability in crossbred bulls:** Lameness is caused by a variety of medical disorders, diagnosing the main cause and key risk factors require a systematic approach. Losses have also been established for animals with elevated locomotion score. Crossbred bulls (H.F x Sahiwal) predominate in the production of sperm. Because of their size and weight, they are more susceptible to lameness. Ten crossbred bulls (age 1.5 to 10 years) were selected for present study. Four out of 10 bulls were affected with one or more than one limbs. Ultrasonography of distal part of limb (phalanges) of bulls was carried out using B-mode ultrasound scanner. Tissue samples from hooves were collected and paraffin sectioning was done. Bulls were mostly affected with dew claws avulsion, interdigital phlegmon, interdigital fibroma. Age of the animal was having significant positive correlation with lameness score (r=0.815, P=0.014). Average diameter of dorsal pouch of limbs in normal bulls was around 1.45 ± 0.03cm. However, in affected bulls, there was increase in diameter of dorsal pouch 1.73 ± 0.08cm. Average temperature range of coronary band in normal bulls was around 33.98 ± 0.44˚C and in affected bulls there was rise in temperature 36.62 ± 0.11˚C. In normal bulls with no hoof lesion, squamous cells with polyhedral cell margins were found distinct in normal hooves, whereas necrotic changes were observed in lame hooves. In lame bulls, the diameter of dorsal pouch, temperature of coronary band was higher. Necrotic changes were observed in histopathological samples collected from lame hooves. No effects of cooling rate on post thaw semen quality was observed in crossbred bulls

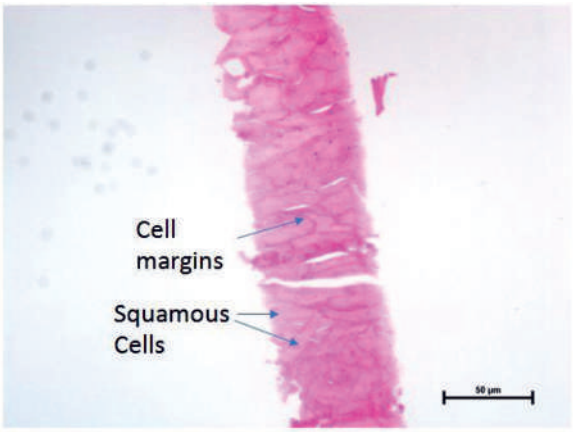


Fig. : Control group

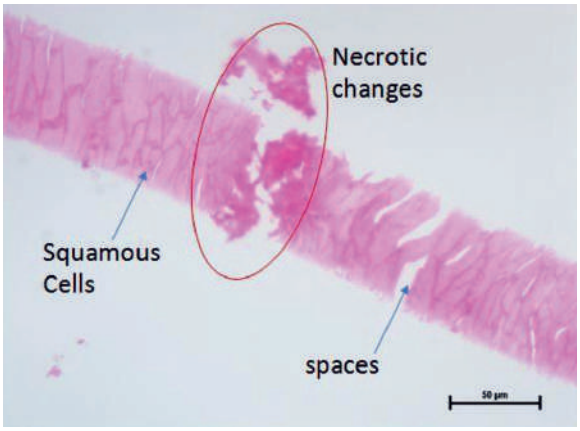
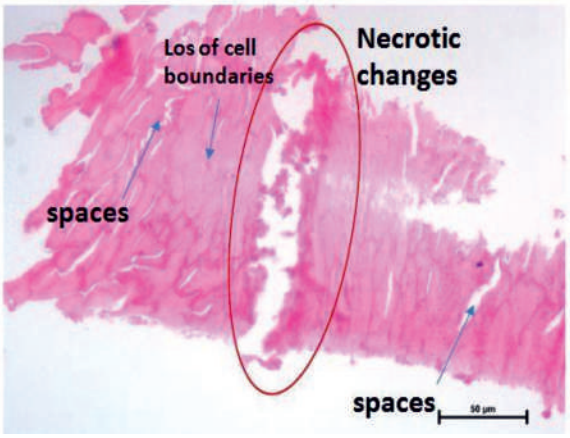
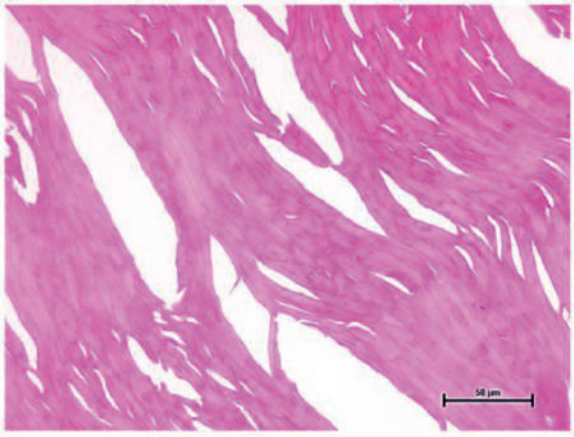


Fig. : Laminitis (early group)





- **Effect of cysteamine, IGF-1 and EGF on *in vitro* developmental competence of sahiwal oocytes:** A comprehensive study was carried out to investigate the effect of antioxidants: cysteamine and

melatonin; growth factors: IGF-1 and EGF; and sex of semen on developmental competence of ovum pick up (OPU) derived Sahiwal oocytes. In experiment 1, effect of cysteamine 50 µM and melatonin 10^{-9} mol L^{-1} on mitochondrial membrane potential (ΔΨM), nuclear maturation and developmental competence was evaluated. In experiment 2, effect of IGF-1 50 ng ml^{-1} and EGF 10 ng ml^{-1} in maturation media were evaluated. In experiment 3, effect of conventional semen IVF versus sexed semen IVF on in vitro developmental competence of OPU derived Sahiwal oocyte was done. COCs were divided in to 4 maturation groups IGF-1, EGF, IGF-1 plus EGF and control to assess oocyte developmental competence and embryo morphology. In vitro matured oocytes were subjected to IVF by conventional semen and sex-sorted semen. JC-1 stain revealed that red to green ratio of fluorescence intensity was higher ($p < 0.05$) in melatonin (1.19±0.04) and cysteamine (1.09±0.04) as compared to control (0.81±0.10) and pre-maturation (0.71±0.03) groups. Melatonin improved ($p < 0.05$) M-II (6.5±0.65, 68.13 per cent) stage oocytes as compared to cysteamine (5.25±0.25, 55.63 per cent) and no supplementation (4.75±0.25, 50.63 per cent). Fertilization, cleavage and blastocyst rate was higher ($p < 0.05$) in melatonin (92.31, 59.17 and 20.56 per cent) as compared to cysteamine (82.96, 41.48 and 11.39 per cent) and control (75.28, 27.59 and 5.19 per cent) groups, respectively. IVM media supplemented with IGF-1, EGF, IGF-1 plus EGF and control groups the cleavage and blastocyst rate were 60, 51.25, 63.75, 45 per cent and 28.75, 23.75, 35, 21.25 per cent, respectively. Code-1 embryos in IGF-1, EGF, IGF-1 plus EGF and control groups were 50.00±8.91, 54.17±12.10, 52.08±9.01 and 41.67±11.36 per cent, respectively. Higher ($p < 0.05$) cleavage rate (74.96 versus 44.4 per cent) and blastocyst rate (49.39 versus 26.4 per cent) in conventional IVF to sexed IVF were observed. In conclusion supplementation of melatonin improved ($p < 0.05$) production of MII stage oocytes, cleavage and blastocyst rate. Melatonin improved both cytoplasmic and nuclear maturation and the developmental competence of Sahiwal oocytes. Cysteamine resulted in improvement of cytoplasmic maturation alone. Growth factors in combination (IGF-1 and EGF) revealed better developmental competence. EGF improved the oocyte maturation and cleavage rate, whereas, IGF-1 improved oocyte maturation, fertilization, cleavage and blastocyst rate. Conventional semen IVF was better than sex-sorted semen IVF.

- **Developmental competence of oocytes vis-à-vis culture media, antioxidant supplementation and semen preparation in Sahiwal cattle:** In experiment 1, culturable COCs were matured in CO_2 based media, non-CO_2 based media and their combination and developmental competence was assessed as M-II stage oocytes and cleavage and blastocyst rate. In experiment 2, the effect of antioxidants was studied as supplementation of maturation media with melatonin (0.01µg), vitamin E (100 µg), and their combination on blastocyst production and total blastomere number. In Experiment 3, the effects of semen preparation methods and concentration was studied on blastocyst rate of Sahiwal oocytes. These three protocols have achieved similar M-II oocytes, cleavage rate HEPES (40.98%), TCM (45.45%) and HEPES+TCM (57.35%) blastocyst rate HEPES (25.00), TCM (33.33%) and HEPES+TCM (37%) similar and varied non-significantly($p>0.05$). In experiment 2, the cleavage rates and blastocyst rates between groups varied non significantly ($P >0.05$), but higher in supplemented groups having Melatonin (54.13±10.57) as compared to control (43.30±4.39). The proportions of blastocysts were higher in melatonin 29.11±9.76 vs. 21.16±3.59 in control ($P >0.05$). In experiment 3, percoll 1 and 3 million spermatozoa for IVF achieved 65.6% and 70.6% cleavage rate, and, 26.40% and 37.59 % blastocyst rate, respectively, and were higher as compared to other groups. In conclusion, both CO2 based and non-CO2 based media led to equivalent oocyte maturation and melatonin supplementation resulted in higher developmental competence of oocytes as well as blastomere number, however sperm preparation method and concentration did not affect developmental competence.

- **Comparative efficacy of post insemination administration of human chorionic gonadotropin and progesterone on conception rate in sub-fertile buffaloes:** This study was planned with the hypothesis that administration of hCG or Progsterone (P4) on day 4 and 11 post insemination will improve the corpus luteum size and function followed by improved pregnancy rates in sub-fertile buffaloes. A total of 30 sub-fertile buffaloes after ruling out subclinical endometritis and artificial insemination (AI) were equally subdivided in three groups based on treatments given viz., control (normal saline), hCG (1500 IU hCG on day 4 and 11 post-AI) and progesterone (500 mg hydroxy progesterone caproate on day 4 and 11 post-AI). B-mode and color doppler ultrasonography was performed on day of AI, days 4, 11, 21 and 50 post-AI) to assess the ovarian structures as well as luteal color doppler profile. Pregnancy diagnosis of all the inseminated buffaloes was done at day 50-60 post-AI using transrectal ultrasonography. Results showed that post-AI P4 and hCG treatments yielded better conception ($p<0.05$) than control group (70% and 50% versus 10%). It was also observed that size of pre-ovulatory follicle on day of AI had positive correlation with CL area ($p<0.05$) and CL blood supply ($p>0.05$) but, no correlation was obtained with P4 concentration on day 11 and 21 post-AI. Also, CL area had positive significant correlation ($p<0.05$) with blood supply but not with progesterone concentration. Therefore, it can be concluded that administration of progesterone on day 4 and 11 could lead to better pregnancy rate in sub-fertile buffaloes by alleviating luteal insufficiency.

VI. Livestock Production and Management

- **Comparative analysis of whole milk and milk replacer feeding on growth, performance and health status of Murrah buffalo calves:**

✓ A significantly ($P< 0.01$) higher overall body weight was found in whole milk fed calves followed by CMR and FMR group of calves with no significant difference between them.

✓ The overall stature (height and length) was significantly ($P< 0.01$) higher in whole milk fed group followed by CMR and FMR group of calves.

✓ Significantly ($P< 0.05$) higher dry matter intake and apparent digestibility (DM, CP & EE) was found for WM group followed by CMR and FMR group.

✓ No significant effect was found on health and blood metabolites of calves fed with WM, CMR & FMR.

- **Evaluation of airborne pollutants and microbial concentration in conventional and modern livestock sheds:**

✓ The concentration of CO2, CH4 and NH3 were within the recommended limits in the livestock sheds.

✓ The concentration of PM10 and PM2.5 were higher than recommended limits which of concerns especially during winter months. The climatic variables played significant role in higher concentration within livestock sheds.

✓ In our study, microbial population also within recommended range suggested by various studies and countries organization.

✓ The predominant microbial count was mesophilic followed by staphylococci, fungal and Enterobacteriaceae.

✓ Thermographic variations showed that RCC and MPS modified with Aluminium bubble sheets had lowest internal surface temperatures in the hottest hours of the day. Rubber mats recorded highest

flooring surface temperature compared to others flooring materials.

- **Comparative study of alternative composting methods for redressal of poultry waste:**

✓ Vermin compost as well as *Saccromyces cerevasie* assisted compost when integrated with aerobic composting, produced improved quality compost in terms of more nitrogen, potassium, phosphorus and calcium with a loose and fine structure and earthy aroma.

✓ The paddy straw, as an agriculture by- product, merely a waste, was able to play a crucial role in physical and chemical characteristics of final compost obtained under all the treatment groups.

✓ Germination index was obtained above 70% in all the treatments, indicating effective disappearance of phytotoxicity thus in turn safe and mature compost.

✓ Economic analysis of the composting integrated either with vermin assisted (T2) or *S. cerevasie* (T3) revealed better economic return through shortening of the composting period.

✓ Composting poultry waste with paddy straw as a carbonaceous material may prove to be an efficient method for deteriorating and turning waste paddy straw into useful fertilizer, which accomplishes two goals at once.

✓ Small to medium sized poultry farms might benefit from composting in rotational compost bins that are mechanized to make the process easier. Furthermore, farms that use these hygienic, eco-friendly approaches may potentially be able to eliminate the fly problem.

- **Effect of different managemental practices for the enrichment of welfare and productive performance in weaned pigs:** The Provision of creep ration supplemented with additional protein and energy during the pre-weaning and split weaning reveals a better growth performance. Provision of enrichment as a flooring material improved the welfare of animals, and there is increased activity, and in growth performance. Decreasing the floor allowance per pig by 0.27 m^2/pig (10%) does not greatly affect the growth performance compared to the conventional floor allowance of 0.3 m^2/pig. However more negative social behaviour were observed in higher stocking density.

VII. Livestock Product Technology

- The formulation and processing protocol for the development of extruded meat puffs was standardized by the optimizing the levels of chicken meat powder and barrel speed of the twin screw extruder.
- Three different levels of chicken meat powder i.e. 10, 20 and 30%, and barrel speed (25 Hz, 30 Hz and 35 Hz) of twin screw extruder was standardized.
- On the basis of physicochemical parameters, proximate composition, instrumental colour profile, texture profile analysis and sensory evaluation, barrel frequency of 30 Hz and 10% level of meat powder incorporation was selected.
- Extruded chicken meat puffs was fortified with different levels of hen egg shell powder i.e., 1.0%, 2.0% and 3.0%. Among these 1.0% level was adjudged best for the development of calcium enriched chicken meat puffs.
- Developed product with with 10% chicken meat powder and 1% hen egg shell powder can be successfully stored up to 100 days under aerobic packaging and MAP conditions without any marked loss in physico-chemical quality, microbiological quality and acceptable sensory attributes within permissible limits.
- The cost of 1 Kg chicken meat puffs was app. Rs 168/Kg and the cost of calcium enriched product was app. Rs 175/Kg.

VIII. Veterinary Medicine

- Issued advisory to equine farmers for ongoing equine herpes virus myeloencephalopathy (EHM) disease in the state resulting in suspension of animals, horse fares and thus control of outbreaks in horses.
- Established the cause of haemoglobinurea related to barseem feeding in cattle and buffaloes in the state, and thus preventive measures to the farmers could be suggested.
- Topical polyherbal preparation of aloevera gel, turmeric, sesame oil and lime is effective in control of subclinical mastitis in crossbred cattle.
- Hepatobiliary diseases are one of the important differential in diagnosis of forestomach disorders in dairy animals.

IX. Veterinary Microbiology

- The prevalence of canine parvovirus-2 (CPV-2) was 54.89% and male dogs (56%) were found to be affected more commonly than female dogs (44%). Pups under 3 months of age (58.22%) were found to be most vulnerable to CPV-2 infection but few cases were evident even in older dogs. The majority of the positive cases of CPV-2 infection were the unvaccinated dogs (60.89%) supporting the role of vaccination in the control of this disease. Around 4% of the positive samples were CPV-2c and interestingly all of them were found in vaccinated dogs above 6 months of age. The antigenic relationship between the various CPV-2 variants and CPV-2c when compared to heterologous combinations, the homologous combinations or sets were found to have a considerably greater titer. The highest dilution at which CPV-2c serum could neutralize CPV-2, CPV-2a, CPV-2b, and CPV-2c was 1:4096, 1: 8192, 1:8192, and 1:32768, respectively. Around 32% of the vaccinated animals getting affected by the virus is a considerable data raising questions on the potential and efficacy of the current immunization strategies. As a result, sustained surveillance for CPV-2 prevalence and the development of effective vaccinations are essential in the future.
- A novel Tetra amplification refractory mutation system polymerase chain reaction (Tetra ARMS PCR) is able to detect the single nucleotide polymorphism (SNP) and hence can differentiate the variants. In the present study, conventional PCR was used to detect CPV2 positive samples and also a novel Tetra ARMS PCR was developed for rapid and easy typing of the antigenic variants of CPV. A total of 100 samples were collected from dogs showing signs of parvoviral enteritis and screened using conventional PCR while 138 samples were screened using the designed primers for Tetra ARMS PCR. Conventional PCR detected 69 positive samples out of total 100 samples (69%) whereas Tetra ARMS PCR detected 120 positive samples out of total 138 suspected samples (86.95%). The Tetra ARMS PCR successfully typed the 120 positive samples into CPV 2a (20.81%), CPV 2b (31.66%), both CPV 2a & 2b (22.5%), and other than 2a or 2b (25%).
- A study was conducted to isolate and identify *Escherichia coli* from healthy and diseased poultry birds, in order to compare their antimicrobial resistance pattern as well as the antimicrobial resistance genes. A total of 120 samples consisting of faecal samples from 50 healthy birds and; faecal and tissue samples from 70 diseased birds were collected from five farms in and around Ludhiana, Punjab. The prevalence of E. coli was 40 (80%) in healthy birds and 46 (65.71%) in diseased birds. Isolated E. coli were tested against 20 antibiotics to study their resistance and sensitivity pattern. All (100%) of the E. coli isolates were resistant to fusidic acid, methicillin, and penicillin in healthy as well as diseased birds. Highest sensitivity was observed towards ceftriaxone (98%, 95%) ampicillin/sulbactum (62.5%, 75.08%), and amoxicillin (60%, 73.91%) in healthy and diseased

birds respectively. Statistically, no significant difference was observed between healthy and diseased birds in regard to antibiotic resistance pattern.

- Prevalence, antibiotic resistance pattern and resistance genes in Coagulase negative Staphylococci (CoNS) associated with pigs and their environment was studied. A total of 287 samples consisting of nasal and skin swabs were collected from apparently healthy and diseased pigs and their environment. A total of 108 CoNS were isolated which comprises 23(21.29%), 79(73.14%) and 6 (5.55%) CoNS isolates from healthy, diseased animals and farm environment, respectively. Out of the total CoNS isolates, eleven different strains of CoNS were identified which were S. epidermidis (n=10 i.e., 9.25%), S. hominis (n=33 i.e., 30.55%), S. xylosus (n=4 i.e., 3.70%), S. sciuri (n= 22 i.e., 20.37%), S. chromogenes (n=18 i.e., 16,66%), S. equorum (n=1 i.e., 0.92%), S. hemolyticus (n=7 i.e., 6.48%) and S. simulans (n=9 i.e., 8.33%), S. hyicus (n=2 i.e., 1.85%), S. warneri (n= 1 i.e., .92%), S. pasteuri (n=1 i.e. 0.92%). The overall isolates showed highest resistance towards cefoxitin (78.7%), penicillin (73.14%), and tetracycline (55.55%). In case of healthy and diseased pigs, highest resistance was observed towards cefoxitin i.e., 73.91% and 82.27%, respectively. While in environmental isolates the highest resistance was shown towards penicillin (83.3%). Statistical analysis using Student T test revealed no significant difference between healthy and diseased animals for antibiotic resistance pattern. While in ANOVA test significant difference between resistance pattern of CoNS isolates from the environment and pigs was observed.
- Detection of *Mycobacterium avium* complex in lymphadenitis cases in dogs was studied in a total of 91 suspected cases of dogs. Lymph node aspirate (LNA) samples, lymph node (LN) tissues and blood samples revealed pyogranulomatous inflammation of the lymph node tissue. Impression smear from lymph node tissues displayed the presence of acid-fast organisms. The aspirated material was also directly used for molecular detection by triplex Nested Polymerase Chain Reaction (nPCR) assay. Out of 91 cases, 8 cases were found to be positive for Mycobacterium spp. Among those 8 positive cases, 3 were confirmed to belong to Mycobacterium avium complex (MAC) and the rest 5 belonged to Mycobacterium tuberculosis complex (MTB complex).
- Fluorescence Polarization assay using Mycobacterium avium subsp. paratuberculosis whole protein labelled with FITC was tested on 218 serum samples collected from cattle and buffaloes. All the serum samples (n= 218) were tested with ELISA kit (Prionics). A total of 35 out of 218 serum samples were tested positive by FPA. A cutoff value of >39mP was able to discriminate between positive and negative animals with sensitivity of 85% and specificity of 71.1% by MedCalc software. This analysis also revealed an AUC of 0.830 and $P<0.001$.
- Fluorescent in situ Hybridization was done on acid-fast positive fecal sample (n=54) out of a total of 218 fecal samples from cattle and buffaloes with history of intermittent diarrhoea using in-house designed MAP probe. The probe showed no cross-reactivity with other Mycobacterial species viz; M. intracellulare, M. smegmatis, M. fortuitum and M. vaccae except Mycobacterium kansasii. However, M. kansasii and Mycobacterium avium subsp. paratuberculosis were clearly differentiated by the probe based on morphology.

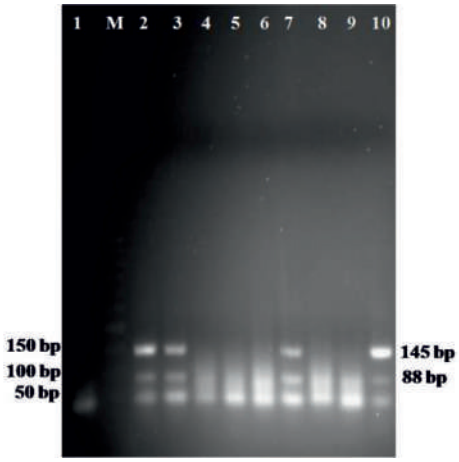
X. Animal Nutrition:

- Puppy food and adult dog food both vegetarian and non-vegetarian variants were developed by the department.
- Utilization of distiller's dried grain with solubles (DDGS) and hatchery discarded infertile egg meal with shell in the diet of dog as alternate protein source.

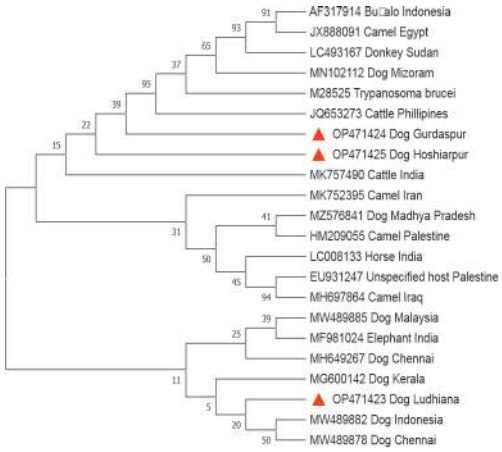
- Supplementation of hatchery discarded whole infertile egg meal (HDWIEM) at 5 % level (14 % Soybean meal replacement) increased growth performance, nutrient utilisation in terms of CP (crude protein), EE (ether extract) and Calcium especially along with improved immune status of broiler birds.
- Supplementation of 15 gm Rumen protected methionine/d in transition buffaloes resulted in higher CP digestibility, and improved milk production parameters.
- Growing buffalo heifers can grow @ >800 gm/d with basal ration of urea-molasses treatment of paddy straw as compared to about 700 gm/d in untreated paddy straw.
- The effect of inclusion of urea, biological inoculant, fiber degrading enzymes and molasses on chemical composition, *in vitro* utilization and degradability of paddy straw silage was studied and concluded that 1% urea+ cocktail of enzymes + 6% molasses with bacterial culture improved digestibility and milk production.
- Herbal waste like amla pomace and aloe vera waste at 20 g/kg dry matter intake to dairy cows increased milk production and decreased methane production.

XI. Veterinary Parasitology

- **Molecular detection and characterization of *Trypanosoma evansi* infections in dogs:** Microscopy revealed the prevalence of *T. evansi* infection as 0.21% (1/482) whereas with PCR assay, targeting *RoTAT1.2*, 1.45% (7/482) dogs showed positivity. Risk factors like age, breed, location, season and sex revealed a non-significant correlation with prevalence of *T. evansi* except for age by microscopy ($p<0.05$). The kappa value statistics revealed "fair" agreement between PCR assay and microscopy and the data was statistically significant ($p<0.05$). The sequence analysis of field isolates revealed nucleotide variation ranging from 0.00% to 1.19% indicating high level of homogeneity of the targeted gene.

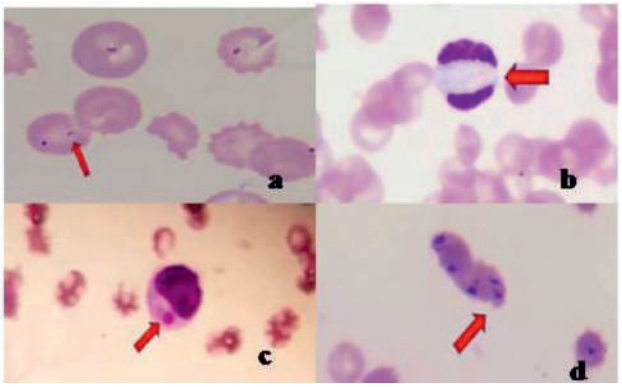


Field application of standardized TE-PCR assay
Lane M : 50bp ladder RTU (GeneDireX®, Inc.)
Lane 1 : No-template control Lane 2 : Positive control
Lane 3-10 : Field samples

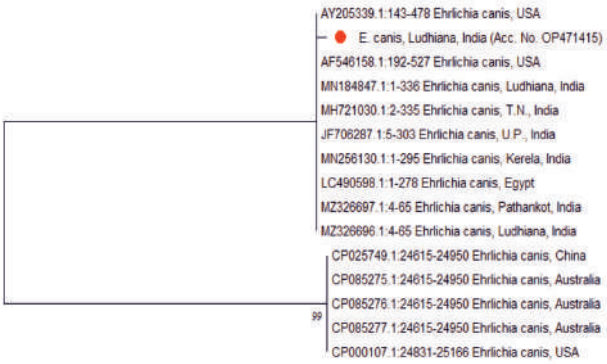


Maximum-likelihood tree of *RoTAT1.2* sequences of *Trypanosoma evansi* constructed using Kimura 2-parameter Model

- **Prevalence and risk factors of haemoparasitic diseases in dogs of Ludhiana:** A total of blood samples collected from 400 (pet 352; 52 stray) dogs showed an overall prevalence 6% (24/400) of hamoparasites further comprising of *Babesia gibsoni* (3.75%), *Hepatozoon canis* (1.25%), *Ehrlichia canis*(0.5%), *Babesia canis* (0.25%) and *Trypanosoma evansi* (0.25%). The significantly associated risk factors with haemoparasites were exercise intolerance, fever, haemoglobin and total platelet count.
- **Immuno-molecular analysis of ehrlichiosis and dirofilariosis in dogs:** The sensitivity of 100% and specificity of 4.26% & 68.09% was by lateral flow assay (LFA-Ec) and polymerase chain reaction (Ec-PCR), respectively. Complete sequence of *virB9* gene of *E. canis* showed closest homology with the USA isolate. The samples were found negative for dirofilariosis by immune-molecular assays.



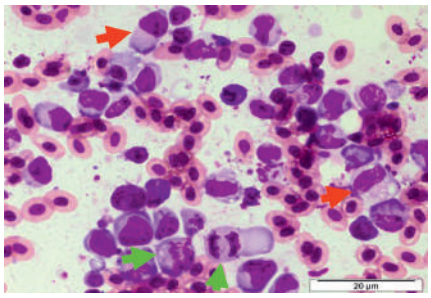
Photomicrograph of Leishman stained blood smears showing a: *B. gibsoni*, b: *H. canis*, c: *E. canis*, d: *B. canis*



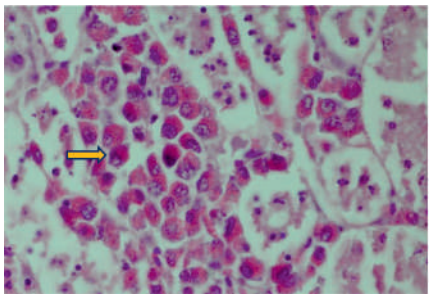
Phylogeny of *virB9* gene *E. canis* nucleotide sequence using Neighbour joining method

XII. Veterinary Pathology

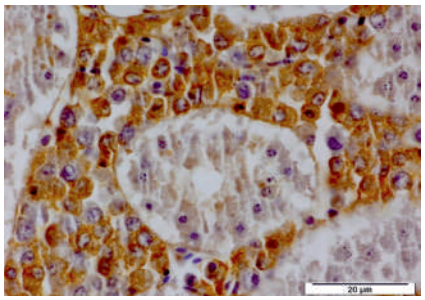
- **Cytopathological and immunohistochemical studies on naturally occurring co-infection of avian oncogenic viruses with chicken anaemia virus in poultry:** This study was conducted on naturally occurring co-infection of avian oncogenic viruses and chicken anaemia viruses in poultry under field conditions. Based on cytological, histopathological and immunohistochemical analysis for neoplastic diseases viz., Marek's disease (MD), Lymphoid leukosis (LL), Avian leukosis virus-J (ALV-J) and Reticuloendotheliosis virus (REV) infection as well as Chicken infectious anemia virus (CIAV) infection in 100 tumor cases, a total of 72 cases showed neoplastic lesions while remaining where of gout, aspergillosis and inflammatory conditions. Mixed infections of avian oncogenic viruses were found more prevalent than single infection involving maximum 53 cases of (MD+REV) followed by 12 cases of (MD + REV+ ALV-J) and 7 cases of sole infection of LL. Out of total 72 neoplastic cases, CIAV were co-infected with 27 (MD + REV), 2 (REV + LL), 4 (LL + ALV-J), 1 (MD + LL), 4 (MD + REV + LL), 7 (MD + REV+ ALV-J) and 8 (MD + REV + LL + ALV-J) cases.



Heart: Cytology showing myelocytes having eccentric nucleus, prominent nucleoli and abundant basophilic cytoplasm filled with eosinophilic granules (Red arrows) and mitotic figures (Green arrows). Giemsa stain,100x.

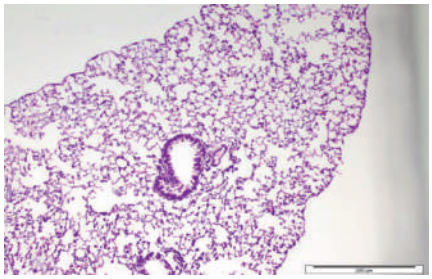


Kidney: Focal infiltration of myelocytes with eccentric nucleus prominent nucleoli and cytoplasm filled with eosinophilic granules between the tubules (arrow) along with tubular degeneration. H and E Stain, 100x Bar 20µm

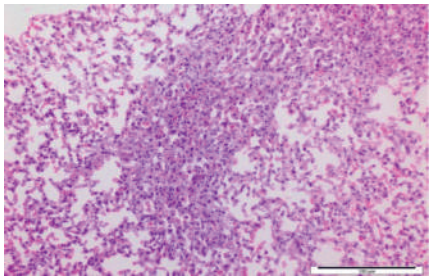


Kidney: Immunolocalization of Avian leukosis virus – J viral antigen. Vectastain ABC staining, counter-stained by Gill's haematoxylin x 100 X, Bar 20µm.

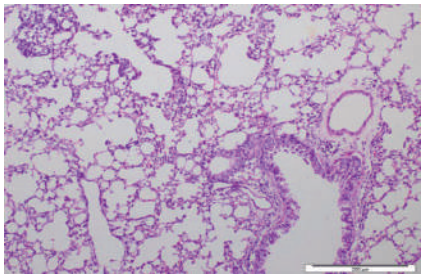
- **Pulmonary fibrosis and its amelioration with p-coumaric acid: a study in experimental mouse model:** In this study, administration of p-coumaric acid@100mg/kg bw ameliorate the bleomycin induced pulmonary fibrosis in mice through attenuation of inflammation, oxidative stress and epithelial to mesenchymal transition.



Sham Group: Lung showing normal histology with normal bronchi and alveolar epithelium. (H&E, Bar=100 µm)



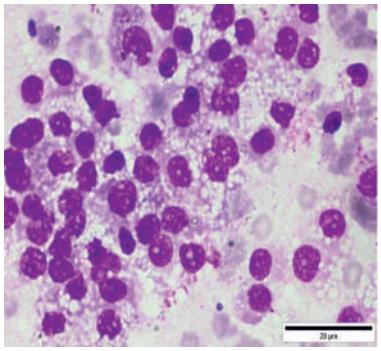
Bleomycin treated group showing infiltration of inflammatory cells, fibrosis and decreased alveolar spaces. (H&E, Bar=100 µm)



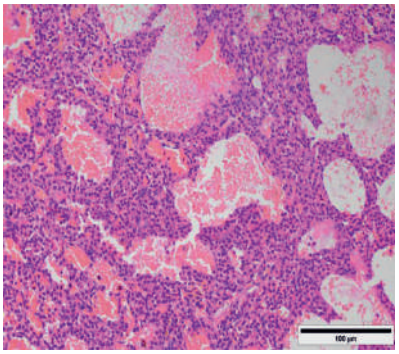
Bleomycin and p-coumaric acid group showing Moderate fibrin deposition with reduction in inflammatory cells infiltration,with improved lung architecture compare to BLEO group. (H&E, Bar=100 µm

- **Diagnostic and prognostic studies on abdominal affections in dogs:** A study was conducted on 83 dogs suffering from abdominal affections. Statistically significant decrease in mean values of Hb, PCV and TEC, whereas, significant increase in values of TLC and neutrophil count was observed. Similarly, statistically significant increase in mean values of AST, ALT, ALKP, GGT, BUN, creatinine and phosphorus, whereas, decrease in albumin was observed. Maximum number of cases were recorded in spleen (26), followed by liver (22), urinary tract (10), genital organs (10), peritoneum (8) and gastrointestinal tract (6). The most common lesion in spleen was lymphoma, in liver hepatocellular carcinoma, in urinary bladder transitional cell carcinoma, in kidney renal cell carcinoma and in peritoneal effusions haemangiosarcoma. Comparison of cytological and

histopathological diagnosis showed high correlation (80.95%), sensitivity (88.24%) and positive predictive value (78.95%). Similarly, high correlation (89.74%), sensitivity (97.5%), positive predictive value (92.86%) and low specificity (25%) were observed between ultrasonographic and cytological and/or histopathological diagnosis.



Impression smear of liver from a case of hepatocellular carcinoma showing moderate anisocytosis, high N:C ratio large clear lipid globules in cytoplasm. Leishman stain x 100X.



Microphotograph of liver showing proliferation of neoplastic hepatocytes separated by varying sized blood channels devoid of endothelial limning suggestive of with peliotic hepatocellular carcinoma. H&E x 20X

XIII. Veterinary Pharmacology & Toxicology

- **Research findings in Ethnopharmacological studies:**

✓ Study on Polyherbal formulation (AYUSH-13) containing 13 medicinal plant materials was conducted. It did not have significant influence on haematological profile except Hb and hepatic and renal functional enzyme. Polyherbal formulation treatment had a minor effect on blood metabolites, helped in the improvement of the digestion, antioxidant system and lower downs the lipid peroxidation. It had non-significant effect on TNF-α and IL-1β and down regulated the immunological marker (IFN-γ). The study finally concluded that polyherbal formulation supplementation is safe to use in lactating cows as a galactagague. Moreover, it had a positive impact on the overall improvement of the immune status to combat the stress induced during different stages of lactation.

✓ The study was undertaken to investigate the effect of polyherbal formulation on production and plasma hormonal parameters of lactating cattle. Group I was given regular diet, group II was given synthetic galactagogue @ 10mg/100 kg bw, OD, orally and group III was fed with polyherbal supplementation @ 20 gm/100 kg bw, BID along scheduled diet, for 45 days. Animals were observed for one month post feeding. No significant difference was observed in milk yield, milk fat, density, protein and total solids within all groups. A significant decrease was observed in milk lactose in group I and II as compared to group III. The SNF was significantly less in group II and III on day 60 and 75. A significant decrease in SCC within group III was observed at day 45. Significant decline in the values of electrical conductivity was seen within group III. No significant variation in milk pH was observed. In sensory evaluation, no significant difference was observed within all groups. At day 45, T_3 hormone showed a non-significant decrease in group III and % decrease of PHF group was less than group II and I. Significant decrease in plasma T_4 concentration was reported in group III on day 45. Non-significant increase in TSH concentration was seen within all groups at day 45 and % increase in TSH levels in group III was less than group II and I. Non-significant variation was observed in levels of prolactin in group I and III. Group II animals showed significant increase

in levels of prolactin on day 45 which reduced on day 75. Significant reduction in cortisol levels was observed in group III as compared to group II on day 45. Levels of oxytocin increased non-significantly in group II and group III at day 45, but declined one month post feeding. Ayurvedic formulation was not helpful to compensate the massive demands of milk but has the therapeutic potential to keep animals healthy and to cope up with production stress.

✓ **Research findings in Pharmacokinetic –Pharmacodynamic study:** The study on pharmacokinetic-pharmacodynamic integration of cefovecin in goats (*Capra hircus*) was conducted to elucidate PK-PD determinants of cefovecin in goats. Group I (n=6) was administered cefovecin (8 $mg.kg^{-1}$ b.wt. SC), and group II (n=6) was given same dose of cefovecin along with meloxicam (0.5 $mg.kg^{-1}$ b.wt. SC). Skin swabs were taken to determine resistance pattern of commensal bacteria. Plasma urine concentration in both the groups were estimated at different term by microbiological assay. PK parameters were estimated by non-compartmental analysis. *Staphylococcus* spp. were isolated using appropriate media. Cefovecin administration was found to be safe in goats as none of the liver/ kidney function parameters were altered by it. *In-vitro* plasma protein binding was in range of 17- 82 %. The values of AUC, total body clearance, $t_{1/2}$ and V_d of cefovecin in group I were 890.6 ± 72.5 h.µg/ml, 337.5 ± 49.4 ml/h, 3.34 ± 0.14 h and 1618.4 ± 201.2 ml ; corresponding values in group II were 942.5 ± 63.8 h.µg/ml, 305.8 ± 26.3 ml/h, 3.53 ± 0.04 h and 1568.6 ± 141.2 ml , respectively. Urinary excretion of cefovecin was 19.2 % in group I and 5.67% in group II. MIC values were above resistance breakpoints for most isolates upto 30th day. This study shows that meloxicam does not alter PK of cefovecin in goats, although it decreases urinary excretion to a small extent. It induces emergence of bacterial resistance in goats, highlighting the importance of optimization of dosage regimen. Further, studies are warranted to determine other excretory routes of cefovecin in goats.

- **Research findings in *in vivo* toxicological studies:**

✓ The study was aimed to assess the antioxidant profile of the rats on subacute oral indoxacarb exposure and the ameliorative effect of ethanolic *Cassia fistula* bark extract on indoxacarb induced toxicity in rats. The study was conducted on 36 female wistar rats, divided in 6 groups of 6 animals each. Subacute oral indoxacarb exposure resulted in significant ($p<0.05$) increase in oxidative stress parameters including lipid peroxidation levels, and even in enzymatic and non-enzymatic antioxidant defence parameters like superoxide dismutase, catalase activity, in blood as well as in liver and kidney tissues. Whereas, significant ($p<0.05$) decrease was reported in total antioxidant capacity in plasma and even total protein level, reduced glutathione and glutathione peroxide activity of these tissues, while in blood the reduction in reduced glutathione and glutathione peroxide activity was nonsignificant. Moreover, there was significant ($p<0.05$) increase in glutathione reductase, glutathione-S-transferae and glucose-6-phosphate dehydrogenase activity in blood samples. Co-treatment with ethanolic bark extract of *Cassia fistula* (@ 250 mg/kg BW) significantly reversed the alterations made by indoxacarb, while the higher dose of *Cassia fistula* bark extract failed to do so. Additionally, there was no such genotoxicity reported in any of the indoxacarb exposed animals. Thus, the results of the present investigation suggests that indoxacarb exposure produced pronounced oxidative stress in rats, whereas, *Cassia fistula* bark extract at lower dose was able to moderately ameliorate the toxic effects produced because of indoxacarb exposure in rats.

✓ The purpose of the study was to evaluate the subacute toxicity of indoxacarb caused in rats over the course of 28 days. Wistar female rats were split into two groups of six each.1 ml of deionized water was administered orally to the control group. Indoxacarb mixed with deionized water was

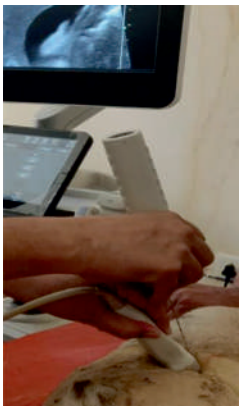
administered orally to rats in treatment groups at a dose of 67.76 mg/kg (1/10th MTD). After 28 days of treatment, rats given indoxacarb showed a substantial decrease in body weight gain. Female rats given indoxacarb had a significant increase in relative liver, brain, and spleen weight as compared to control rats. The relative weight of many other organs, such as the heart and kidney, did not alter with treatment schedules. Haemoglobin, packed cell volume, total erythrocyte count and lymphocyte count all significantly decreased in treatment group as compared to the control group. Indoxacarb-treated groups showed a dose-dependent significant increase in neutrophil level, erythrocyte sedimentation rate, and total leucocyte count when compared to control groups. Indoxacarb significantly raised the levels of the enzymes alanine aminotransferase, aspartate aminotransferase, lactate dehydrogenase, gamma-glutamyl transpeptidase, glucose, blood urea nitrogen, serum creatinine, creatinine kinase, serum cholesterol, and LDL-cholesterol when compared to the control group. Total plasma protein, triglycerides, and HDL-cholesterol levels significantly decreased with indoxacarb compared to the control group. Rats exposed to indoxacarb had a considerable rise in TSH levels but a significant fall in T3 and T4 levels. In indoxacarb-exposed rats, neurobehavioral indicators such as the elevated plus-maze demonstrated anxiety-like behaviour. Rota rod activity and grip strength were drastically reduced. Thus, the current study's findings revealed that indoxacarb insecticide caused a significant toxicological damage in the exposed animals at the tested level and may be harmful to animal health.

XIV. Veterinary Physiology and Biochemistry

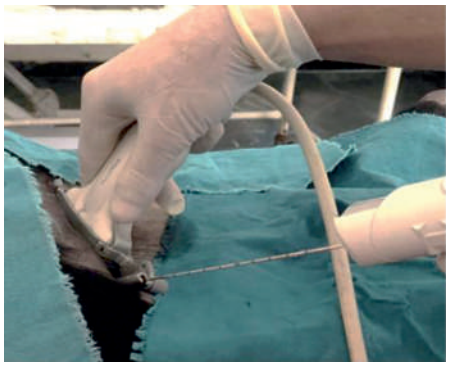
- **Growth pattern, differentiation and cellular senescence of adipose tissue derived stem cells from young and adult buffaloes**: Adipose derived MSCs from buffalo of any age group can be considered as source cells for regenerative therapeutics as age doesn't not make any significant difference in the cell characteristics.
- **Effect of supplementing lysine and butyric acid on metabolic profile and growth performance of buffalo calves during winter:** Combined supplementation of lysine and sodium butyrate in calf starter was beneficial in improving the body weight of buffalo calves without any detrimental effect on blood biochemical profile.

XV. Veterinary Surgery and Radiology

- **Designing and evaluation of various configurations of threaded intramedullary pins for canine long bone fractures:** Newly designed double-threaded (DT) intramedullary pins (IMP) were used to repair long bone fractures (femur, tibia, and humerus) in 43 dogs using Stainless Steel (n=18) and Titanium (n=25) implants. The 6mm X 4.5mm and 7mm x 5.5mm sizes of DT IMP pinswere used. Both titanium and stainless steel DT IMP had comparative results with minimum implant related complications.
- **Clinical studies on the role of ultrasound and ultrasound-guided biopsy in the diagnosis of canine hepatic disease:** The study included 20 clinical cases of canine hepatic affections to compare free-handtru-cut needle biopsy (n=10)withguide-assisted tru-cut biopsy (n=10). Both techniques were equally efficacious in terms of liver biopsy sample yield. Guide-assisted biopsy technique was found better in terms of precision and time benefit, whereas free hand technique was better in terms of maneuverability, ease of technique, and less instrumentation.

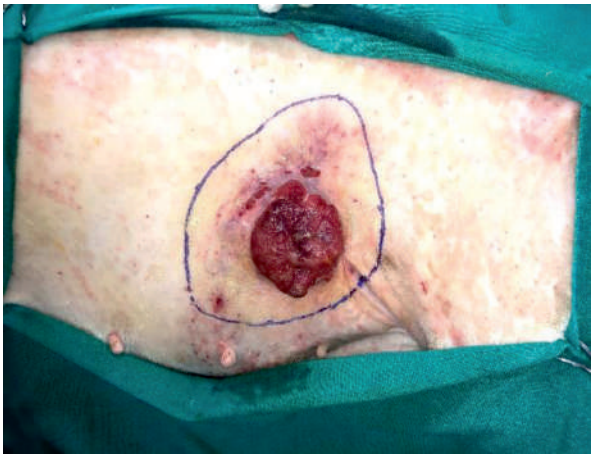


Free Hand Tru cut biopsy technique

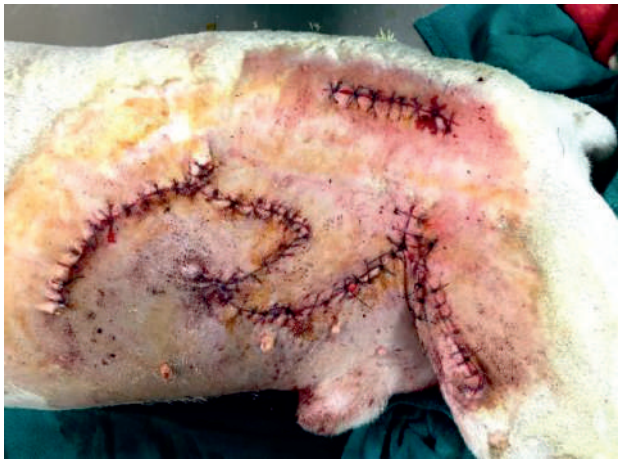


Guide assisted Tru cut biopsy technique

- **Studies on circulating cell freedna in dogs with skin tumors and its correlation with wide surgical resection and skin reconstruction:** This study included 30 dogs; 10 healthy and 20 with skin tumors with an objective to estimate Cell free (cf) DNA in the blood. A higher level of cfDNA was observed in tumor affected dogs followed in inflammation and healthy dogs.The mean±SD of integrity index was calculated using the ratio of long and short fragment cfDNA which was highest in case of healthy dogs (1.23±0.19) followed by dogs with inflammation (0.89±0.06) and dogs with skin tumors (0.88±0.07). In conclusions, cf DNA is a useful biomarker in skin tumors in dogs and post-operative elevation of cfDNA levels is suggestive of metastasis.



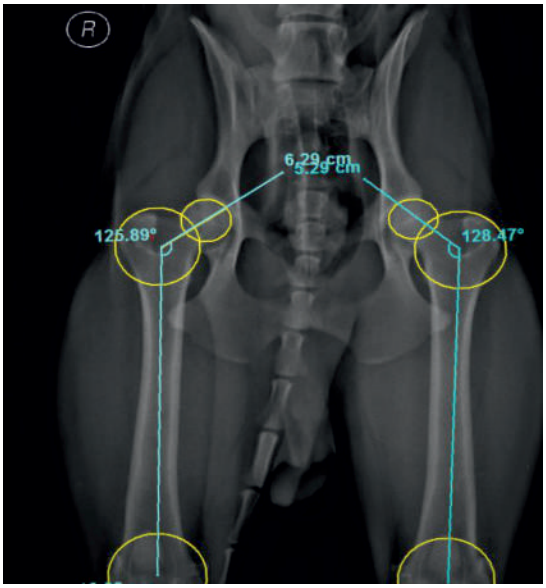
Photograph showing marking of 2 cm of skin margin around the tumor using sterile marker



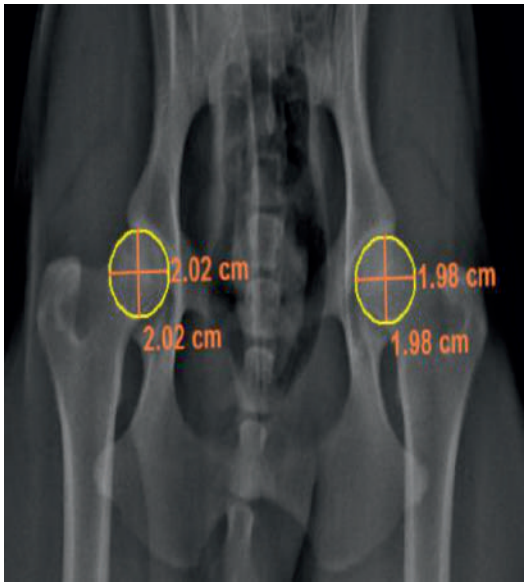
Photograph showing skin defect closure using simple interrupted suture pattern with 1-0 nylon monofilament non absorbable suture material

- **Studies on the radiographic morphometry and surgical approaches to the hip joint in dogs:** For radiographic morphometry, healthy (n=51) and dysplastic (n=18) dogs were categorized based on their breed and body weight to generate a database for total hip replacement implants. Observations revealed a greater mean head diameter value in Pugs, but it was lesser in German shepherds; reduced mean Neck Length Index in the Labradors and Golden retrievers; reduced mean proximal femoral shaft diameter in Labradors; and reduced mean SCW value in Golden retrievers than normal ranges. Out of three approaches viz. excision arthroplasty by craniolateral approach, curvilinear approach, and modified dorsal approach for hip joints, the curvilinear approach provided better surgical

exposure and easy excision of the femur head and neck. However, a minimum amount of tissue trauma and lesser skin incision length were required with a modified dorsal approach that helped to achieve early mobility and good outcome in dogs weighing even more than 25kg

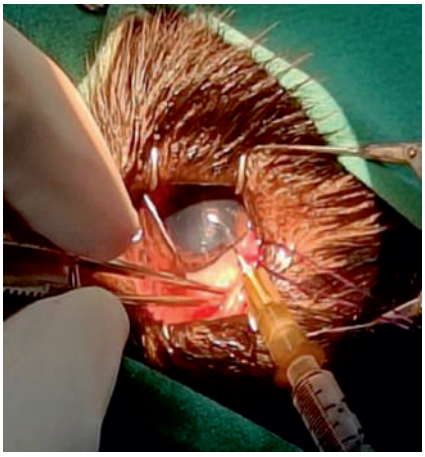


Angle of Inclination

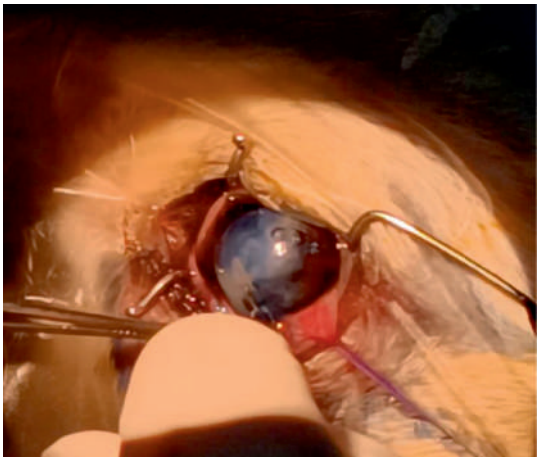


Head Diameter

- **Enzymatic Evaluation of aqueous humor in diabetic and non-diabetic cataractous dog:** The study evaluated TGF β2, MMP9, and TIMP enzymes in the aqueous humor of cataract-affected (diabetic vs. non-diabetic) dogs as compared to terminally ill healthy eyes.Also to compare the clinical outcome of diabetic and non-diabetic cataractouslens following phacoemulsification and intra-ocular lens implantation. The study revealed significantly higher levels of TGF β2 and MMP 9 and significantly lower levels of TIMP 1 in the aqueous humor of dogs with cataractous lens, with more severe alterations in cases of diabetic cataract. Phacoemulsification & IOL technique had higher success rate in the treatment of non-diabetic cataractous lens than diabetic cataractous lens of dogs.

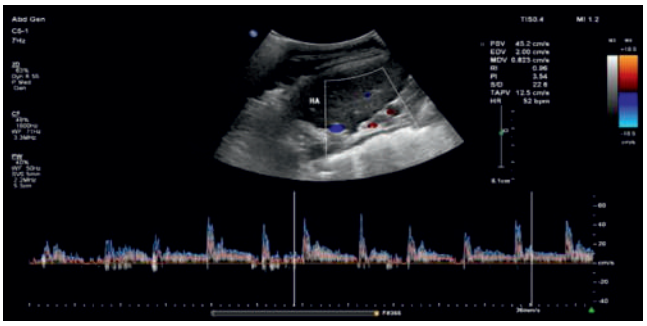


Photograph of Aqueous humor collection in cataract dogs during surgery

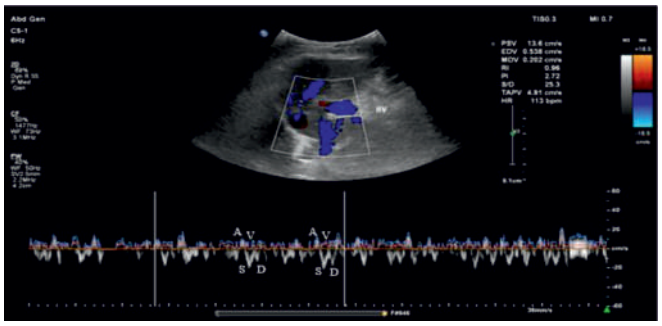


Photograph of Capsulorhexis

- **Triplex doppler studies on hepatic and splenic vasculature in canine health:** The study established and standardized triplex color Doppler ultrasonography along with pulsed wave Doppler waveforms, indices, and vascular resistance of blood flow in the splenic artery, splenic vein, portal vein, hepatic vein and hepatic artery in different breeds of clinically healthy 60 dogs. Variations in the landmark of HA were seen in Beagles. A significant variation was seen in Doppler indices of the splenic vasculature in Pitbulls and German shepherds and hepatic vasculature in Labradors, Pitbulls and German shepherds.

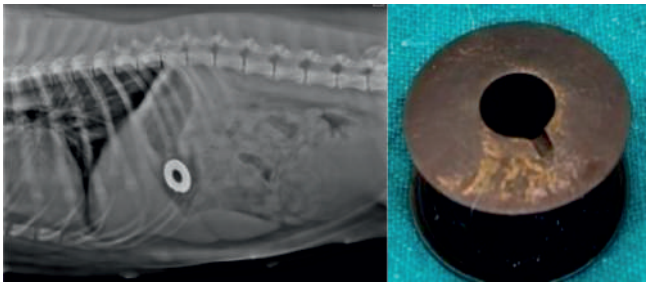


Triplex Doppler Ultrasonogram showing normal Doppler Waveform of hepatic artery (HA) at porta Hepatis



Triplex Doppler Ultrasonogram showing normal triphasic Doppler Waveform of hepatic Vein (HV) at porta Hepatis (Waveform below baseline)

- **Evaluation of radiography and ultrasonography as diagnostic and prognostic tools for surgical affections of the gastrointestinal tract in canine:** Real-time B-mode ultrasonography and colorDoppler ultrasonography were successful in arriving at a definitive diagnosis in 100% of cases and in assessing vascularity of the affected intestinal segment in 66.6% of cases respectively and thus helped in formulating prognosis and planning surgery with a favorable outcome. Radiography was useful in detecting radiopaque foreign bodies in the various parts of the GIT.

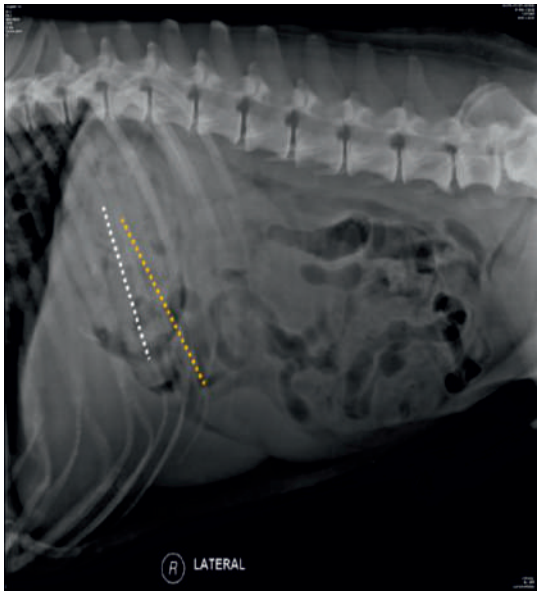


Lateral radiograph showing circular radio-opaque density in the gastric region and spool was removed as foreign body

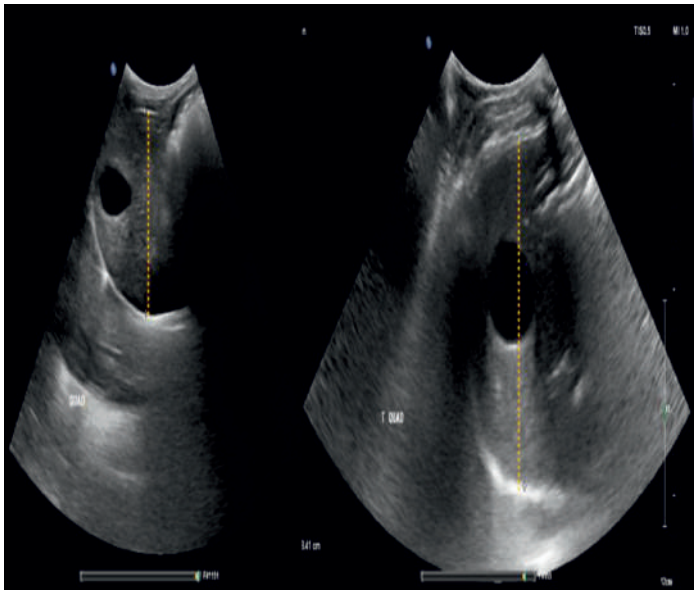
Ultrasound image showing target like lesion or bull's eye pattern i.e. multiple hyperechoic and hypoechoic concentric rings on transverse plane suggestive of intussusception.

- **Morphometric evaluation of liver size using ultrasonography and radiography in healthy and diseased dogs:** The present study was conducted in 78 dogs which were divided asHealthy animals, Ascites of hepatic origin, Hepatitis, and Suspected liver neoplasia to quantitatively evaluate the liver size using ultrasonography and radiography in healthy and diseased dogs. Radiography was only useful in the subjective evaluation of liver size in dogs. Liver size of more than 7.38 cmof

quadrate lobe, right liver lobe and left liver lobe with or without alteration in hepatic echotexture were indicative of liver disease in dogs. Dimensions of the caudate lobe of liver were not useful for evaluating liver size in dogs.

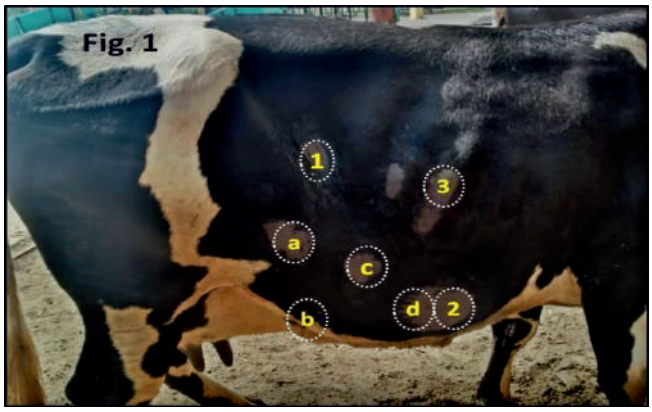


Ultrasonogram of quadrate lobe [(a) longitudinal plane (b) transverse plane] with dimension (yellow line) in an animal of Group 1 (apparently healthy dogs) with uniform echotexture

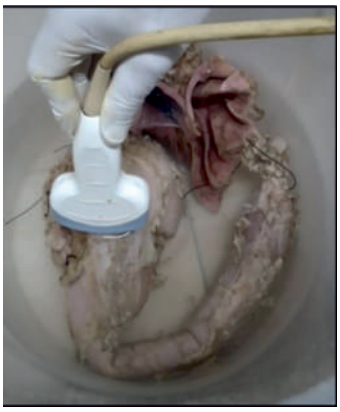


Radiograph of cranial abdomen showing extent beyond costal arch, gastric axis (yellow line) caudally displaced to adjacent rib (white line), dorsally shifted pylorus, sharp and regular margins in an animal of Group 3 (Hepatitis)

- **Clinical study on the development of ultrasonographic screening protocols for the assessment of small intestines in cows and buffaloes:** Seven acoustic windows were evaluated for small intestines (SI) i.e., 1) Pyloric window: 9-10th ICS at the level of elbow. 2) Cranial duodenum (Cd); 3) Descending duodenum (Dd) at right PL fossa; 4) Jejunal windows: a)12th ICS; b) Mid flank; c) Near udder; d) and Caudal to pylorus in 107 bovines (33 healthy and 74 clinical cases with GIT disorders). It is easy to scan pylorus in cattle than buffaloes. Ultrasonographically, pylorus was located at 9th ICS with squeezing motility (4-6/min) characterized by an inward fold, and identified by Torus pyloricus. Three acoustic windows; caudal to pylorus, right paralumbar fossa and 12th ICS are recommended for the quick assessment of small intestines irrespective of pregnancy status. Right paralumbar fossa window is recommended for the scanning of descending duodenum in Cattle and Buffaloes. Easy identification of fluid distended descending duodenum with reduced contractions is suggestive of bowel obstruction. Ultrasonographic visualization of the distended loops of jejunum at right paralumbar fossa is a reliable indicator of small intestinal obstruction, irrespective of species and pregnancy status.

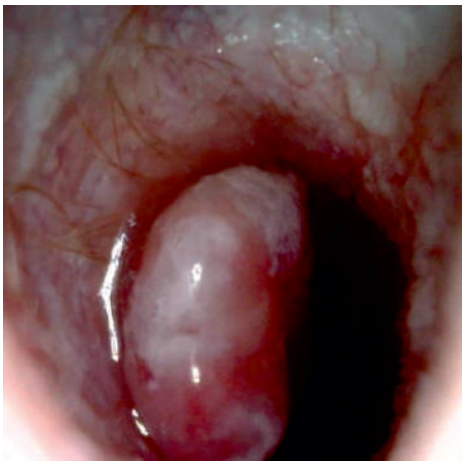


Photograph of right side of abdomen in a cow showing the seven established acousticwindows for assessment of small intestines; Para-lumbar fossa at ventral edge of triangle(descending duodenal window) (1), 9 ICS at the level of elbow (pyloric window) (2). 9-11 ICS atlevel of line joining elbow to tuber coxae (cranial duodenal window) (3), Jejunal windows (a. Midflank,b.Nearudder,c. Level of 12ICS at themid abdomenandd.Caudaltopylorus).



Photographof the In-vitroultraso nographicvisualization ofpylorus (transversesection) in thewaterbath.

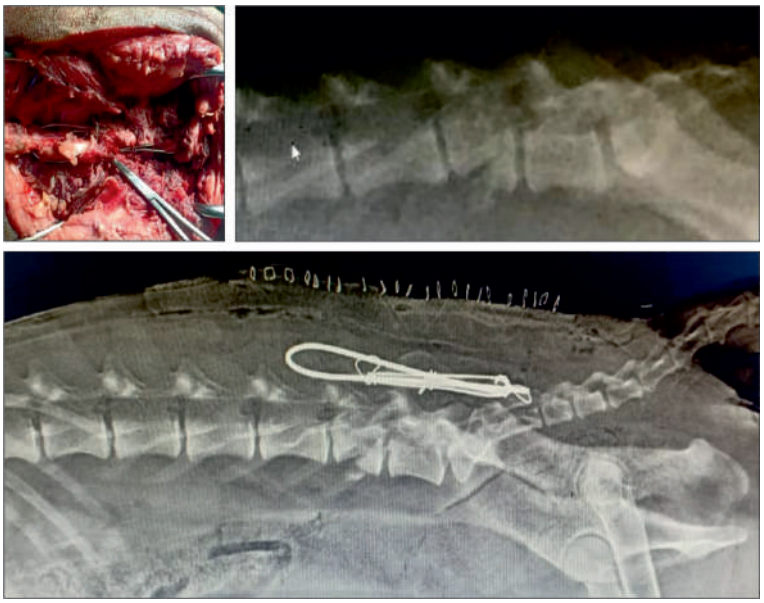
- **Clinical studies on diagnostic exploration and management of ear canal affections in dogs:** The study was conducted on 100 dogs suffering from various ear canal affections and managed with conservative (n=80) or surgical intervention (n=20). Bacterial agents of otitis were mostly sensitive to Enrofloxacin. Video otoscopy was a useful diagnostic modality for precise and accurate assessment of ear canal affections. Radiography is an important diagnostic tool that helps in deciding the medicinal versus surgical line of treatment. Deep ear canal flushing with Propylene Glycol solution as an adjunct to medicinal treatment shows excellent response in management of otitis. Lateral ear canal resection is an efficient surgical procedure to establish drainage in dogs with ear disease mainly affecting the vertical ear canal. TECA-LBO is a salvage surgical procedure recommended in dogs with end term otitis or neoplasia involving both vertical and horizontal ear canal.



Otoscopic view of ear canal with mass at the junction of vertical and horizontal ear canal

Dorsoventral radiograph showing severe bilateral calcification of ear canal cartilage

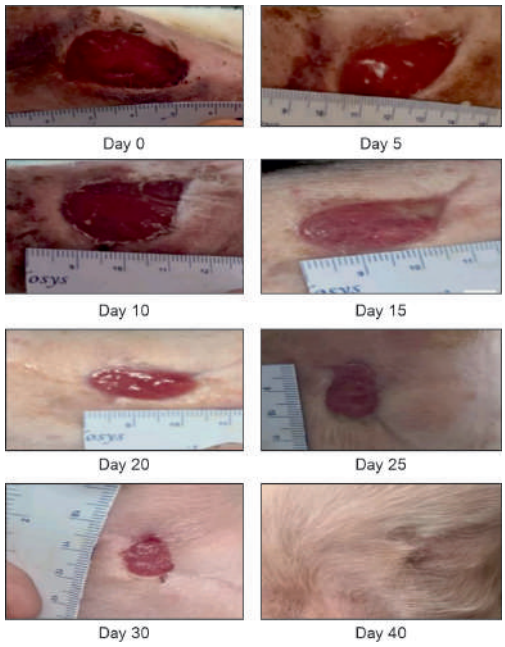
- **Studies on diagnostic and therapeutic protocols for management of thoracolumbar spine injuries in canine:** Major spinal injuries included spinal cord contusions, vertebral fractures or luxations and intervertebral disc herniation in male stray dogs associated with motor vehicle trauma. Fifty percent of vertebral fractures or luxationoccurred in the thoracolumbar region of dogs. Dorsal surgical approach was assessed better than dorsolateral approach to access the thoracolumbar spine in cadaveric dogs. The treatment outcome depends on the severity of injury and duration of trauma. Prednisolone was found more effective than methylprednisolone in spinal trauma cases.The surgical treatment had poor prognosis due to the difficult rehabilitation of animals with complete dislocation.



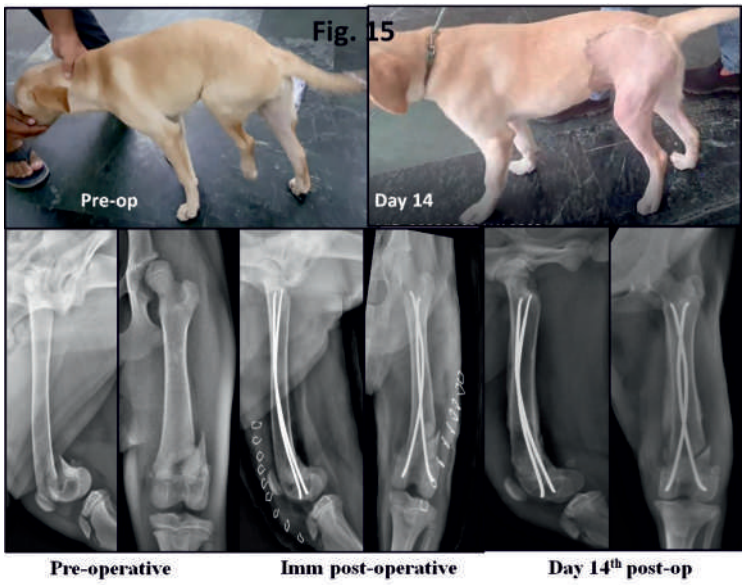
Bilateral spinous process fixation of fractured of L_6 vertebra with 2.5 mm and 2 mm pins and wire, Pre-operative radiograph, Post-operative radiograph

- **Clinical study on wound healing ability of povidone iodine in comparison to a new herbal drug in dogs:** The study wasconducted in32 dogs,aged between 2 months to 14 years with different kinds of wounds treated with topical application of polyherbal drug orpovidone iodine (5% solution) combined with or withoutan antibiotic (cefotaxime). The study concluded better wound healing properties of polyherbal drug without antibiotics as compared to the povidone-iodine alone or povidone-iodine combined with an antibiotic based on percent wound healing and Bates-Jensen Wound Assessment Tool (BWAT) scoring systems.
- **Stainless steel versus titanium elastic nails for the stabilization of femoral fracture in growing dogs:** This clinical study included 16 juvenile dogswith femoral fractures stabilized with Stainless Steel Elastic Nails and Titanium Elastic Nails. Both (Stainless steel and Titanium elastic nails) implants provide comparable and adequate stability for the repair of femoral fractures in growing dogs.The overall functional outcome (weight-bearing status, stifle joint goniometry) was found comparable in both groups.

Case treated with polyherbal drug



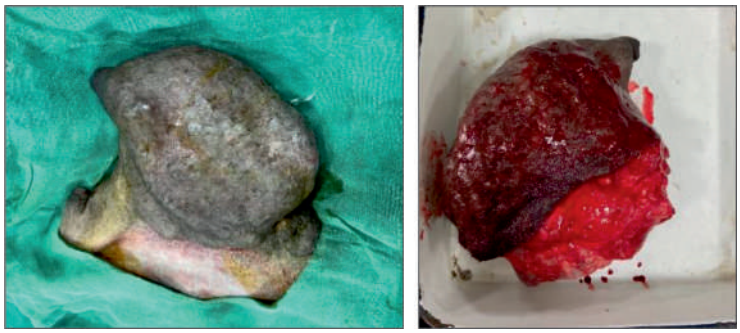
Cases treated with Povidine Iodine



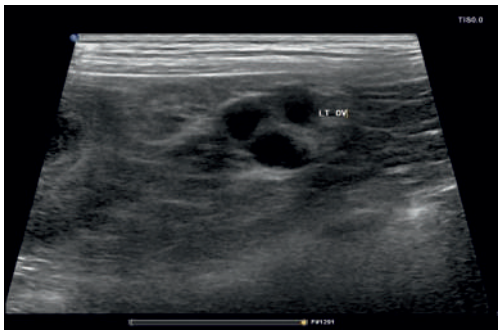
Serial photographs and radiographs of a 4 months old Labrador pup weighing 11.2kg with 5 days old femur fracture repaired with SSENs and showing excellent outcome

- **Comparative evaluation of tiletamine-zolazepam and ketamine-diazepam combinations for induction of general anesthesia in dogs undergoing musculoskeletal surgical procedures:** Twenty client owned dogs brought in for scheduled musculoskeletal surgical procedureswere premedicated with butorphanol @0.2 mg/kg and atropine sulphate @0.04mg/kg followed bygeneral anaesthesia induction with Tiletamine-Zolazepam (@4mg/kg)or Ketamine-Diazepam combination (@5mg/kg + 0.5mg/kg). Further anaesthesia was maintained by isoflurane. Overall, Tiletamine-Zolazepam protocol was found better as compared to Ketamine-Diazepam combination in terms of superior quality of induction, shorter induction and recovery time, excellent depth of anaesthesia, analgesia and muscle relaxation with minimal effects on haemato-biochemical parameters.

- **Clinical study on co-occurrence of genital organ pathology with canine mammary tumour:** The study included 28 canine patients having a mammary tumorandthese cases were treated surgically by mastectomy alone, and mastectomy with ovariohysterectomy based on surgical judgment. Mammary tumors had a high rate of concurrentutero-ovarian pathologies in female dogs. Treating mammary tumors in dogs by mastectomy alone or mastectomy with ovariohysterectomy did not have a positive impact on the overall survival and recurrence rates. Carcinoma with squamous cell differentiation, anaplastic carcinoma, and carcinosarcoma had a poor prognosis. There is no direct link between the expression of ER and PR in mammary tumors and genital organs.

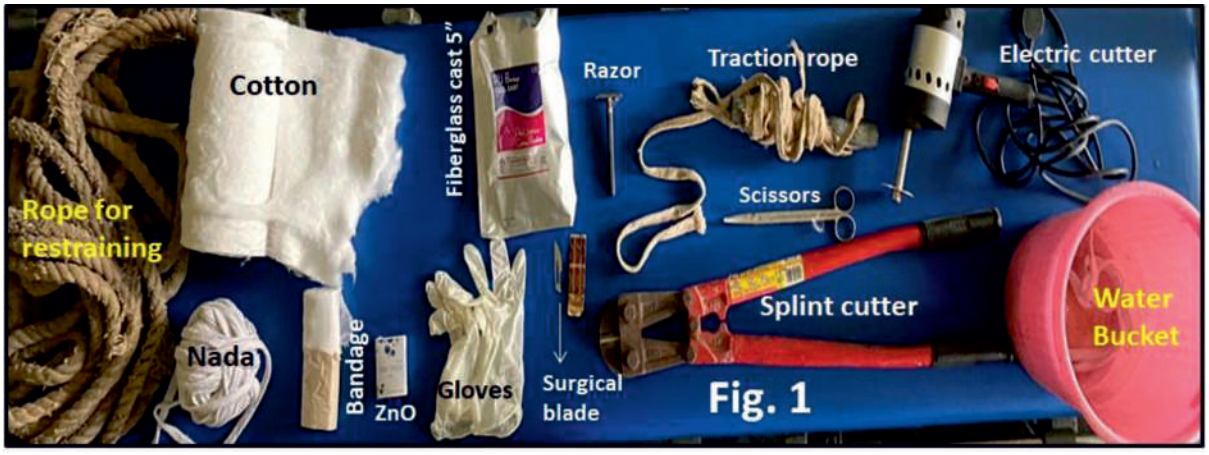


Mammary tumour before and after resection



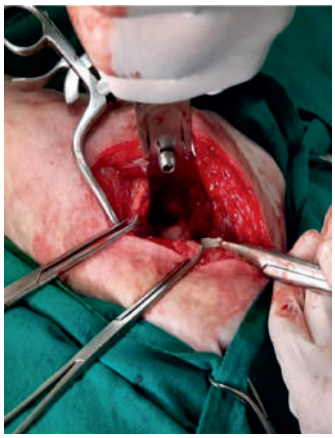
Ultrasonogram of polycystic ovary

- **Clinical study on the use of external coaptation for the management of radius, ulna, and tibia fractures in bovines:** A total of 95 fractures in 93 bovines were presented during the one-year studyperiod with fractures of radial bone (n=17,) olecranon (n=29), and tibia (n=49). Cattle were 1.5 times more susceptible to fractures as compared to buffaloes with buffaloes more prone to forelimb and cattle to open and hind limb fractures. Slipping was the most common etiology for all types of fractures in bovines. Recumbent bovines and open fractures of the radius, olecranon, and tibia are poor prognostics. Closed fractures of tibia and radius presented in standing bovines irrespective of fracture site and configuration and stabilized with external coaptation bear good prognosis. Olecranon fractures in cattle bear a better prognosis in comparison to buffaloes as the formeris less prone to the development of carpal contracture in untreated cases.



- **Clinical studies on surgical management of canine hip dysplasia and its coherence with stifle-related arthropathies:** The clinical investigation on 23 dogs with hind limb lamenessrevealed a significant degree of coherence and synchronicity between concurrent hip and stifle arthropathies. Further studies involving large sample size are warranted.

Quadriceps Release Incisions and Deepened Groove post abrasion and rasping for Patellar Luxation repair



Placement of modular osteotome for femoral head resection during Femur Head Ostectomy (FHO)

16. Teaching Veterinary Clinical Complex:

Clinical studies on hepatobiliary diseases in dairy animals

- Liver enzymes AST, GGT and GDH are good indicators of hepatobiliary diseases in diary animals however, the definitive diagnosis is only possible after histopathology of biopsy samples.
- Biopsy helps to differentiate cases of hepatitis, hepatosis and cirrhosis in dairy animals.
- Ceftiofur and enrofloxacin has been found as an effective treatment along with liver tonics and antioxidants in hepatobiliary diseases.
- Ascorbic acid is very effective antioxidant in treating hepatobiliary diseases in dairy animals and must be given along with treatment at least for 5 days.

Hoof resiliency in relation to foot lameness in Sahiwal cows

- Average sole thickness in Sahiwal cows is nearly 7 mm irrespective of lameness score 0 or 1.
- A significant effect of biotin supplementation on sole thickness was observed in all the Sahiwal cows after 4 months of supplementation.
- Overall, 16 ceramides were seen in sole portion and 15 in wall portion of the hoof in Sahiwal cows out of which 13 and 10 were major ceramides, respectively.
- A qualitative increase in the density of ceramides was seen in sole and wall samples**.**

Retrospective studies on Canine Monocytic Ehrlichiosis

- The study indicated that Canine Monocytic Ehrlichiosis is endemic in dog population of Punjab causing major clinico-haematobiochemical alterations which are required to be addressed promptly while undertaking therapeutic management in these dogs. Further, minocycline could be a better drug for the treatment of dogs with ehrlichiosis than doxycycline as it resulted in a rapid and earlier clinico-haematobiochemical remission as well as parasitological clearance.

Creation of Research facilities

- Established state-of-the-art Dialysis Unit for pets at Multi-specialty Veterinary Hospital (MSVH) which is one of its kind in whole North-India.
- Established state-of-the-art Interventional Ultrasound Unit at MSVH.

- Critical care unit for treatment and management of emergency patients at MSVH.

17. Veterinary and Animal Husbandry Extension Education:

- Majority of respondent readers of *Vigiyanak Pashu Palan* magazine, a monthly magazine published by Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana in Punjabi since 2007, belonged to Malwa region (56.00%) and were males (93.50%). Majority obtained education up to secondary level (53.5 %). Almost equal proportion of respondents got motivation to subscribe this magazine from friends, neighbours, family members and university experts, and the main purpose for subscribing this magazine was to seek newer information (62.5 %). It was mainly the subscriber (59.5%) himself who used to read this magazine. Majority (39.5 %) liked to read the magazine at home (72.0 %) in the afternoon (39.5 %) for half to one hour (67.0 %) and found the articles relevant (> 90 %) to their enterprise. Majority (74.0 %) of them used to stock old issues and they did share (72.0 %) the information with others. Around 80 per cent of the farmer found no disliking feature in any issue of the magazine and charts, tables and illustrations were the most striking features of this magazine.
- Among farm waste management practices followed by dairy farmers of Punjab, the adoption index for animal dung was highest (51.56) and it was lowest (27.18) for animal urine among farm waste. According to 'adoption score', majority of Punjab farmers fell under medium category (77.50%). The major constraints perceived by dairy farmers were; 'poor knowledge about advanced waste management practices' (mean score: 62.75), 'lack of trained, field oriented and experienced experts at village level' (mean score: 63.31), 'lack of proper technical guidance and advice related to farm waste management' (mean score: 63.09). The SWOT analysis of the farm waste management practices inferred that in strengths: "resource availability: abundance of farm waste like dung, urine, and other waste" (mean score: 65.98), weaknesses: "requirement of larger investment for larger level operations" (mean score: 65.98), opportunities: "government schemes helps dairy farmers with respect to farm waste management practices" (mean score: 66.52), threats: "marketing of bio fertilizers like vermicompost, vermiwash, bio slurry is a challenge" (mean score: 56.71) were perceived as most important factors by dairy farmers.
- Farmers, traders, butchers, veterinarians, suppliers, all were found to be the main actors in the pig value chain in descending order. However Farmers – Traders – North East market – Consumer is the major prevalent chain in the state. The pig farming business is highly dependent upon traders or butchers for marketing. Adoption of biosecurity and personal protection measures is almost negligible. There are many risk spots which could potentiate inter-farm disease transmission. This makes pig farming highly vulnerable to infectious diseases like African Swine Fever, Classical Swine Fever etc. Traders and butchers should be included in outreach programmes to prevent the spread of infectious diseases and to produce wholesome meat.
- The major constraints perceived by managers of Gaushalas for their smooth functioning are- "lack of awareness about general animal welfare practices", "lack of transportation facilities", "non-availability of information providers/channels regarding animal welfare management practices at Gaushala".
- Around 59.33 per cent of dairy farmers in Punjab opined that good feeding practices reduce the chance of dystocia and 56.33 per cent of farmers knew about the correct breeding strategy. Most (83.33%) of farmers use traction method (Manual or with the help of ropes) to relieve dystocia.

B. College of Animal Biotechnology

- Diagnostics and Vaccinology:
  - ✓ Developed Peptide-based indirect ELISA for the detection of African Swine Fever Virus (ASFV) infection. The diagnostic tool showed high sensitivity and specificity (Fig. 1 and 2). This assay is suitable for detecting ASF infection, conducting sero-monitoring, and studying sero-prevalence.

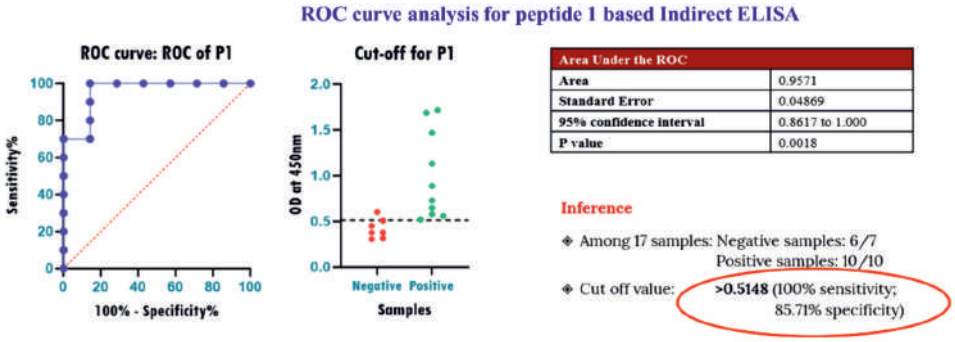


Fig 1. ROC curve analysis showing sensitivity and specificity of indirect ELISA developed with peptide I.

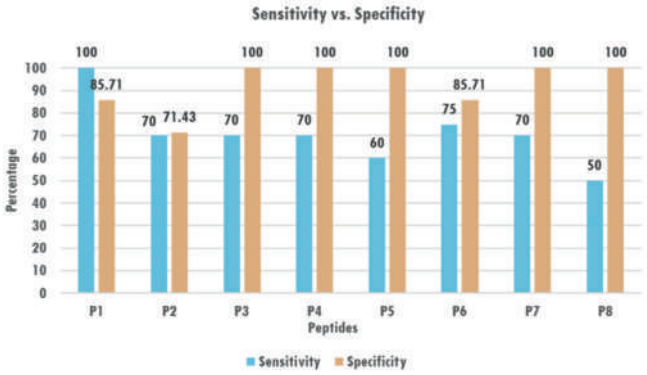


Fig 2. The plot shows sensitivity and specificity of the developed ELISA were assessed by analyzing the optical density values of positive and negative samples using ROC curve analysis in Prism software

- ✓ Developed novel and highly sensitive duplex-qPCR-HRM assays for the detection of ASFV. The assays not only detect low viral loads but also can detect early infection(Fig 3).

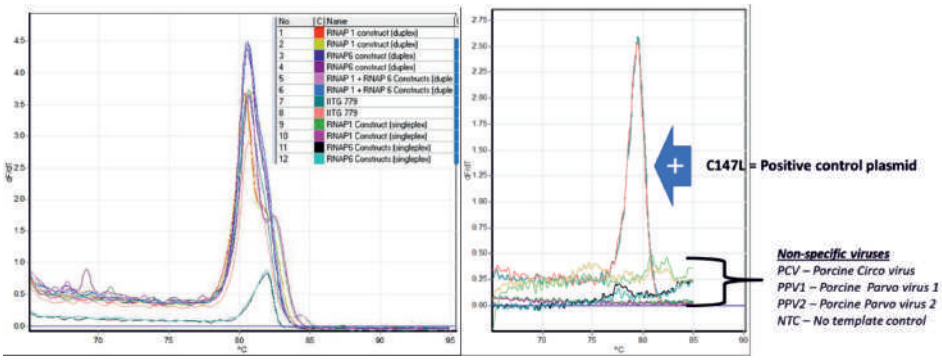


Fig 3: Development of high-resolution melt (HRM) PCR methodology for the detection of the African swine fever virus (ASFV). PCR amplification of RNAP1 and RNAP6 plasmid DNA resulting in two single peaks in singleplex, and a bi-model peak in duplex reaction. Right panel showing the specificity of duplex HRM-qPCR assay. Positive control plasmids displayed expected amplification, all non-specific disease viral DNA (PCV, PPV1, PPV2) and the no-template control (NTC) remained negative.

- A multiplex sandwich ELISA has been developed for the diagnosis of canine mammary tumors with a sensitivity of 97% and specificity of 100% with respect to histopathological diagnosis(Fig 4).

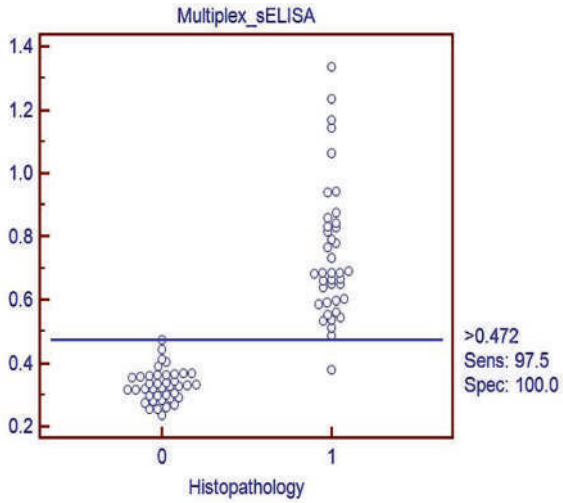


Fig 4. ROC analysis based estimation of sandwich ELISA (0 : Histopathology-Tumor Negative, 1 : Histopathology-Tumor positive) for canine mammary tumor

✓ A strategy for xenogenic therapeutic DNA vaccine has been developed against mammary tumors in mice models. The vaccine construct will be tested in clinical cases of CMT in phase II of the DBT project(Fig 5 and 6).

Fig 5. Cloning strategy for the vaccine construct generation

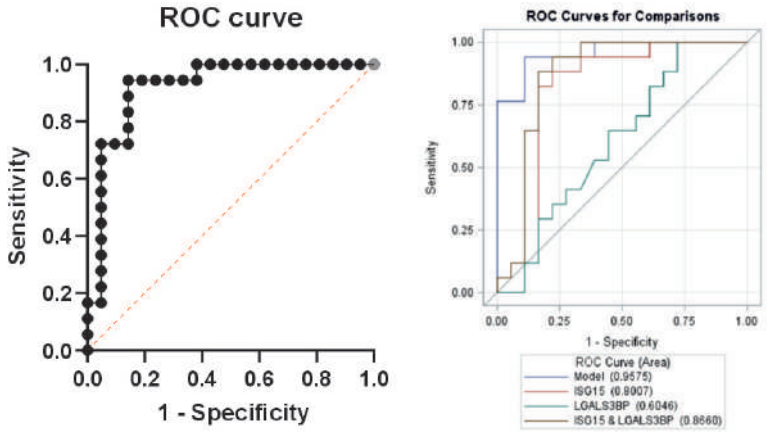


Fig 6. Receiver operator characteristic (ROC) curves for the early pregnancy detection in buffalo using two genes (left panel) and ROC of individuals gene showing various models of analysis (right panel).

- ✓ PCR and qPCR-HRM-based detection of milk adulteration of goat milk from buffalo and cow milk has been developed with the PCR sensitivity of detecting 0.01 ng of DNA harvested from milk. The test was able to distinguish the milk of three species namely, goat, cow, and buffalo, and the mixed milk of these species from test samples (n = 18) and field samples (n = 9) (Fig 7 and 8).

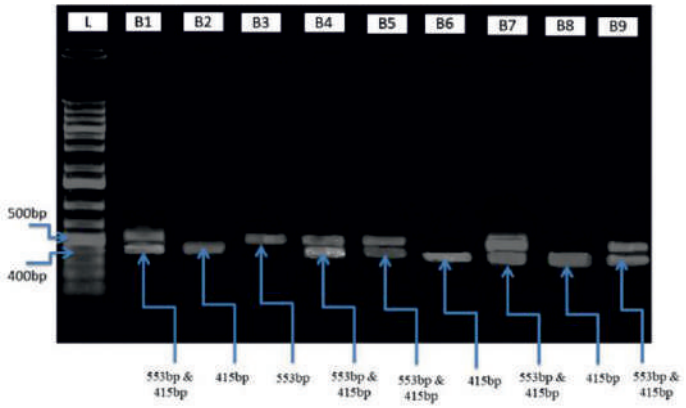


Fig 7. PCR-based detection of interspecies milk adulteration. The presence of a single band of different sizes correspondence to DNA from the milk of a single species, while the presence of two bands corresponds to the presence of DNA from two species, indicating milk adulteration.

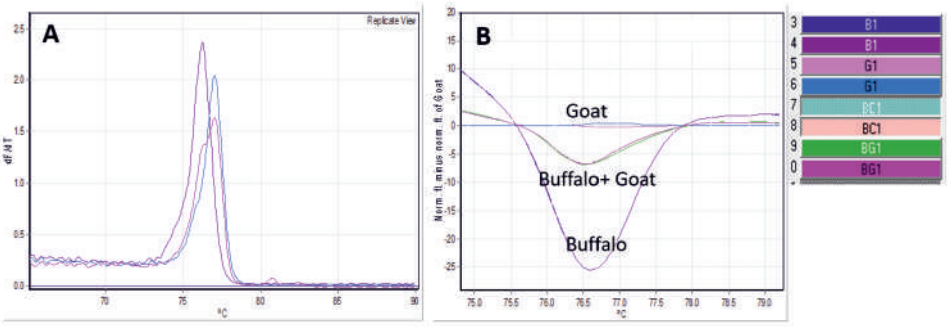


Fig 8. qPCR-HRM based detection of interspecies milk adulteration. The presence of a single peak at various melting temperatures (Tm) correspondence to DNA from the milk of a single species, while the presence of double peaks corresponds to the presence of DNA from two species (A), indicating milk adulteration. Differentiation of single and double peaks of amplified DNA of milk is also shown (B).

- ✓ rDNAJ and rDNAK of *Brucella* species were evaluated for their immunomodulatory property. The recombinant proteins boosted CMI response in mice(Fig 9).

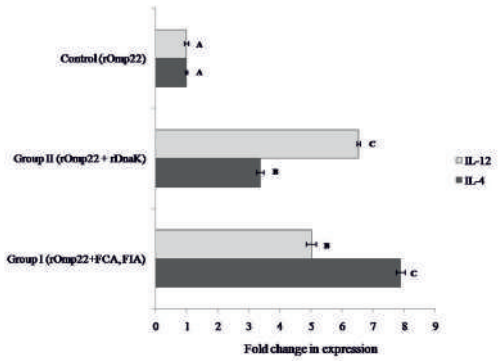


Fig 9. Expression of IL-4 and IL-12 mRNA in the treatment groups as compared to the control groups depicting enhanced CMI response in the group co-immunized with rOmp22 and rDNAK.

✓ Antimicrobial peptides identified as having a role in controlling *Listeria monocytogenes*. RI12 was found to reduce the bacterial counts in meat when compared with controls (Fig 10).

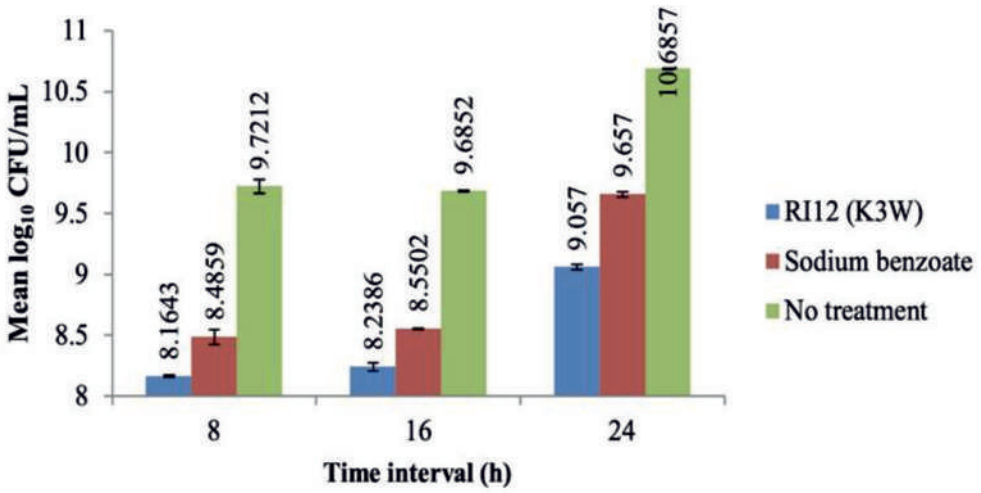


Fig 10. Efficacy of AMP R 112 in comparison with untreated and chemical control

✓ Osteopontin (OPN) has been evaluated as a diagnostic marker of canine mammary tumors. The protein was found to be significantly overexpressed in canine mammary tumor tissue. A sandwich ELISA was developed to detect OPN in circulation. The serum level of the OPN was also found to be higher in CMT subjects(Fig 11).

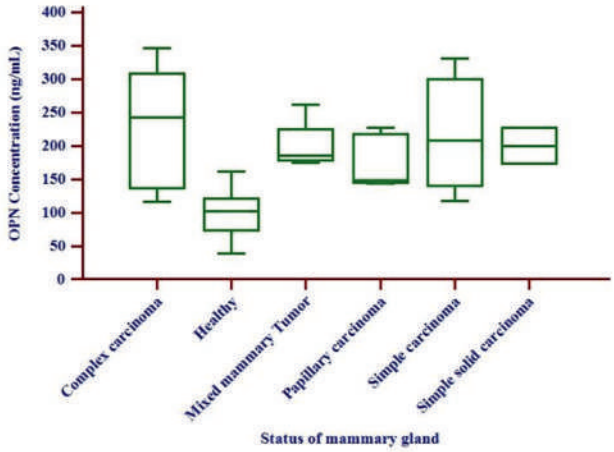


Fig 11. Serum levels of OPN in dogs with various types of mammary tumors.

- **Animal Genomics and Bioinformatics:**

✓ Differential miRNome profile was reported for the first time in diseased vs. Healthy buffaloes. The results indicated that a total of 288 bubaline miRNA homologous to that of cattle were identified and a total number of 130 novel miRNA with no homologue in cattle was first discovered in buffalo(Fig12).

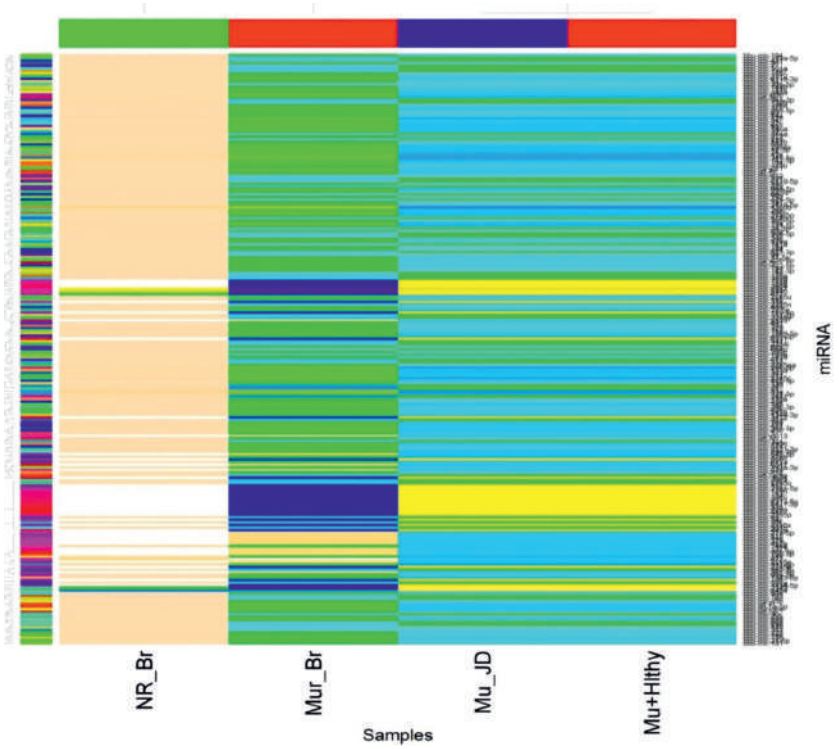


Fig 12. Sample dendogram clustering the samples and the miRNAs according to co-expression patterns among the diseased and healthy buffaloes

- The bubaline miRNAs were predicted via in silico analysis of whole genome sequences of buffalo. Eight identified miRNAs were selected based on lowest E-value and validated by real time PCR (SYBR green chemistry) using RNU6 as endogenous control(Fig13).

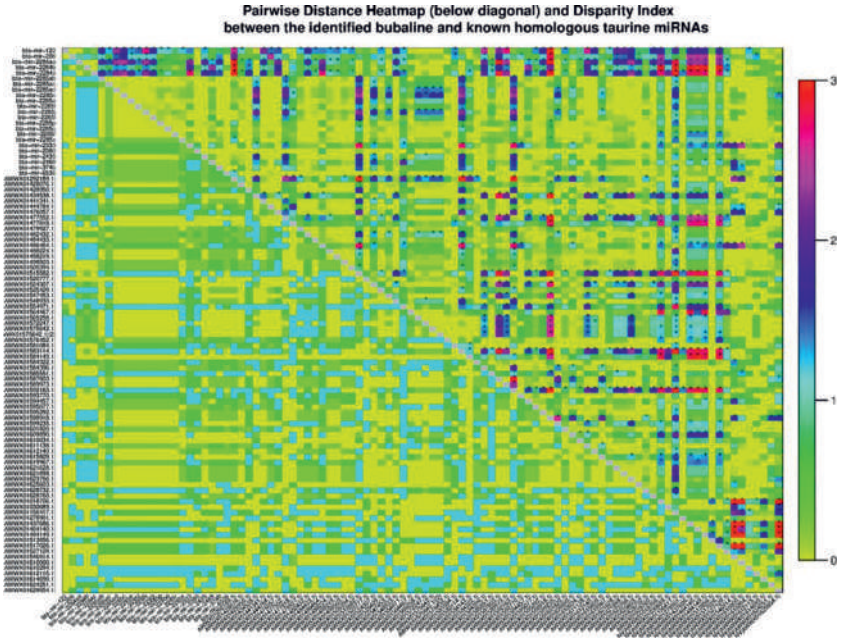


Fig 13 . Heatmap depicting the pair-wise distance (below diagonal) and disparity index (above diagonal) between the predicted as well as reported miRNA-pairs

- Established parentage determination technique in cattle and buffalo using cross-hybridizing SSR-primers (usable in both species) with high accuracy of parentage determination (>99.9%). The technique is now being used as seervice to detect parentage to the dairy farmers.
- Published for the first time the Gaddi whole genome sequence which is available in the NCBI database (Bioproject Accession: PRJNA843534 ID: 843534): Whole genome sequencing and assembly till contig level of indigenous Gaddi breed of dog. This is the maiden report on whole genome sequencing on any indigenous breed of dog. The whole-genome raw data of the Gaddi dog have been submitted to NCBI Bioproject: PRJNA843534 (Five Samples), SRA Id: SUB11545263 (Fig 14)

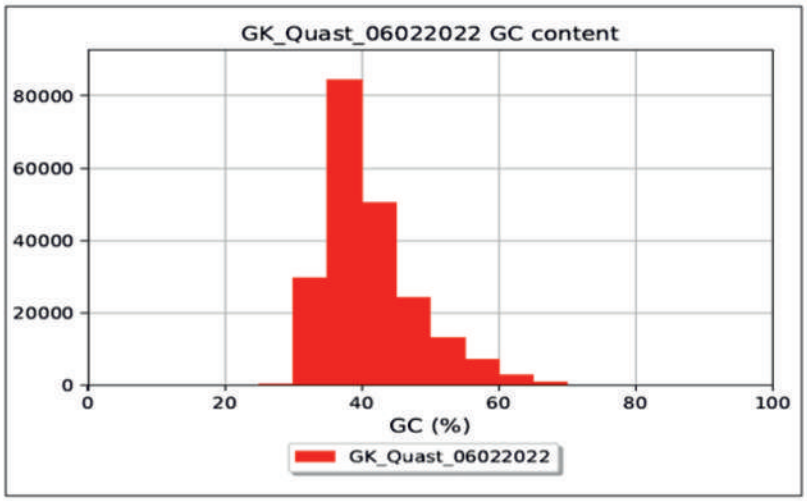


Fig 14. Whole Genome Assembly through QUAST Assessment (of Gaddi dogs)

✓ Comparative annotation of whole genome for protein-coding and non-coding genes and microsatellite loci between indigenous Gaddi dogs and exotic breeds of dogs (Labrador, Basenji, Tasha-Boxer, Mischka German shepherd, and Zoey Great Dane) (Fig 15).

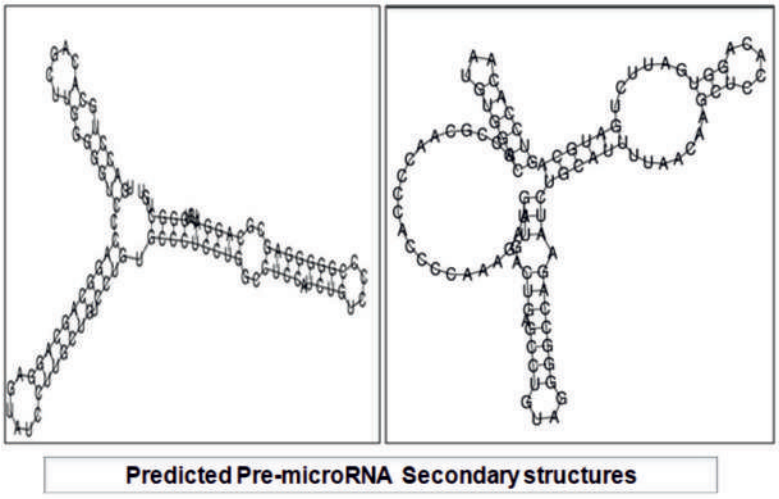


Fig 15. Demonstration of secondary structure formation of pre-microRNAs (identified through analyzing whole genome sequence of Gaddi dogs)

- **Stem and Cell Biology**
  - ✓ Development of a protocol for mesenchymal stem cells containing stromal vascular fractions isolation from canine adipose tissue suitable for regenerative therapy(Fig 16).

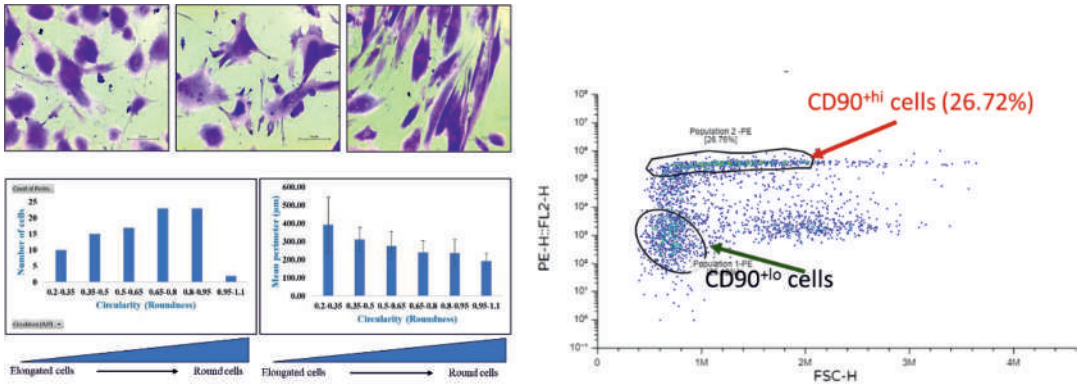
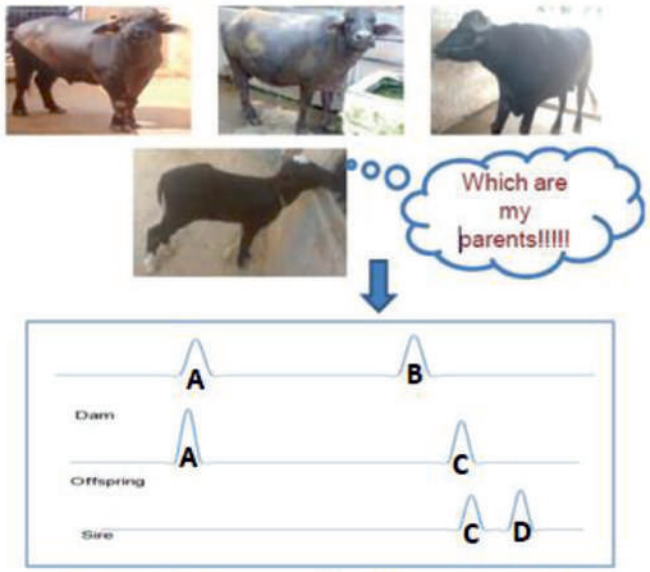


Fig 16. Isolation, culture and characterization of canine stromal vascular fractions (SVFs) for therapeutic applications in canine regenerative medicine.

- **Success story: Parentage Service for Dairy Animals: A New Vista to Enhance Profitability through Scientific Farming**

Punjab has played a critical role in White revolution in India by contributing to the milk pool of the nation. According to the 2019 livestock census the exotic/ crossbred cattle, indigenous cattle are 25 lakh and buffalo 40 lakh (https://dahd.nic.in/sites/default/filess/Livestock%20%205_0.pdf). With a commendable productivity of milk, Punjab produces 1216 gm per capita milk- highest in the country and is self-reliant and rather exporting mik and milk products to other states/UT. Thus, it necessitates thorough incorporation of scientific breeding and keeping of pedigree records to ensure correct germplasm selection.

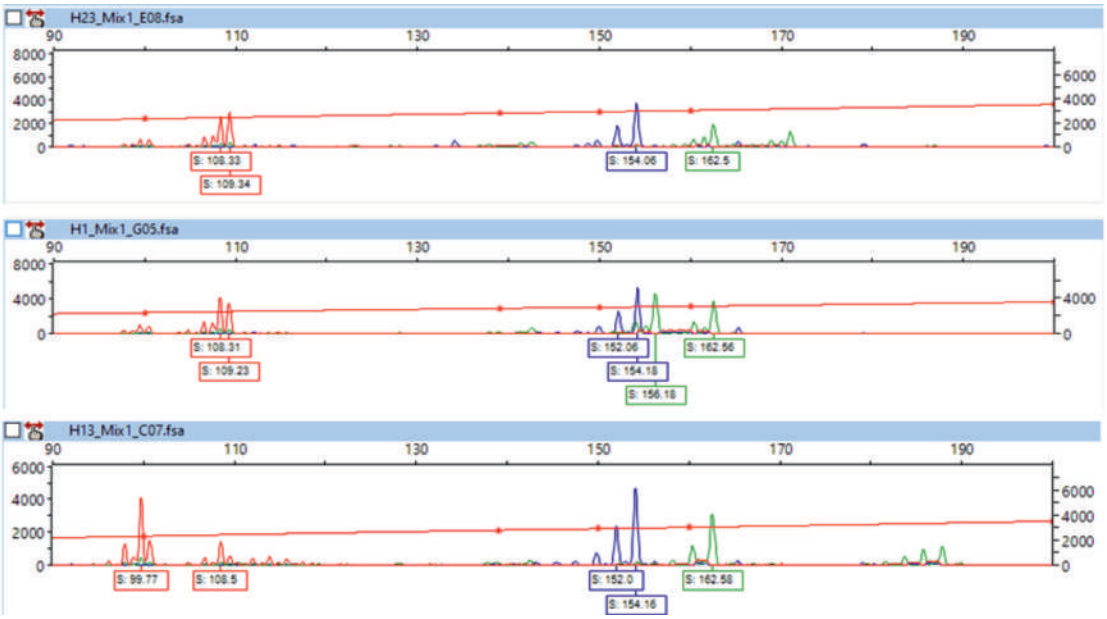


One peak each of the Sire (with peaks 'C', 'D') and the dam (peaks 'A' and 'B') is being shared by the offspring (peaks 'A' and 'C'). Similarly, other marks are verified for the matching of peaks between sire –dam and offspring

In a step forward, the College of Animal Biotechnology, Guru Angad Dev Veterinary, and Animal Sciences University, Ludhiana has started offering services of parentage determination in dairy animals (cattle and buffalo) after three years of long research work. Parentage determination refers to the identification of the true biological parents (Sire and Dam) of an offspring using some suitable molecular markers, like simple sequence repeats (SSR), single nucleotide polymorphism (SNP), etc.

The technique makes use of DNA fingerprinting (DFP) which is highly reproducible and reliable. DFP identifies the molecular signatures of an individual which is matched between the parents and offspring. The accuracy of parentage determination is required to be very high to increase the likelihood of exclusion of the putative parents.

The parentage detection technique using simple sequence repeat length polymorphism has been developed from the required modification of the available methodology. The technique involves the collection of peripheral blood from animals, extraction of quality DNA, custom sequencing of the SSR loci using 5'-labeled SSR primers, length polymorphism detection and finally analyzing the data using software like Peakscanner, Cervus, etc. Each of the allele information is manually crosschecked and the data of the putative parent (one parent is assumed to be correct) and the offspring is matched. The results are being matched for all the 12 markers.



Representative plots showing peaks following multiplexing of three SSRs (of a trio) using the software Peakscanner 1.0. Marker dyes used: (ILSTS033 (Blue), CSSM033 (Green), and CSSM045 (Red)

The laboratory of Animal Genomics of the College of Animal Biotechnology initiated the work on parentage determination in cattle and buffalo. A team of experts from the College (including Dr. YS Malik, Dean, College of Animal Biotechnology, Dr. CS Mukhopadhyay, Senior Scientist, Dr. Neeraj Kashyap, Assistant Professor, Dr. RK Choudhary, Assistant Professor, Dr. Kalpana Singh, Assistant Professor) monitored the accuracy of the identified suitable molecular markers for accurate parentage detection. The accuracy of parentage determination is high >99.99% with the top 12 selected markers (out of those 18 markers). The selected markers also exhibit high probabilities of exclusion (0.99999), thus indicating higher parentage assignment.

The 18 cross-hybridizing primers of cattle and buffalo have been validated in-house. Several trio samples (representing Murrah and Nili Ravi buffaloes) were sequenced (SSR-Length Polymorphism) in a blinded way (the trio relationship of the samples ere not disclosed to the sequencing agency). It successfully identified the sires in each trio. Besides, the lab has started providing the service to farmers, as well. Farmers have availed the facility of sire testing extended by our laboratory. The cost of the parentage service is around Rs. 4000/- per sample per set.

Parentage testing facilities for cattle and buffalo has been developed and made available to the farmers in Punjab. This is the second such facility after NDDB. The vet-versity is committed to serving livestock farmers through all possible means including providing high-end technical services to the stakeholders. This parentage determination service is essential for verified sale and purchase of highly prized animals, maintaining proper pedigree records, and solving vetero-legal issues. It is also essential for resourcing

bulls from field for semen production. The accurate parentage detection will enable farmers to sale and buy germplasm of high genetic merit.

C. College of Diary Science and Technology

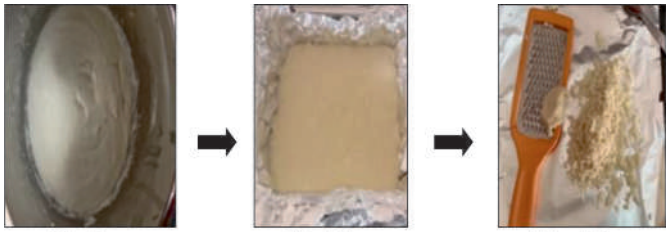
The college has five departments that undertake research activities within their mandate areas primarily focusing milk processing, new product development, newer tools and techniques, milk and milk products quality and safety and dairy economics. Research achievements of different departments are listed below:

I. Department of Dairy Technology

- ***Chhana podo:*** *Chhana podo* is a baked sweet cottage cheese, made from chhana, sugar, and refined wheat flour (suji)/(maida), Nuts, cloves, and cardamoms. The shelf life of the product is only 2–3 days in ambient conditions. Application of gallic acid and grapefruit extract in the active packaging materials extended the shelf life of the product. Jaggery and brown sugar having cytoprotective and antioxidant activity provided nutraceutical benefits to the final product.

CHHANA PODO WITH ACTIVE PACKAGING

- **Ricotta Cheese Spread**: This new product was prepared from heat co-precipitation of proteins from mixture of cheese whey and milk mixed in desired ratio along with addition of salt and combination of hydrocolloids with improved spreadability.
- **Smoothie:** Smoothies are characterized by food beverages having functional properties due to added variable ingredients. It can be dairy and non-dairy based depending upon the choice of ingredients added. Because of its high nutrient density, the processing parameters play an important role in product development to retain those very nutrients in the final product. The production of smoothie was standardized applying different treatments viz. Pasteurization and Ultrasonication. Effect of treatments on quality characteristics of functional Smoothie with ingredients like oats, chia seeds, a natural sweetener like honey and fruit like blueberries was studied. Ultrasonication treatment showed more stable properties in terms of viscosity, serum separation, sensory profile as well as microbiological aspects with the higher antioxidant and phenol content.
- **Pizza Cheese:** A newer variety of Pizza Cheese (processed) **FORTIFIED WITH OMEGA 3 FATTY ACIDS AND DIETARY FIBRE** was prepared.



The milk though being an ideal food is poor source of omega 3 fatty acids and dietary fiber. Also, these omega 3 fatty acids are highly susceptible to oxidative deterioration; thereby leading to undesirable flavor in the milk products. Therefore, to enhance the nutritional status of milk fortification of dairy products these vital ingredients like essential fatty acids & with fiber is the need of an hour. Also, when it comes to popularity of western dairy products, pizza cheese probably is at amongst few top-rated products. Therefore, fortification can be done in such products, visualizing its absorption and availability at wider scale must be added in the form of an emulsion in milk for enhancing the functionality of pizza cheese. The encapsulated powder containing samples had higher RDA value of vital ingredients like omega 3 fatty acids and fibre as compared to emulsion fortified samples.

II. Department of Dairy Microbiology

- Department of Dairy Microbiology developed Customized Media for selective isolation of *S. aureus* from milk. The developed media was validated *In-house* and qualified third Party validation from NABL Accredited Lab. The developed media was antagonistic to *Macrococcus caseolyticus*, *Klebsiella pneumonia*e, *Proteus mirabilis*, *Lactococcus garvieae*, *Lactococcus lactis* and *Enterococcus durans*. The media limits the growth of *S. aureus* alike colonies from milk and displays high selectivity for *S. aureus* with productivity 1.02.

- Technology for extraction of crude β-galactosidase extract from *L. acidophilus* ATCC 4356 by using five different extraction methods was developed. Up to 40% of lactose in milk can be hydrolysed using extracted crude enzyme. Also lactose hydrolyzed milk was successfully optimized using crude extracted enzyme and being an economical, innovative and therapeutic product, large scale production of the product can be taken up by large players of the field.

III. Department of Dairy Engineering

- Collaborative research on predictive modeling for prediction of shelf life of yogurt was undertaken at SIU, Carbondale, USA using neural network technique of artificial intelligence.
- Prototype for stretching and kneading unit for mozzarella cheese manufacture at cottage scale was designed and fabricated. At large scale, mechanization of mozzarella cheese manufacturing is still a highly labor-intensive job which can be manufacture without labour drudgery at cottage scale. This prototype is an indigenous machine for mechanization of mozzarella cheese at cottage scale which can help dairy farmers to venture into value addition of milk by manufacturing mozzarella at their own farm. This prototype will also result in product of hygienic and uniform quality.

IV. Department of Dairy Economics and Business Management

A project entitled "A Study of water footprint Analysis of Dairy sector of Punjab" in collaboration with IIT Ropar is in operational in department since July 2021 and Dr Inderpreet Kaur is PI of the project. The main objective of the project are 1) to study regional climatic effects on milk production 2) To study species wise, breed wise, herd size and sector wise water usage in dairy farms in the selected zones and 3) To study water usage at milk processing plant. Under this project, a forecasting model has been developed for milk yield prediction w.r.t. feeding pattern, animal's lactation, milking days, inter-calving period and climatic factors.

A comprehensive data regarding water utilization at dairy farms to evaluate direct and indirect water footprint was collected. Total 10 milk processing plants spreading across the length and breadth of the state were selected for the study and data collection. The total water footprint was found out to be 8.99 l water per kg of milk processed. The share of direct water footprint was 10.57% and rest 89.43% came from indirect water footprint. Assessment of the Indirect Water Footprint (IWF) in the Milk Processing was done for the 1st time globally. Principal Component Analysis for milk products was done to determine major water consumable products i.e. *Liquid Milk, Milk Powder, Butter, Ghee and Dahi.* Prediction for water usage for existing and newly planned plants was also done Water Usage in total milk processing sector was assessed i.e. 2.27 % of the total domestic and industrial water usage in Punjab.

D . COLLEGE OF FISHERIES

I. Inland Saline Water Aquaculture

i) **Technology Demonstration and Replication - Demonstration of shrimp farming at Village Shijrana, Kharunj & Gaddan Dob, District Fazilka:** Demonstration trials (03) of shrimp (*Penaeus vannamei)* farming (1 acre each) were undertaken at Village Shijrana, Kharunj & Gaddan Dob, District Fazilka for demonstration and replication. The shrimp larvae (PL-10) were stocked @38 PL/m^2. The demonstration trials were conducted by following approved scientific guidelines w.r.to feeding, water quality maintenance and biosecurity measures along with minimal use of water/soil/feed probiotics and sanitizers/chemicals The water quality was maintained through regular water exchange and balancing C:N ratio. After 120 days of successful culture trial, shrimp biomass (per acre) of about 3.5 tonne (t), 3.8 t and 4.5 t were harvested from village Shijrana, Gaddan Dob and Kharunj, respectively with an average shrimp weight of 25 grams and a profit margin of around 3.5 lakhs/acre.

Demonstration Trials - Shrimp Farming

Shrimp Harvest after Completion of Demonstration Trial

ii) Feasibility of rearing fresh water food fish in inland saline water

a. Histo-morphological changes in freshwater Indian major carp, Cirrhinus mrigala (Ham.) in inland saline water (ISW)

- Salinity tolerance (survival and behaviour), growth, and histo-morphology of freshwater carp, *C. mrigala* (mrigal) was studied in ISW. Results revealed that mrigal can tolerate salinity up to 6 ppt for short duration of salinity exposure with 100% survival, whereas during longer salinity exposure fish adapted to 4 ppt. Fish growth and organ histology was significantly affected at the higher salinity treatments (beyond 4 ppt)
- Overall results in terms of survival, growth, and histological alterations revealed that, although fish was capable of adapting and growing under salinity conditions up to 6 ppt in inland saline water, but 4 ppt salinity can be considered safe with respect to overall performance of fish.

b. Eco-physiological responses of freshwater ornamental fish Sword tail, Xiphophorus helleri in inland saline waters (ISW)

- Salinity tolerance (survival and behaviour), growth, reproduction, overall health performance, colouration and histomorphological alterations of freshwater ornamental fish *viz. Xiphophorus helleri* **(**Sword tail) were studied in ISW. Results revealed that fish can tolerate salinity up to 12 ppt for short duration of salinity exposure with 83.33 % survival, whereas during longer salinity exposure fish adapted upto 8 ppt.

(A) (B)

(A) Conditioning and Acclimation of Experimental Fish (B) Experimental Set-up

- Fish growth and reproductive performances were significantly affected at the higher salinity treatments (beyond 8 ppt), while best values were recorded at intermediate salinity treatments (6 -8 ppt). Stress affected fish growth and survival, as evidenced by high plasma glucose and cortisol levels at higher salinities. Furthermore, SOD, CAT, LPO (nmol MDA g protein-1), and GR up to 8 ppt showed elevated levels of antioxidant components. Skin colouration also showed improvement with increasing salinity up to 8 ppt, indicates that fish was able to conserve normal metabolism.
- Overall results in terms of survival, growth, reproductive performances, and overall health condition including coloration revealed that, although Sword tail was capable of adapting and growing under salinity conditions up to 12 ppt in inland saline water, but 8 ppt salinity can be considered safe with respect to overall performance of fish.

II. Aquaculture System Modification: Climate Smart Pangas Culture Technology

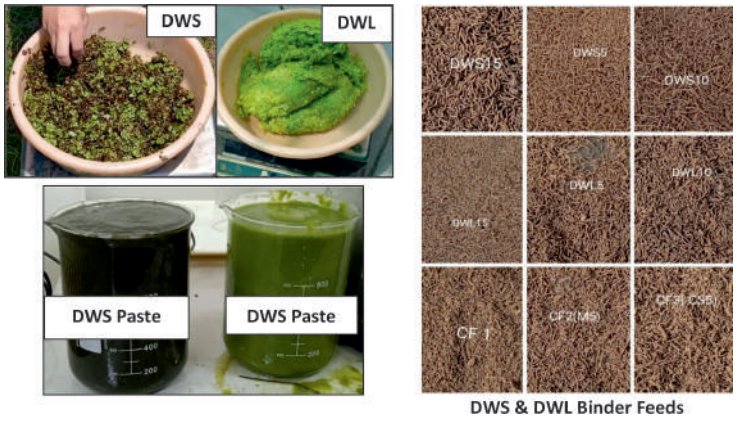
Off-campus Pangas culture trials conducted at Regional Research and Training Centre (RRTC), Talwara in LDPE poly-lined pond (500 m2) by following standard biosecurity measures. In culture period of 5 months, productivity of 4.8 ton/acre was achieved, which is considerably higher than the traditional carp culture. The results of trial will help in promoting Pangas culture in low to moderate rainfall area and (sandy/stony) not suitable for traditional aquaculture.

Pangas Culture Demonstration Unit at RRTC, Talwara | **Onsite Demonstration of Culture Technology** | **Harvesting of Pangas Fish**

III. Aquaculture Nutrition

Nutritionally rich organic binder for pellet fish feed

Protein rich Duckweeds, *Spirodela polyrhiza and Lemna minor* were tested to produce water stable pellet feed and its effect on fish growth, health and quality was studied. Nine experimental feeds viz., control feed without binder (CF), cane molasses (5%) binder feed (MF5), corn starch (5%) binder feed (CSF5) and duckweed (DW) binder feeds viz. *Spirodela* (DWS) containing DW paste @ 5% (DWS5), 10% (DWS10) and 15% (DWS15); *Lemna* (DWL) containing DW paste @ 5% (DWL5), 10% (DWL10) and 15% (DWL15) were prepared and evaluated in terms of proximate composition, water stability, sinking time, microbial load and aflatoxin levels over a storage period 360 days (12 months).



DWS & DWL Binder Feeds

Among DWS and DWL feeds, DWS appeared as a potent binder, with enhanced water stability i.e., 61.17, 65.44, 60.26 % higher (Max. DWS15) and sinking time i.e., 1.41, 1.72 and 2.58 times higher (Max. DWS10) as compared to CF, MF5 and CSF5 feeds, respectively. Microbial contamination and aflatoxin level in all the DW binder reduced significantly during the storage period, indicating antimicrobial/ antifungal properties of duckweed.

IV. Intensive Aquaculture Technologies

i) For getting higher production, aquaculture systems are also being intensified to enhance productivity with significant reduction in water and land requirements to achieve the production targets in accordance to increasing human population. In this context, '***Capacity Building Resource Centre for Intensive Aquaculture Technologies in Punjab: Re-Circulatory and Biofloc Aquaculture Systems'*** established under Pradhan Mantri Matsya Sampada Yojna (PMMSY) of Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying (GOI), to cater capacity buildings needs of the region for commercial adoption of intensive aquaculture technologies through an integrated research, demonstration and skill development program.

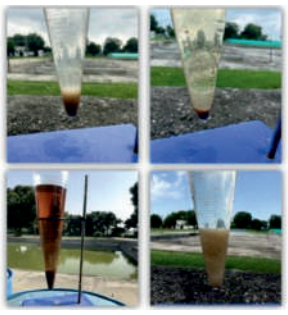
Re-Circulatory and Biofloc Aquaculture Systems

ii) Biofloc Aquaculture System (BFAS) - Production performance of high value Pangas catfish (*Pangasius hypopthalmus*) in BFAS with different carbohydrates sources

Among the different carbohydrate sources tested, supplementation of jaggery significantly improved water quality through reduction of total ammonia nitrogen (3.23-18.70%↓), nitrite-nitrogen (2.59-34.68%↓) and enhancement of nitrate-nitrogen (12.86-87.78%↑) concentrations. Additionally, jaggery supplemented biofloc also enhanced growth performance (11.91-64.14%↑), fish body weight gain (4.40-33.33%↑) specific growth rate and improved feed conversion ratio (2.16-26.09%↓), digestive enzymes activity, haematological (13.01-33.06%↑ total erythrocytes, 7.86-26.26%↑ total leukocytes and 3.58-20.52%↑ haemoglobin), immunological (23.92-38.07%↑ serum protein, 35.32-59.06%↑ albumin) and improved oxidative stress (27.25-31.64%↑ higher super oxide dismutase and 12.96-41.31%↓ lower glucose) responses in striped catfish in biofloc system.

Biofloc Tanks Experimental Set Up

Biofloc Media with Different Carbohydrate Sources

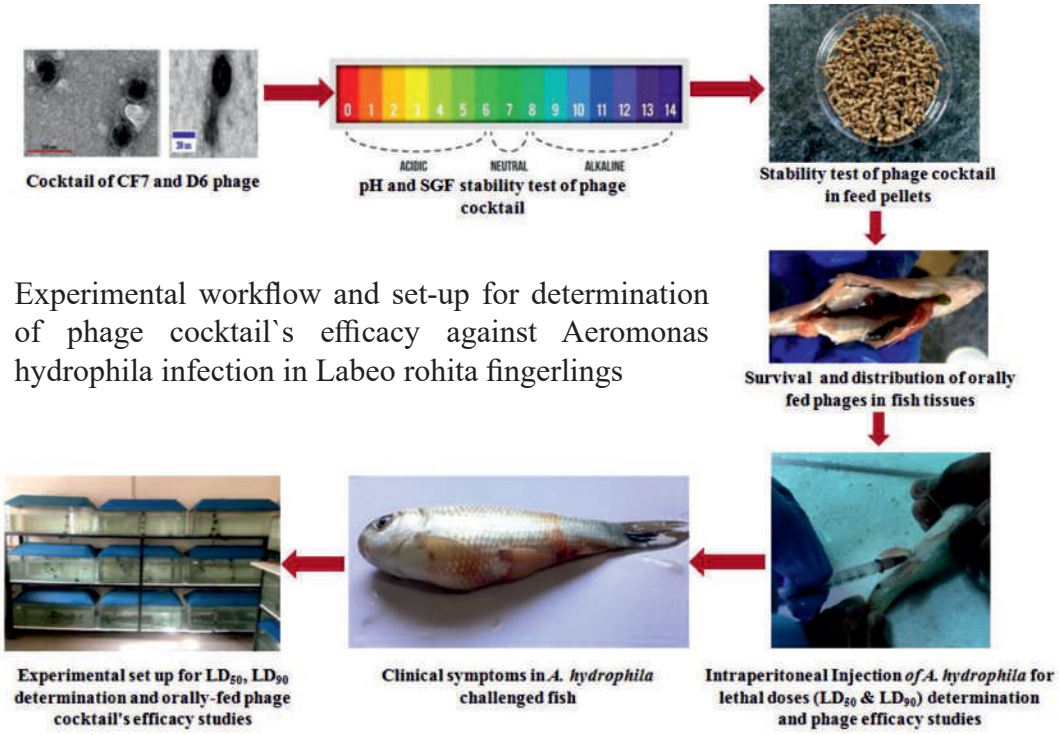


Imhoff Cone For Biofloc Volume Estimation

V. Aquatic Environment and Health Management

i) Protective efficacy of an orally administered phage cocktail against ***Aeromonas hydrophila*** infection in ***Labeo rohita***

- A cocktail of two phages (D6 and CF7) which can be used for control of *Aeromonas hydrophila* infection in fish.
- Both D6 and CF7 phages showed good survival in feed for almost 2 months with a decline of phages counts by ≤1.66 $\log_{10}$ and ≤0.34 $\log_{10}$ plaque forming unit (PFU) per gram of feed during storage at room temperature and 4° C, respectively.
- After oral feed-based administration of the phage cocktail, both D6 and CF7 phages were able to survive in the fish gut and also cross the intestinal barrier to distribute into the fish kidney.
- At the estimated phage cocktail concentrations (D6 and CF7 each) of 1 x 10^6, 1 x 10^7 and 1 x 10^8PFU per gram of feed, relative percentage survivals (RPS) in *A. hydrophila* LD50 challenged fish groups were 8.3, 30.6 and 66.7, respectively.
- The findings of the present study are significant as these lead to a practical approach to applying phage therapy for disease prevention in large-scale aquaculture farms.

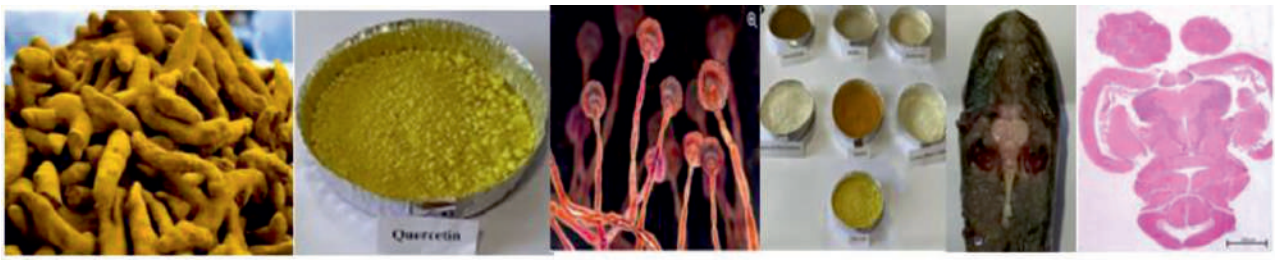


Experimental workflow and set-up for determination of phage cocktail`s efficacy against Aeromonas hydrophila infection in Labeo rohita fingerlings

ii) Disease amelioration & management through herbal therapy

Efficacy of turmeric and quercetin in *Labeo rohita* challenged with aflatoxin B_1-potential alternatives for fungal control in aquaculture

Dietary inclusion of turmeric and quercetin increased resistance against aflatoxin and recorded highest amelioration at 25 ppb AFB1 and 5 g turmeric and 200 mg quercetin in *L. rohita*, respectively. Turmeric and quercetin supplementation diets exhibited differential modulatory responses on the growth, haematology, biochemical, flesh quality, gene expression, and histomorphological studies depending on the dose, and hence on the physiology of the fish.



VI. Fish/Shellfish Disease Surveillance was carried out under National Surveillance Programme for Aquatic Animal Diseases (NSPAAD)

- Non-infectious shrimp diseases and *Enterocytozoon hepatopenaei* (EHP) were reported in the shrimp farms and Bacterial (*Aeromonas hydrohipla)* and parasitic diseases (*Larnaeasis* and *Argulosis*) were reported in the finfish culture of Punjab
- No incidence of DNA and RNA viruses were observed even by third level of diagnosis (PCR) in the cultured shrimp
- National inter laboratory evaluation test/ring test conducted by funding agency for aquatic pathogens (viral, bacterial, parasitic, and fungus) was successfully completed (level-III diagnosis)

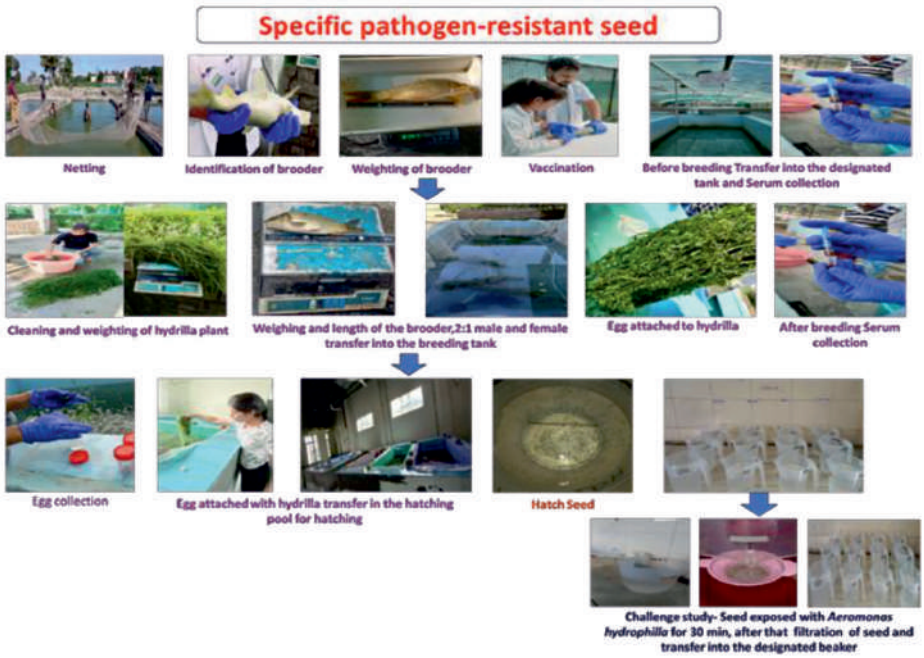
Bacterial Infection: Level - III

Parasitic Infection: Level – I & II

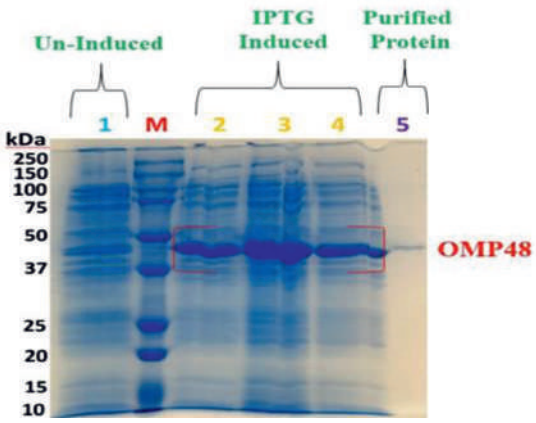
Fish disease diagnosis as per the standard protocol (OIE/NSPAAD)

VII. Nanoparticle Based Novel Oral Biofilm Recombinant Vaccine Model for Aquaculture - Development of specific pathogen resistant fish seed by vaccinating the brood fish

- The protective role of maternally transferred immunity was evaluated in vaccinated brood fish offspring with challenge against *Aeromonas hydrophila*. Preliminary study revealed 10–40% mortality during the early stages of fish seed production; it is found that, early phases of fish seed rearing reported a 10–40% mortality rate (Data from the 13 private hatcheries from four different states of India).
- In this regard, recombinant vaccine (OMP 48 protein) was produced by recombinant DNA technology and was injected to brood fish (male and female) in different concentration with different combination [Treatment 1: High dose (1mg/kg body weight); Treatment 2: High dose with adjuvant (Freunds adjuvant in 1:1); Treatment 3: Low dose (0.25 mg/kg body weight); Treatment 4: Low dose with adjuvant; Treatment 5: Adjuvant; Treatment 6: Phosphate buffered saline (Control).



- After booster dose, brood stock (male and female) was separately (treatment wise). After spawning, vaccinated and control groups offspring (1st week of post-hatch) were challenged with a pathogenic strain of *A. hydrophila*. (LD50 dose) to study the protective efficacy; treatment 4 group i.e. low dose with adjuvant showed significantly higher resistance against the *A. hydrophila* compared to other treatment groups.
- Further, the immune gene expression was also higher in the treatment 4 group (low dose with adjuvant). Therefore, the study concludes that, specific pathogen seed can be produced in the fish by immunizing the brood fish with OMP 48 vaccine (0.25 mg/kg body weight with adjuvant).



Development and production of recombinant vaccine; Confirmation of expressed OMP 48 recombinant protein using bacterial expression system (IPTG-Isopropyl β-D-1-thiogalactopyranoside)

VIII. Fish market survey and data base generation

- Fish markets of five major districts (Ludhiana, Amritsar, Mohali, Jalandhar and Bathinda) of Punjab were surveyed w.r.t. fish species assemblage, catch composition, demand and supply, market structure, market chain, quantum of banned fish species being marketed from September, 2021- December, 2022.
- In Punjab, fish produced in individual and community ponds are marketed in live and ice preserved condition. Fish species available in markets exclusively from capture fisheries, within the State, mainly harvested from Harike (31°13'N and 75°12'E), Nangal (31° 23' N and 76° 22' E) and Pong dams (31°97' N and 75°94'

Major Districts of Punjab Selected for Survey of Fish Markets

E) (70-75 %). Rest of the capture fisheries (25-30%) generally harvested from rivers.

- Locally produced Rohu (*Labeo rohita*) (25- 30%), and imported Pangas catfish (*Pangasianodon hypophthalmus*) (30-35%) from Andhra Pradesh have the highest demand among the consumers.
- Three banned species i.e. Big head (*Hypophthalmichthys nobilis*), Pacu *(Piaractus brachypomus*) and Thai Magur (*Clarius gariepinus*) comprised 2-7% of market share in different markets.
- Marketing channels can be simplified so that the fish produced in farm or harvested from natural sources can directly be reached to the consumers without intervention of number of intermediaries. Unregulated fish supply in the markets, lack of proper storage and waste disposal facilities are the major constrains in fish markets of Punjab.

Parameters	Ludhiana	Amritsar	Mohali	Jalandhar	Bathinda
Total fish sale (ton/day)	2.0 -12.0	0.5- 4.5	1.0-5.5	2.5-5.5	0.75- 5.0
Capture (%)	35-40	40-45	30-35	30-35	25-30
Culture (%)	20-30	25-30	30-35	35-40	30-35
Imported (%)	10-20	15-20	15-25	20-25	30-35
Low value/ non- economic	5-10	0-5	0-5	0	0
Banned species	5-7*	2-5**	2-5*	2-5**	2-5**
Total spp. marketed (Nos.)	35	22	12	13	19
Dominant species	Carps	Carps	Carps	Pangas	Carps

* All three banned species Big head, Pacu and Thai Magur, ** Two banned species Big head and Pacu

IX. Fish diversity valuation and socio-economic assessment from Harike wetland system

- From the Harike wetland, a total of 29 fish species belonging to 12 families were identified during Pre-monsoon period (March to June 2023).
- During the species landing analysis, Cyprinidae was observed as most dominant family (10 species), followed by Bagridae (4 species) and Channidae, Notopteridae, Sisoridae. Besides, miscellaneous catch consists of species from the families, like- Sisoridae, Ambassidae, Clariidae, Heteropneustidae, Mastacembelidae, Nandidae and Schilbeidae
- To get an idea about landing pattern of fish w.r.t size of the fishes captured, total length and weight of commercial important fishes were also recorded. The ranges of these data varied within and amongst the different species. For instance, *Labeo rohita* (L = 55.6-72.4 cm Wt.= 2.05-2.55 kg), *L. gonius* (L =33.2-44.7 cm, Wt.=- 0.6-1.45 kg), *Cyprinus carpio* (48.3-53.1 cm, Wt.= 2-2.5 kg), *Sperata seenghala* (L=46.2-95.5 cm, Wt.= 0.5-4.5 kg), *Wallago attu* (L=-13.6-115.3 cm, Wt.= 1.1-9.3 kg) *Channa striata* (L=66.5-97 cm, Wt.= 2.05-6.9 kg), and *Notopterus notopterus* (L=20.3-27.4 cm,

Wt.= 0.05-0.15 kg).

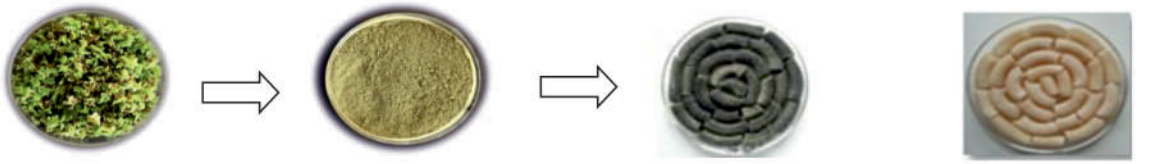
- The study included socio-economic conditions of the fishermen involved in fishing around Harike wetland system. It has been observed that approximately 50 to 100 fishers from Uttar Pradesh, Bihar and West Bengal have settled in makeshift houses near the wetland system.
- The fishery of this area is completely under the control of male members without any involvement of women. These fishermen have been living alone (without their families) or in groups (with other fishermen). The literacy rate among them was found to be relatively low, indicating limited access to education and awareness. Most of the fishermen also lack in knowledge regarding government schemes, insurance, loans, and training programs aimed at supporting their livelihoods.
- The fishing is carried out by using wooden boats as major craft with fishing gears like cast nets, hooks, and drag nets.
- These fishermen have reportedly been earning an average of Rs. 200-1000 per day, which mainly depends on factors such as catch size, market demand, and prevailing fishing conditions.

Fishermen Communities along Harike Wetland

Recording of Morphometric Data

X. Preparation of Functional Food (Pasta) by supplementing protein from non-conventional source - Supplementation of aquatic fern (***Azolla sp.***) powder in semolina for preparation of Pasta

- Aquatic fern (*Azolla sp*.) powder was used as a non-conventional protein source to supplement semolina pasta.



Fresh Azolla | **Azolla Powder** | **Azolla powder (10%) incorporated pasta** | **Pasta (Control)**

- The pre-blanched and dried powder of *Azolla* was used to supplement semolina @ 5, 10, 15, 20 g/100 g, followed by its quality evaluation. Addition of *Azolla* powder upto 10% into pasta was highly acceptable with significantly higher protein (11.23%) and fibre (2.84%) in comparison to control treatment (Pasta without *Azolla* - 10.08% protein and 1.93% fibre).

RESEARCH PROJECTS

1. Schemes Operational during 2022-23

Sr. No.	Funding Agency - Name of the Scheme [Budget in INR]
1.	ICAR-NAHEP - Institutional Development Plan (IDP) For Improved Learning Outcome, Skill and Entrepreneurship at GADVASU [8,30,70,068]
2.	ICAR - Strengthening and Development of Agricultural Education in Agricultural Universities: ICAR-1) [12,94,460]
3.	ICAR - Network Project on Buffalo Improvement (Main Unit) (C: AGB-1) [53,00,000]
4.	ICAR - Network Project on Buffalo Improvement (Field Unit) (C: AGB-2) [20,00,000]
5.	ICAR - Project Directorate on Cattle Field Progeny Testing Project (C: AGB-3) [69,37,333]
6.	ICAR – All India Coordinated Research Project (AICRP) on Poultry Breeding (C: AGB-4) [69,30,000]
7.	ICAR - AlCRP on Cattle -Sahiwal (Data Recording Unit) (C: AGB-5) [21,13,333]
8.	ICAR - AICRP on Nutritional and Physiological Approaches for Enhancing Reproductive Performance in Animals 75:25 [7,66,667]
9.	ICAR - All India Network Programme on Diagnostic Imaging and Management of Surgical Condition in Animals [8,33,333]
10.	ICAR - Monitoring of Drug Residues and Environmental Pollutants [3,20,000]
11.	ICAR - Integrated Approaches for Livestock Development: Farmer's Context [15,50,000]
12.	ICAR - Network Project on Buffalo Improvement Centre at GADVASU (Nili Ravi) 75:25 [20,00,000]
13.	ICAR - AICRP on Pig (75:25) [29,92,000]
14.	ICAR - National Animal Disease Epidemiology Network (NADEN) [2,00,000]
15.	ICAR - National Surveillance Programme for Aquatic Animal Diseases (NSPAAD)-Phase 2 [9,10,000]
16.	ICAR - AICRP on Goat Improvement [16,27,999]
17.	ICAR - Funds for Infrastructure in Science and Technology (FIST) [11,58,000]
18.	ICAR - Establishment of a New KVK at Village Majra, S.A.S. Nagar (Mohali) [1,81,00,000]
19.	ICAR - Cluster Frontline Demonstration on Oilseed (Rabi) under KVK S.A.S. Nagar (Mohali) [64,800]
20.	ICAR - Promotion of Agricultural Mechanization for In-Situ Management of Crop Residue in the state of Punjab under KVK, S.A.S. Nagar (Mohali) [21,87,000]
21.	ICAR 126: Out Scaling of Natural Farming through KVK S.A.S. Nagar (Mohali) [2,73,500]
22.	ICAR-131: Garib Kisan Sammelan organized by KVK SAS Nagar Mohali [1,99,350]
23.	ICAR-132: Kisan Mela under Kisan Bhagidari- Prathmikta Hamari campaign organized by KVK S.A.S. Nagar Mohali [1,03,772]
24.	ICAR- Establishment of a new KVK at Panchayat Booh, Tarn Taran ICAR-14
25.	ICAR-Promotion of Agricultural Mechanization for in-situ crop residue management in district Tarn Taran
26.	ICAR- Cluster Frontline Demonstration on Oilseeds
27.	Pb. Govt.- NPV-04 (Animal Genetics & Breeding) [3,98,2974]

28.	Pb. Govt.- Research Facilities for Dairy Cattle & Buffalo Breeding (NPV 16) [51,46,669]
29.	Pb. Govt.- Additional Facilities for the Modernization of Dairy Operations (NPV 19) [15,46,500]
30.	Pb. Govt.- Advanced Research Centre for Dairy Animal Reproduction (NPV 18) [71,97,768]
31.	Pb. Govt.- Genetics Improvement in Poultry Stocks (NPV 17) [32,54,508]
32.	Pb. Govt. - NPV 31: Toxicity Studies on Insecticides in Livestock
33.	Pb. Govt. - NPV-26 Animal Disease Research Centre & Strengthening of Diagnostic Facilities and Experimentation [3,70,044]
34.	Punjab Govt.- NPV-01: College of Veterinary Science
35.	Revolving Fund, DLF- RF-7: Processing & Distribution of Livestock Farm Produce [3,15,45,095]
36.	DBT - Modelling of Indigenous Diagnostics and Immune-Potent Vaccine Candidates to Combat African Swine Fever in India [4,01,129]
37.	DBT- Establishment of a Consortium for One Health to Address Zoonotic and Transboundary Diseases In India Including the North East Region [32,00,727]
38.	The International Atomic Energy Agency - Genome Wide Association Studies for the Improvement of Productivity in Dairy Buffalo in Cattle in India [14,29,235]
39.	MOFPI - Development of Good Quality and Healthy Ready to Drink Concoction of Milk Tea [1,91,158]
40.	CCRAS - Nursery for Cultivation of Selected Medicinal Plants at Guru Angad Dev Veterinary & Animal Sciences University, Ludhiana [1,50,000]
41.	Bill and Melinda Gates Foundation - Modelling Exposure to Biological Hazards in the Dairy Chain of Andhra Pradesh to Inform Food Safety Policy [10,20,501]
42.	Bill and Melinda Gates Foundation - Modelling Exposure to Biological Hazards in the Dairy Chain of Andhra Pradesh to Inform Food Safety Policy (SPHZ) [6,97,378]
43.	BASF India Limited, Mumbai - Studies on Effect of Feeding Organic Trace Minerals on Production, Reproduction, Immune Response and Metabolic Profile in Dairy Cows [2,00,437]
44.	BCL Industries Limited, Bathinda - Study on Utilization of DDGS as Livestock and Poultry Feed [4,07,766]
45.	Virbac Animal Health India Private Limited - Effects of Supplementing Chelated Agrimin Forte on the Performance of Dairy Animals [5,12,637]
46.	CCRAS - Clinical Evaluation of Efficacy of Padmakanta Yoga, an Ayurveda Formulation in the Management of Mastitis in Bovines [7,28,533]
47.	Swaraj Engines Limited, Mohali - Creation and Strengthening of Self Help Groups of District S.A.S.Nagar for Livelihood Security [8,59,268]
48.	ATMA, SAS Nagar- MISC- 116: Assessment, Refinement, Validation & Adoption of Frontline Technologies & Researchable Issue through KVK's under KVK, S.A.S. Nagar (Mohali) [2,00,000]
49.	Board of Research in Nuclear Sciences (BRNS) - Development of Phage-Based Strategies for Biocontrol of Antibiotic Resistant *Aeromanas* Species in Fishery Products [6,84,921]
50.	The Aditya Birla Science and Technology Co. Pvt. Ltd. - Study on the Supplementary Effects of Sodium Sulphate on Performance of Lactating Bovines [7,49,650]

51.	S S Waste Link Sustainability Services Pvt. Ltd. India - Effect of Supplementary Bakery Waste to the Total Mixed Ration on Milk Production, Quality and Reproduction in Dairy Animals [7,00,000]
52.	Trouw Nutrition India Pvt. Ltd. - Effects of Organic Acids on Aerobic Stability of Maize Silage [4,96,125]
53.	Reliance Industries Limited - Exploring Potential of RIL Plant-Based Protein Biomass (RPPB) As an Alternate Protein Ingredient in Pet Food [14,98,500]
54.	French National Research Institute for Sustainable Development (IRD) - Preliminary Evaluation of Atypical - Human Trypanosomiasis (a-HT) due to *Trypanosoma avansi* in Punjab [4,98,000]
55.	National Fisheries Development Board (NFDB) - Demonstration of Growth Performance, Health Status and Meat Quality of Biofloc Raised Fish in Northern India [13,63,250]
56.	DST - An Assessment of the Role of Mitochondria in Bovine Mastitis [7,46,000]
57.	SERB - Designing and Evaluation of Various Configurations of Threaded Intramedullary Pins for Canine Long Fractures [7,00,219]
58.	SERB- Engineering Intervention for Mechanization of Mozzarella Cheese Manufacture at cottage Scale [35,91,200]
59.	PLDB - Creation of State of Art Institute for Sahiwal Breeding Farm at RRTC, Kaljharani, Bathinda [43,93,960]
60.	PLDB - Implementation of EMBYRO Transfer & *in vitro* Fertilization Technology for Bovine Breeding [14,94,292]
61.	PSCST - Towards Climate Resilient Livestock Production System in Punjab [53,67,450]
62.	Department of Rural Development and Panchayats, Govt. of Punjab - Establishment of Instructional Gaushala at Guru Angad Dev Veterinary and Animal Sciences University [13,72,908]
63.	PPCB - Establishment of Dedicated River Health Monitoring Cell at GADVASU for Conservation and Restoration of the River Beas [27,50,000]
64.	NABARD - Development of Low-Cost Fruit Fly Traps for Cucurbit Vegetables and Its Demonstration at Farmers' Fields in Border Area of District Tarn Taran Implementation by KVK Tarn Taran [2,23,051]
65.	NABARD- Formation of Farmer Producer Organization (FPO) of Dairy Farmers at Border area of district Tarn Taran Sahib, Punjab, India
66.	NABARD- Deciphering the role of artificial intelligence in dairy farms at Border-belt of district Tarn Taran Sahib, Punjab, India
67.	NLM - Improvement of Rural Backyard Poultry Lines Through Genetic and Managemental Interventions Under Low Input System [23,91,000]
68.	NLM - Technological interventions for Development of Sustainable Kajali Sheep Production Model Vis a Vis Prevailing Intensive Paddy-Wheat Cropping System of Punjab [41,50,000]
69.	NLM - Development of Surveillance and Mitigation Tools for the Management of Anthelmintic Resistance in Small-Ruminants [10,73,000]
70.	RKVY - Enhancement of Production and Productivity Potential of Livestock, Poultry and Fisheries Sector for Socio-economic Upliftment of the Farmers of Punjab (2018-19) [65,00,000]

71.	RKVY - Enhancement of Production and Productivity Potential of Livestock, Poultry and Fisheries sector for Socio-economic upliftment of the farmers of Punjab (2019-20) [87,76,898]
72.	RKVY - Push to the Livestock sector and its Sustainability During the Current Challenging Scenario through the Implementation of Novel Practices (2020-21) [4,09,80,066]
73.	RKVY - Diversification through Animal Husbandry and Fisheries for Livelihood and nutritional Security for Difference Strata of Punjab Farmers (2021-22) [1,69,65,543]

2. New Research Projects allocated during 2022-23

Sr. No	Funding Agency - Name of the Scheme [Budget in INR]
1	ICAR -AICRP on Goat Improvement [16,27,999]
2	Aditya Birla Science and Technology Company Private Ltd.- Navi Mumbai Study on the supplementary effects of Sodium Sulphate on Performance of lactating bovines [7,49,650]
3	SS Waste link Sustainability Science Pvt. Ltd. New Delhi - Effect of Supplementary bakery waste to the total mixed ration on milk production, quality and reproduction in dairy animals [7,00,000]
4	Trouw Nutrition India, Pvt. Ltd -. Effects of organic acids on aerobic stability of maize silage [4,96,125]
5	Reliance Industries Limited (RIL) Mumbai - Exploring potential of RIL plant-based protein biomass (RPPB) as an alternate protein ingredient in pet food [14,98,500]
6	French National Research Institute for Sustainable Development (IRD) - Preliminary evaluation of atypical -Human Trypanosomiasis (a-HT) due to Trypanosoma evansi in Punjab [4,98,000]
7	National Fisheries Development Board (NFDB), Department of Fisheries, Ministry of Fisheries, Animal Husbandry, Dairying, Hyderabad, - Demonstration of growth performance, health status and meat quality of Biofloc raised fish in Northern India [13,63,250]
8	National Livestock Mission Improvement of rural backyard poultry lines through genetic and managemental interventions under low input system [23,91,000]
9	National Livestock Mission - Technological interventions for development of sustainable Kajali sheep production model vis a vis prevailing intensive paddy-wheat cropping system of Punjab [41,50,000]
10	National Livestock Mission - Development of surveillance and mitigation tools for the management of anthelmintic resistance in small-ruminants [10,73,000]

3. Research Projects completed during 2022-23

Sr No	Funding Agency- Name of the Scheme [Budget in INR]
1	The BASF India Limited, Mumbai - Studies on effect of feeding organic trace minerals on production, reproduction, immune response and metabolic profile in dairy cows [25,00,000]
2	BCL Industries Limited, Bathinda, Punjab - Study on utilization of DDGS as livestock and poultry feed [20,00,000]
3	Virbac Animal Health India Pvt. Ltd. - Effects of supplementing Chelated Agrimin Forte on the performance of dairy animals" [10,00,000]

4	SERB- Designing and evaluation of various configurations of threaded intramedullary pins for canine long fractures [32,75,000]
5	PSCST - Towards Climate Resilient Livestock Production System in Punjab (395) [5,24,89,142]
6	NABARD- Development of low-cost fruit fly traps for Cucurbit vegetables and its demonstration at farmers fields in border area of district Tarn Taran implementation by KVK Tarn Taran [5,93,050]
7	RKVY - Enhancement of Production and Productivity Potential of Livestock, Poultry and Fisheries sector for Socio-economic upliftment of the farmers of Punjab (2018-19) [10,75,00,000]
8	RKVY - Enhancement of Production and Productivity Potential of Livestock, Poultry and Fisheries sector for Socio-economic upliftment of the farmers of Punjab (2019-20) [5,15,00,000]
9	RKVY - Push to the Livestock sector and its sustainability during the current challenging scenario through the implementation of novel practices (2020-21) [10,39,51,000]
10	RKVY - Diversification through Animal Husbandry and Fisheries for Livelihood and Nutritional Security for Difference Strata of Punjab Farmers (2021-22) [2,15,00,000]

EXTENSION

Extension education in any professional field revolves around the philosophy of bringing about a change in knowledge, skills, attitudes, values, beliefs and understanding of various stakeholders. This university is committed to produce highly qualified human resources through professional teaching and generation of newer technologies and package of practices for different livestock enterprises. The newer technologies and package of practices are being regularly transferred to the end users (livestock, poultry and fish farmers, field functionaries, subject matter specialists, industry people and other related communities) through a well-designed Extension Model which includes following activities:

A. Transfer of technologies to the livestock farmers and their feedback for reorienting the ongoing research programmes

Different departments of the university are actively engaged in research activities which result in generation of area specific technologies. These technologies are effectively transferred to the end users through the following activities:

1. Pashu Palan Mela and Regional Kisan Melas:

The Pashu Palan Mela of the university is a very useful event for people of all walks of life. It is usually held twice a year. The first fair was organized on 23-24th September, 2022 in physical mode after a gap of three years due to Covid-19 restrictions. The slogan of the fair was *Behold Science to Prosper* and the objective was to encourage scientific farming in the state. The university also bestowed *Chief Minister Award* to three best farmers in cattle, poultry and value addition categories in the fair.

The second Pashu Palan Mela was held on March 24-25, 2023. It was inaugurated by Dr. S.S. Gosal, Vice-Chancellor, PAU, Ludhiana. This *Mela* was a centre of attraction for not only the livestock, fisheries, poultry, goat and pig farmers but for children, youth, senior citizens as well as women also, because different items are on display for different age groups, sections and nature. The experts of the University provided on the spot know-how through question answer sessions, discussions as well as practical demonstrations regarding upkeep, vaccination and other timely cares of the small pets like dogs, cats, etc. College of fisheries displayed latest technologies for fish farming in fresh water, saline water, ornamental fish culture, aquarium fabrication, fish processing and value addition. Mela also provided a good privilege to taste and know about the different mouthwatering vegetarian and non-vegetarian delicacies like Sweetened and Salted Lassi, Flavored Milk, Ice Creams, Peda, Mozzarella Cheese, Sweets, Whey drink, Paneer, Milk cake, Dhoda barfi, prepared by College of Dairy Science & Technology, and Meat patties, different types of Meat pickles, Meat cutlets, Meat nuggets, Chicken Momos, Non-veg fibre rich biscuits and sausages by the Department of Livestock Products Technology.

All the KVKs organized a total of four Kisan Melas each. KVK, Barnala organized these melas at its campus. Two melas were held under *Promotion of Agricultural Mechanization for In-situ Management of Crop Residue* on 26th April, 2022 and 16th March, 2023, and respectively 722 and 834 farmers participated. The next mela was organized on 31st May, 2022 under *Kisan Bhagidari Prathmikta Hamari* campaign and 428 farmers took part in it. Another mela on the theme of Garib Kalyan Sammelan was held on 13th October, 2022 in which 517 farmers participated.

KVK, Mohali organized the corresponding melas at Khizrabad, Majri and Khizrabad on 26.04.2022, 10.03.2023, 31.05.2022 and 21.10.2022, respectively. The attendance of farmers was 348, 565, 829 and 318 in these melas.

2. Special Awareness Months/Weeks/Special Days

Specific *Awareness Weeks* were celebrated in the university in order to promote certain products and package of practices. Centre for One Health, COVS, Ludhiana observed World Antimicrobial Awareness Week during November 18 -24, 2022. College of Veterinary Science, Rampura Phul celebrated month-long free milk adulteration testing camp at its campus from 09.03.2022 to 08.04.2022. In this camp, 77 samples of milk were tested for sdulteration.

College of Dairy Science and Technology celebrated *Milk Adultration Testing Week* from May 24-31, 2022 on the occasion of World Milk Day. About 100 milk samples of 90 beneficiaries were tested for adultration free of cost.

Parthenium Awareness Week was celebrated during Aug 16-22, 2021 by KVK, Barnala and KVK, Mohali while the latter also celebrated the month of September, 2022 as National Nutrition Month.

KVKs of the university also celebrated Yoga Day (21.06.2022), National Fish Farmers' Day (10.07.2022), ICAR Foundation Day (16.07.2022), National Honey Bee Day (20.08.2022), National Campaign on *Tree Plantation* (17.09.2022), Swachhta Pakhwara during 02.10.2022 to 31.10.2022.

4. Awareness through ALDE:

The Directorate of Extension Education and Department of Veterinary and Animal Husbandry Extension Education, under the aegis of ALDE (Academy of Livestock Development and Extension) have started an awareness campaign regarding latest scientific practices regarding Animal Husbandry. The first such Camp was organized in village Alhoran Kalan (Nabha), District Patiala on 21.12.2022 in which 190 farmers and farm women participated.

5. Animal Health Camps, Animal Welfare Camps etc.

Different departments of the university under the aegis of Directorate of Extension Education organize Animal Welfare/Health Camps regularly. These are usually a one day affair. In these camps, animals are treated for gynecological, medicinal and surgical problems. Poor and marginal farmers get benefitted through participation in these camps.

S. No	Particulars of Animal Welfare/Health Camps	Date	Participants
College of Veterinary Science, Rampura Phul			
1	Two antirabies vaccination camps (Free) at VCC, COVS, Rampura Phul	13.05.2022 28.09.2022	172 Animals; 155 owners
2	Treatment-cum-Awareness Camp on Lumpy Skin Disease at Nandi Gaushala, Rampura Phul	20.08.2022	30 Animals; 25 farmers
3	Animal Welfare Fortnight and Jiv Jantu Kalyan Diwas	18.01.2023 to 31.01.2023	100 birds; 40 owners
KVKs and RRTCs			
1	Animal health and treatment camp at village Kattu, district Barnala	26.05.2022	63 animals; 36 farmers
2	Chicks' Distribution Camp at KVK, Majri	26.07.2022	550 bird; 22 farmers
3	Health Camp on Lumpy Skin Disease at village Rattangarh, district SAS Nagar, Mohali	16.08.2022 17.08.2022 18.08.2022	22 animals; 53 farmers
4	Vaccination Camp for goats at Villages Jugyal and Narnol, District Hoshiarpur	26.05.2022	30 goats; 3 farmers
5	Chicks Distribution Camp at Main Campus of University, Ludhiana by RRTC, Talwara	23.11.2022	360 birds; 6 farmers

6. Awareness Camps, Training Camps, Field Days:

One of the important extension activities of the university is organization of Awareness Camps and Field Days. These camps are helpful in disseminating information related to livestock, fishery and agriculture production. The subject matter specialists from different departments are invited to deliver their lectures on specific topics in these camps. The list of such camps has been given below**:**

S. No	Particulars of Awareness Camps/ Field Days	Date	Participants
College of Veterinary Science, GADVASU, Ludhiana			
1	World Health Day (One Health)	07.04.2022	25
2	Six Awareness Camps on *Jalvayu parivartan da dudharu pashuan de heha chakkar ate dudh utpaadan te mara asar* at different villages of Ludhiana and Tarn Taran districts	27.05.2022 30.05.2022 02.06.2022 08.06.2022 14.06.2022 08.07.2022	300 farmers
3	Awareness Camp on *Garmiyan 'ch heha samkalikan* at village Pakhowal under NAFCC project	27.05.2022	50 farmers
4	Awareness Camp on *Dudharu pashuan ch masnuyi garabhdan* at village Maheran Kalan, district Ludhiana under NAFCC project	30.05.2022	50 farmers
5	Awareness Camp on S*ooriyan nuh suhn vele aoun waliyan aukhran* at village Mianwind, district Tarn Taran under NAFCC project	15.06.2022	50 farmers
6	Five Awareness camps on clean milk production practices in different villages of Ludhiana district	16.06.2022 24.06.2022 07.07.2022	100 farmers
7	Awareness Camp on *Heha samkalikaran* at village Semakalan distt Bathinda under NAFCC project	06.07.2022	50 farmers
8	World Zoonoses Day (One Health)	07.07.2022	27
9	Workshop on Diary Farm Biosecurity for Farm Workers at Directorate of Livestock Farm of University, Ludhiana	13.07.2022	60 farm workers
10	Workshop on Farm Biosecurity and Milk Hygiene for farm milkers at Directorate of Livestock Farm of University, Ludhiana	15.07.2022	20 milkers
11	One day awareness programme on "Advances and Opportunities in Dairy Sector" at Directorate of Livestock Farm of University, Ludhiana	16.09.2022	12
12	One day awareness programme on "(1) Profitable rearing of male buffalo calves for meat production; (2) Transition period management for optimizing reproductive efficiency in buffaloes" at Village Nathu Chisti, Jalalabad, district (DLF)	07.11.2023	40 and 60
13	World Antimicrobial Awareness Week (One Health)	18.11.2022 to 24.11.2022	20
14	One day awareness programme on "Use of Paddy Straw in animal production" for SC farmers at Directorate of Livestock Farm of University, Ludhiana	23.11.2022	25
15	Farm Biosecurity and precision dairy farming at Directorate of Livestock Farm of University, Ludhiana	10.03.2023	16
16	Profitable rearing of male buffalo calves for meat production at village Mansuran, Ludhiana	13.03.2023	40

17	Transition period management for optimizing health and reproductive efficiency in dairy animals at village Talwara, Ludhiana	17.03.2023	25
18	Management of dairy animals for optimum production at village Khaira, Ludhiana	17.03.2023	25
19	Demonstration of cooling system for enhancing the production and reproductive efficiency in buffaloes at Directorate of Livestock Farm of University, Ludhiana	22.03.2023	15
College of Veterinary Science, RampuraPhul			
1	National level Video Competition on World Veterinary Day	30.04.2022	30 vets
2	Awareness Camps on Rabies at Civil Hospital, Rampura and DM School, Karadwala, district Bathinda	28.09.2022	100 clients and 200 students
3	Quiz competition on World Zoonoses Day	06.07.2022	177 students
4	Awareness Camp on Lumpy Skin Disease at Gaushala Committee, Rampura Phul	12.08.2022	30 workers
5	Awareness about various livestock & fodder production techniques to trainees of KVK, Abohar	21.10.2022	15 trainees
6	Quiz and debate on World Antimicrobial Resistance Awareness Week	18.11.2022 to 24.11.2022	60 farmers and students
7	Awareness camp on *Handling of E-waste and its Recycling*	18.01.2023	292 students
College of Animal Biotechnology			
1	Student awareness camp on Avenues/ opportunities in Biotechnology at (1) Govt. Sen. Sec. Smart School, Hambran, (2) PCTE, Badowal (3) Govt. Girls Sen. Sec. Smart School, Mansuran, district Ludhiana	18.05.2022	160 students
College of Fisheries			
1	Awareness camps on *Best Management Practices in Shrimp Framing* at villages Khuranj and Gaddan Dob, District Fazilka	23.06.2022 and 24.06.2022	50 farmers
KVKs and RRTCs			
1	Summer management of horticultural crops at Dulwa Khadri, district SAS Nagar, Mohali	06.05.2022	16
2	Integrated Pest Management in Maize at village Mundo Mastana, district SAS Nagar, Mohali	12.05.2022	25
3	Awareness camp on balanced feeding of dairy animals in different villages of Hoshiarpur district	19.05.2022 24.05.2022 19.07.2022 22.07.2022	52
4	Integrated Pest Management in Kharif pulses at village Mundo Mastana, district SAS Nagar, Mohali	09.06.2022	18
5	Judicious use of fertilizers at village Tajpura, district SAS Nagar, Mohali	21.06.2022	30

6	Vegetable cultivation under Net House at village Chanalon, district SAS Nagar, Mohali	23.06.2022	12
7	Field Day on Planting and management of fruit crops at village Shekhpura, district SAS Nagar, Mohali	12.07.2022	15
8	Hydroponic vegetable cultivation at village Kambala, district SAS Nagar, Mohali	13.07.2022	46
9	Scientific cultivation of root vegetables at village Padiala, district SAS Nagar, Mohali	14.07.2022	13
10	Integrated Pest Management in rice crop at KVK, Majri	15.07.2022	22
11	Hydroponic vegetable Production at village Kandala, district SAS Nagar, Mohali	20.07.2022	39
12	Scientific cultivation of exotic vegetables at village Bhajoli, district SAS Nagar, Mohali	12.08.2022	12
13	Awareness camp on Lumpy Skin Disease in different villages of Hoshiarpur district	17.08.2022 31.08.2022	67
14	Field Day on Mango cultivation at village Sohali, district SAS Nagar, Mohali	26.08.2022	17
15	Safe use of insecticides at village Mullanpur Sodhian, district SAS Nagar, Mohali	31.08.2022	16
16	Integrated Pest Management in Basmati rice crop at village Kubaheri, district SAS Nagar, Mohali	08.09.2022	26
17	Awareness programme on Lumpy Skin Disease at village Rattangarh, district SAS Nagar, Mohali	09.09.2022	53
18	Organic vegetable farming at village Sohali, district SAS Nagar, Mohali	09.09.2022	27
19	Terrace gardening of vegetables at village Chanalon, district SAS Nagar, Mohali	15.09.2022	14

20	Scientific cultivation of leguminous vegetable crops at village Sohali, district SAS Nagar, Mohali	03.10.2022	10
21	Improved production practices of bulb and cole vegetables crops at village Sahauran, district SAS Nagar, Mohali	07.10.2022	19
22	Awareness camps for school and college students on CRM at Govt. Sr. Sec. School, Dhaula, Guru Gobind Singh College, Sanghera and at KVK, Barnala	13.10.2022 27.10.2022 02.11.2022	389 students
23	Village Level awareness camp on CRM at KVK, Mohali	14.10.2022	37
24	Field day on crop residue management at village Nim Wala Mour, Dhurkot, Mehta, district Barnala	14.10.2022 03.11.2022 31.11.2022	66 farmers
25	Field day on Goat Health at Ghaghwal, district Hoshiarpur	16.11.2022	32
26	Block level awareness camps on CRM at KVK, Barnala and at village Badraon	17.10.2022 18.10.2022	69
27	District level awareness camp on CRM at village Bhainin Mehraj, district Barnala	20.10.2022	87
28	Integrated Pest Management in Gobhi Sarson at village Bhupnagar, district SAS Nagar, Mohali	25.11.2022	20
29	Awareness camp on fish farming at KVK, Barnala	29.11.2022	25
30	Concepts of natural farming at village Sohali, district SAS Nagar, Mohali	16.12.2022	70
31	Basics of natural farming at village Mundo Mastana, district SAS Nagar, Mohali	23.12.2022	42
33	Various components of Natural Farming at KVK, Mohali	02.01.2023	42
33	Layout and management of orchards at village Shahpur, district SAS Nagar, Mohali	30.01.2023	25

34	Drying of vegetables using solar dryer at village Majra, district SAS Nagar, Mohali	16.02.2023	26
35	District level awareness camp on *Crop Residue Management* at village Akalgarh, district SAS Nagar, Mohali	21.02.2023	57
36	Field day on *Gobhi Sarson* at village Bhupnagar, district SAS Nagar, Mohali	06.03.2023	52
37	Field day on *Mapping of grassroot innovations in Punjab* at village Bhupnagar, district SAS Nagar, Mohali	16.03.2023	51
38	Field days on Wheat Crop under CRM at villages Badarpur and Naggal Salempur, district SAS Nagar, Mohali	20.03.2023 and 29.03.2023	48 and 45
39	Production practices of Okra and Beans at KVK, Mohali	28.03.2023	15
40	Scientific cultivation technology of summer horticultural crops at KVK, Mohali	29.03.2023	28

7. Farmer-Scientist Interface:

Department of Veterinary and Animal Husbandry Extension Education in collaboration with RRTC, Talwara organized a Farmer Scientist Interface at Bela Sariana in Hoshiarpur district on 18.03.2023. A total of 76 farmers of the area participated in this interface. Majority of farmers raised animal health related issues and scientists made them aware of related technologies.

8. Special Exposure Visits:

RRTC, Talwara conducted two special exposure visits of its campus and surrounding area of interest for students of Orissa Veterinary College, Bhuvaneshwar on 14.10.2022 and 28.10.2022. In these visits, 18 and 34 students participated.

B. Capacity Building of Livestock Farmers and other Related Personnel

1. Trainings Organized:

Training is one of the powerful tools extension personnel has in empowering skill oriented education to human resources. The major emphasis of such trainings is to bring a desirable change in the behaviour of different clients. University organized specialized training courses for dairy, poultry, piggery, and fish farming and value addition of livestock products for the farmers, army personnel to transfer new technologies evolved by the university. Trainings were also organized sponsored by other animal welfare agencies. Following is the list of these trainings.

S. No	Name of the Training Programme	Dates	Duration (days)	No. of Trainings held	No. of Trainees	Summary about training*
College of Veterinary Sciences, Ludhiana						
1	Basic training on *dairy farming* (Deptt of VAHEE)	16.05.2022 to 27.05.2022, 11.07.2022 to 22.07.2022, 21.11.2022 to 01.11.2022 06.03.2023 to 20.03.2023	10	04	57	Basic practices of dairy farming

2	Basic training on *pig farming* (Deptt of VAHEE)	23.05.2022 to 27.05.2022 08.08.2022 to 12.08.2022, 05.12.2022 to 09.12.2022	05	03	27	Basic practices of pig farming
3	Basic training on *goat farming* (Deptt of VAHEE)	06.06.2022 to 10.06.2022, 22.08.2022 to 26.08.2022, 12.12.2022 to 16.12.2022	05	03	76	Basic practices of goat farming
4	Basic training on *poultry farming* (Deptt of VAHEE)	20.06.2022 to 01.07.2022, 01.11.2022 to 15.11.2022, 20.02.2023 to 03.03.2023	10	03	62	Basic practices of poultry farming
5	Climate change and animal production under NAFCC	13.09.2022	01	01	150	
6	Advanced Equine Management Course for Veterinary Cadre Officers of ITBP (TVCC)	10.10.2022 to 13.02.2022	04	01	05	
7	Feeding, Breeding and Management practices in poultry farm (DLF)	26.12.2022 to 28.12.2022	03	01	20	Under ICAR scheme
8	"Economical and Quality Feed Formulation for Layer Farm" for Sc Farmers" at Deptt of LPM	17.03.2023	01	01	10	
9	"Economical and Quality Feed Formulation for Broiler Farm" for Sc Farmers" at Deptt of LPM	21.03.2023	01	01	10	
10	Fly control on poultry farm	22.03.2023	01	01	10	

11	Two days training on "Alternative Poultry Farming" for SC farmers at Directorate of Livestock Farm of University, Ludhiana	20.03.2023 to 21.03.2023	02	01	20	
College of Veterinary Science, RampuraPhul						
12	Vocational training program on 'Learning and Earning'	23.01.2023	01	01	80	
13	Training Program on Goat Farming	20.02.2023 to 24.02.2023	05	01	09	
College of Animal Biotechnology						
14	Training for the preparation of DBT-GAT-B aspirants	05.04.2022 to 21.04.2022	17	01	05	
15	Workshop on "Pig diseases and health management"	28.07.2022	01	01	34	

College of Dairy Science and Technology						
16	Specialized Training on "Testing and Analysis of Milk"	07.06.2022 to 08.06.2022	02	01	02	
17	Value Addition of Milk and Milk Products	21.11.2022 to 25.11.2022 02.01.2023 to 06.01.2023 09.01.2023 to 13.01.2023 30.01.2023 to 03.02.2023 13.03.2023 to 17.03.2023	05	05	150	
College of Fisheries						
18	Best management practices (BMPs) for *Shrimp Farming* in Inland Saline Areas'	25.07.2022 to 27.07.2022	03	01	20	Training of farmers on BMPs for sustainable shrimp farming
19	Pangas Catfish Farming and Processing	29.07.2022	01	01	28	

20	Fish Farming	01.08.2022 to 05.08.2022	05	01	27	
21	Pangas Catfish Culture and Processing	16.08.2022 to 18.08.2022	03	01	14	
22	Fish Processing and Value Addition	15.10.2022 to 19.10.2022	05	01	15	
23	Fish Farming	12.10.2022 to 16.10.2022	05	01	17	

Glimpses of training programmes organized by KVK, Tarn Taran

S. No.	Title	Date	Duration (Days)	No. of Events undertaken	No. of Participants
1.	Direct seeded rice (DSR)	13.05.2022	1	1	15
2.	Scientific management of Vitamin D deficiency	25.05.2022	1	1	14
3.	Backyard poultry production and management	25.05.2022	1	1	30
4.	Cost effective healthful cooking methods	30.05.2022	1	1	15
5.	Scientific Management of Small scale dairy	31.05.2022	1	1	13
6.	Nutrional security of family by kitchen garden	08.06.2022	1	1	23
7.	Fish feed formulation from non conventional feed products	08.06.2022	1	1	15
8.	Scientific deworming programme for farm animals	10.06.2022	1	1	11
9.	Balanced diet for adolescents	16.06.2022	1	1	19
10.	Formation of FPO for Higher returns	17.06.2022	1	1	60
11.	Role and importance of minerals in feeding of dairy animals	20.06.2022	1	1	15
12.	Integrated Fish cum Livestock Farming was conducted in from.	20-24.06.2022	5	1	23

13.	Seed stocking in Indian Major Carp Culture	21.06.2022	1	1	23
14.	Direct seeded rice (DSR)	21.06.2022	1	1	23
15.	Efficient utilization of water for sustainable livestock production	21.06.2022	1	1	09
16.	Scientific breeding strategies in dairy animals	22.06.2022	1	1	13
17.	Value addition techniques in bakery, fruits and vegetables	27.06.2022-01.07.2022	5	1	18
18.	Care and management of kids to prevent mortality	07.07.2022	1	1	12
19.	Role of micronutrient in vegetable crop	11.07.2022	1	1	11
20.	Disease Management in Indian Major Carp Culture was conducted	13.07.2022	1	1	12
21.	Scientific dairy farming	14-20.07.2022	5	1	20
22.	Pre partum and post-partum care of dairy animals	15.07.2022	1	1	10
23.	Scientific rearing of calf	19.07.2022	1	1	13
24.	Awareness of milk adulteration kits	20.07.2022	1	1	18
25.	Organic Vegetable production	25-29.07.2022	5	1	20
26.	Scientific mushroom farming	25-29.07.2022	5	1	21
27.	Importance of mineral mixture in the ration of dairy animals	28.07.2022	1	1	14
28.	Scientific Goat farming	04-08.07.2022	5	1	28
29.	Self-marketing of vegetable crops	08.08.2022	1	1	12
30.	Conservation of green forages as silage/hay for lean period	10.08.2022	1	1	25
31.	Dissolved Oxygen Management in Indian Major Carp	10.08.2022	1	1	17
32.	Organic farming	12.08.2022	1	5	29
33.	Quality fodder production through judicious use of Organic and inorganic sources of nutrients	17.08.2022	1	1	17
34.	Nutritional, medicinal and economic importance of honey and techniques of honey harvesting	09.09.2022	1	1	32

35.	Scientific housing management of dairy cattle/buffalo	14.09.2022	1	1	25
36.	Underutilized green to curtail hidden hunger	28.09.2022	1	1	13
37.	Promotion of agricultural mechanization and machinery for *In-situ* management of crop residues	29.09.2022 -06.10.2022	5	1	25
38.	Value addition of biscuits through incorporating millets	30.09.2022	1	1	15
39.	Food hygiene and sanitation	03.10.2022	1	1	14
40.	Use of milletes for healthy lifestyle	04.10.2022	1	1	20
41.	Methods to enhance iron bioavailability	06.10.2022	1	1	13
42.	Promotion of agricultural mechanization and machinery for *In-situ* management of crop residues	06.10.2022 -12.10.2022	5	1	25
43.	Fabric painting techniques	10.10.2022	1	1	15
44.	Scientific dairy farming and value addition of milk	10-14.10.2022	5	1	25
45.	Scientific Pig farming	12.10.2022 -18.10.2022	5	1	30
46.	Techniques in post harvest management through value addition	17.10.2022	1	1	15
47.	Pear and Guava Technologies	18.10.2022	1	1	17
48.	Tips for consuming fruits and vegetables	09.11.2022	1	1	31
49.	Scientific fish farming and value addition of fish	11-17.11.2022	5	1	25
50.	Marketing, harvesting and packaging of early sown pea	12.12.2022	1	1	01
51.	Nutritious lunch for school going children	14.12.2022	1	1	54
52.	Rearing of ornamental fish	14.12.2022	1	1	11
53.	Pregnancy diagnosis in dairy animals	04.01.2023	1	1	16
54.	Utility of solar cooker for efficient cooking	12.01.2023	1	1	16
55.	Role and importance of minerals in feeding of dairy animals	18.01.2023	1	1	31

56.	Scientific Dairy Farming and value addition of Dairy Produce	23-30.01.2023	5	1	36
57.	Recommended foods in zinc deficiency	10.02.2023	1	1	13
58.	Peanut and soya bean as health foods	23.02.2023	1	1	25
59.	Zero waste processing technology for milk products	15.03.2023	1	1	21

Glimpses of one day training programmes

Glimpses of vocational and skill-oriented training programme

Training on New techniques for In-situ crop residue

KVK, Barnala						
1	Direct seeded rice cultivation practices	04.05.2022 to 06.05.2022	03	01	16	ICAR
2	Vermicomposting	30.08.2022 to 05.09.2022	05	01	23	ICAR
3	Organic Farming	14.09.2022 to 20.09.2022	05	01	10	ICAR
4	Scientific Bee Keeping	26.04.2022 to 02.05.2022	05	01	28	ARYA
5	Vocational training on Scientific Bee Keeping	18.07.2022 to 22.07.2022	05	01	16	ICAR
6	Entrepreneurship development trough bee-keeping	27.09.2022 to 04.10.2022	07	01	39	ICAR
7	Mushroom Production Technologies	07.03.2022 to 11.03.2022	07	01	12	ICAR
8	Market strategies and future aspects of agricultural produce	12.07.2022 to 15.07.2022	04	01	18	ICAR
9	Mushroom production technologies	05.08.2022 to 11.08.2022	07	01	10	ARYA
10	Value addition to fruits and vegetables	19.07.2022 to 25.07.2022	05	01	10	ICAR
11	Value addition in fruits and vegetables	28.07.2022 to 03.08.2022	05	01	10	ICAR
12	Stitching & tailoring	30.11.2022 to 30.12.2022	30 days	01	10	ICAR
13	Vocational training on “Fish processing and value addition”	18.05.2022 to 20.05.2022	03	01	15	ICAR
14	Scientific Fish Farming	11.07.2022 to 15.07.2022	05	01	9	ICAR
15	Mushroom Production Technologies	17.01.2023 to 23.01.2023	07	01	13	ARYA
16	Scientific backyard poultry farming	23.01.2023 to 25.01.2023	03	01	21	ICAR
17	Scientific Backyard Poultry Farming	27.02.2023 to 01.03.2023	04	01	20	ARYA
18	Scientific Backyard Poultry Farming (Dhanaula)	17.03.2023 to 21.03.2023	05	01	10	ARYA
19	Scientific Backyard Poultry Farming (Daraj, Daraka, Mehta farmers)	22.03.2023 to 24.03.2023	04	01	25	ARYA
20	Value addition of milk and milk products.	23.03.2023 to 27.03.2023	05	01	36	ARYA

Glimpses of vocational training programmes organized by KVK, Barnala

KVK, Mohali						
1	Scientific dairy farming and value addition of milk at village Khizrabad	10.05.2022 to 16.05.2022	07	01	20	
2	Beekeeping at District Administrative Complex, Mohali	26.05.2022to 02.06.2022	08	01	12	
3	Scientific Goat Farming at village Akalgarh	20.07.2022 to 26.07.2022	07	01	38	
4	Bakery technology and food processing at village Khizrabad	22.07.2022 to 09.08.2022	19	01	43	
6	In-service training on organic vegetable kitchen gardening at KVK, Mohali	12.09.2022	01	01	50	
6	Fish Farming at KVK, Mohali	14.09.2022 to 20.09.2022	07	01	18	
7	Mushroom cultivation at village Khizrabad	15.09.2022 to 21.09.2022	07	01	20	
8	Scientific vegetable farming at Chanalon	19.09.2022 to 23.09.2022	05	01	15	
9	Integrated pest management in basmati rice at Kubaheri	03.10.2022 to 10.10.2022	08	01	25	

10	In-Situ Crop Residue Management at Sohali	06.10.2022 to 12.10.2022	07	01	25	
11	Natural Farming at Jhande Majra	18.01.2023 to 19.01.2023	02	01	44	
12	Training and pruning of fruit crops at Chanalon	31.01.2023	01	01	15	
13	Development of value added products of agri-produce at Gunno Majra	01.02.2023 to 07.02.2023	07	01	20	
14	One day training on "Nursery management of horticultural crops" at Dusarna	03.02.2023	01	01	26	
15	Beekeeping at Naggal Salempur	03.02.2023to 09.02.2023	07	01	14	
16	One day training on "Cultivation techniques of summer vegetables" at Bhajoli	06.02.2023	01	01	22	
17	Vocational Training on "Scientific Vegetable Cultivation" at Rakoli	07.02.2023 to 13.02.2023	07	01	20	

Glimpses of trainings organized by KVK, Mohali

RRTC, Talwara						
1	Training on *Pangas Fish Culture in Kandi area*	29.07.2022	01	01	28	
2	Training on Goat farming at RRTC, Talwara	17.03.2023 to 23.03.2023	07	01	11	

2. Webinars/ On-line Trainings Organized:

S No	Title of the Webinar	Date	Name of the Speaker	Participants (No)
College of Veterinary Science, GADVASU, Ludhiana				
1	Imparting Skill among youth for Scientific Rearing of Livestock	18.05.2022 to 20.05.2022	MANAGE, Hyderabad and GADVASU, Ludhiana	69
2	Nutritional and Health Management of Dairy Animals	03.08.2022 to 05.08.2022		55
3	Online Panel Discussion on Lumpy Skin Disease	11.08.2022	GADVASU Experts	151
4	Online Panel Discussion on African Swine Fever	23.08.2022	GADVASU Experts	116
College of Veterinary Science, RampuraPhul				
1	Antimicrobial Resistance and Human Health	22.06.2022	Dr. Sushant Garg, MD Medicine, Medical officer, SDH, Rampura Phul.	100
2	Ways to develop emotional strength and mental stability in life	08.09.2022	Mr. Vivek Bansal, Dr. Minakshi, MBBS	80

3. Lectures delivered at off-campus trainings

Subject Matter Specialists of the University also delivered expert lectures in trainings organized by outstations of the university or various other agencies.

S No	Date	Topic	Organized by
College of Veterinary Science, Ludhiana			
1	27.05.2022	Jalvayu parivartan da dudharu pashuan de heha chakkar ate dudh utpaadan te mara asar	CVH Pakhowal
2	30.05.2022		CVH, Maherna Kalan
3	01.06.2022		CVH Mangewal
4	08.06.2022		CVH Kasele
5	14.06.2022		CVH Khanna
6	15.06.2022	Dudharu pashuan ‘ch masnuyi garabhdan	CVH, Mianwind, Taran Tarn
7	18.07.2022	Jalvayu parivartan da dudharu pashuan de heha chakkar ate dudh utpaadan te mara asar	CVH, Booh
8	03.08.2022	Major diseases related to nutritional deficiencies	MANAGE, Hyderabad
9	18.09.2022	Oppourtunity in Silage and Hay Making	MANAGE, Hyderabad
10	28.09.2022	Packing and Marketing of Eggs	PAU, Ludhiana
11	10.10.2022	Advanced Equine Management Course	ITBP
12	14.11.2022 07.12.2022 22.12.2022 06.01.2023 24.02.2023	Evaluation, processing and storage of semen, Shipment and handling of semen, thawing of semen and evaluation of post thaw motility of sperms, care, training and maintenance of breeding bulls for AI	COVS, RampuraPhul
13	28.09.2022	Packing and Marketing of Eggs	PAU, Ludhiana
14	16.03.2023	Entrepreneurial options for rural youth in poultry and turkey production	PAMETI, Ludhiana
15	22.03.2023	Entrepreneurial options for rural youth in poultry and turkey production	PAMETI, Ludhiana
16	22.03.2023	Recent developments in the role of minerals and vitamins in dairy animals	Department of Animal Nutrition, Ludhiana in Village Threekey
College of Veterinary Science, RampuraPhul			
17	26.04.2022	1. Common diseases in dairy animal and their management 2. Goat Farming	KVK, Barnala
18	29.09.2022	Emerging livestock diseases and their prevention	RRS, Bathinda
19	28.12.2022	1. Selection of Layer and broiler breeds suitable for backyard poultry farming 2. Alternate poultry farming	DLF, Ludhiana
20	22.02.2023 16.03.2023	Bakrian layi aadhunik danche	VP & RRTC, Kaljharani, Bathinda

21	16.03.2023	1. Manangement of fodder during summers for livestock feeding 2. Common diseases in dairy animal and their control and management	KVK, Barnala
College of Fisheries			
22	27.04.2022	1. Cold chain technologies 2. Fish post-harvest processing technologies	LINAC-NCDC Fisheries Business Incubation Center (LlFlC) at Gurgaon, New Delhi
23	12.05.2022	Mobile Apps and Government Schemes for fisheries marketing	Extension Education Institute, PJTSAU, Hyderabad
24	08.06.2022	Supply chain linkage Mechanism in fisheries	Extension Education Institute, PJTSAU, Hyderabad
25	05.07.2022	1. post-harvest fish processing technologies 2. Cold chain technologies 3. Fish as health food	Fisheries Business Incubation Center of LINAC-NCDC, Gurugram, Haryana
26	09.08.2022	Health Management Practices in Shrimp Culture	Fish Farmers Development Agency (FFDA), Mansa
27	09.08.2022	Use of herbal feed in aquaculture	FFDA/Fisheries Department, Kapurthala
28	09.08.2022	1. Carp Culture 2. Fish processing and value added products	Fisheries Department, Patiala
29	13.08.2022	1. Post-Harvest and Value Addition 2. Integrated Fish Culture/ Composite Fish Culture	FFDA, Sangrur
30	31.08.2022	Culture of Indian Major Carps	Fish Seed Farm, Malwal, Moga Road, Ferozpur
31	15.09.2022	1. Ornamental Fish Culture 2. Propagation of Aquatic plants	KVK, Mohali
32	13.10.2022	Fish culture	KVK, Handiaya (Barnala)
33	14.10.2022	Fish culture	KVK, Booh (Tarn Taran)
34	02.11.2022	Disease management for shrimp culture	Punjab State Fisheries Development Board at Mansa
35	11.11.2022	Role of fish culture in integrated farming system	PAU, Ludhiana
36	23.11.2022	1. Fish Disease & Health Management 2. Fish Nutrition/Feed And Feeding Strategies 3. Freshwater Aquaculture	FFDA Fish Seed Farm, Mohie, Ludhiana

37	07.12.2022	1. Hatchery management to grow out ponds and disease management 2. Pangas Catfish culture	FFDA, Dist. Hoshiarpur
38	08.12.2022	1. Economics and marketing of value added fish 2. Packaging material and packaging of fish products 3. Quality issues and its control during production and marketing of value added products	PAMETI, Ludhiana
39	17.02.2023	Shrimp Farming-International & Domestic Scenario and Future Prospective	State Fisheries Department, Village Enakhera, Sri Muktsar Sahib
College of Dairy Science & Technology			
40	21.11.2022 16.03.2023	1. Significance of analysis of milk and milk products 2. Laboratory test for checking the quality of Milk	National Commission for Women, New Delhi
41	23.11.2022	Microbiological quality and safety of milk and milk products	
42	25.11.2022 06.01.2023 13.01.2023 03.02.2023 17.03.2023	FSSAI registration and license for dairy enterprise	
43	25.11.2022 06.01.2023 11.01.2023	Packaging of milk and milk products	
44	02.01.2023 09.01.2023 30.01.2023	1. Significance of analysis of milk and milk products 2. Quality and safety assessment of milk	
45	20.02.2023	Food Safety and Standards Authority of India (FSSAI)	MSME – Development & Facilitation Office, Ludhiana
KVKs and RRTCs			
46	11.04.2022	Livestock production, potential and constants	Department of Agriculture, Mohali
47	30.05.2022	1. Health Benefits of Honey 2. Value Addition of Honey and its By-Products	DC office SAS Nagar
48	04.10.2022	Cultivation practices of Rabi horticulture crops	Department of Agriculture, Mohali
49	01.03.2023 15.03.2023	Pest management in rabi season crops	

50	29.09.2022	Nutrient management in happy seeder sown wheat crop	Department of Agriculture and Farmer Welfare, Barnala
51	12.01.2023	Onion cultivation and post harvest managements	
52	29.03.2023	Fruits and vegetable production scope in district Barnala	ATMA, Barnala

C. Meetings of Livestock And Fishery Farmers Associations

Name of the Association	Date of Meeting	Title of Lecture(s) and name of Speaker(s)	No. of Participants
Innovative Fish Farmer's Association (IFFA)	21.07.2022	• Advances in fish feed formulation and manufacturing (Dr Abhed Pandey) • Monsoon management of fish farming (Dr Grishma Tewari)	10
	18.08.2022	• On-farm meet with Fish Farmers • at Fish Farm of Dr Adeeb Tiwana, Village-Kurali, Mohali (Co-ordinated by Drs Grishma Tewari & Sachin O. Khairnar)	10
	15.12.2022	• Diversification of Carp Culture with high value fish species – Murrels and Catfishes (Dr. Vaneet Inder Kaur) • Alternative fish species in context of Punjab (Dr. Vikas Phulia)	11
Progressive Livestock Farmers Association (PLFA)	12.05.2022	Hoof Management (Dr Swaran Singh Randhawa)	39
	15.09.2022	Transitional Feeding (Dr Parminder Singh)	53
	10.11.2022	Mastitis Control (Dr Dheeraj Gupta)	41
	08.12.2022	Bull Management (Dr Punit Malhotra)	36
	12.01.2023	• Heifer Management (Dr. Kulwinder Singh) • Repeater Management (Dr Bilawal Singh)	44
All Feed Millers Association (AFMA)	13.12.2022	BIS Specification & Feed Laws (Dr Parminder Singh)	225
Independent poultry Association	11.07.2022	Management of broilers during rainy season (Dr Kulwinder Singh)	26
	14.11.2022	Winter management of broilers (Dr Daljit Kaur)	24
	09.01.2023	Viral Diseases of broilers (Dr BS Sandhu)	31

	15.03.2023	Summer care for broilers (Dr Yash Paul)	22
Progressive Pig Farmers Association (PGFA)	26.05.2022	• Common diseases of Pig (Dr. Randhir Singh) • Value addition of pork (Dr. Rajesh Wagh)	19
	28.07.2022	• Facilities available at college of Biotechnologies, GADVASU for pig Farmers (Dr. YPS Malik, Dr. J S Bedi & Dr. Adarsh Mishra)	34
	24.11.2022	• Feeding management of Pigs Dr Udeybir Singh) • Reproductive Management of Pigs (Dr Rakesh Sharma)	37
	25.01.2023	• Zoonotic disease of Pigs (Dr. Rajnish Sharma) • Comparison of Pig farming in India and Sweden (Dr A K Singh)	16
	28.04.2023	• Slaughtering techniques for Pigs and Value addition of Pork (Dr. Nitin Mehta)	32
Self Help Groups	13.07.2022	Problem faced by Members of SHGs (Dr Parul Gupta)	38
	13.09.2022	New initiatives for SHGs (Dr Parul Gupta)	19
	03.03.2023	Interaction with members of SHGs (Dr. Parul Gupta)	34

D. Extension Publications

1. Books/Booklets/Bulletins published

i. Kasrija, R, Sharma, R K, Jadoun, Y S, Kaur, N and Brar, P S. (2022). Axle of successful dairy farm- Good reproductive management, Technical Bulletin (/DEE/FFP/2022/09) (Punjabi). Published under Farmer First Programme, ICAR New Delhi by Directorate of Extension Education, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana.

ii. Kasrija, R, Singh, N K, Singh, H, Jadoun, Y S and Brar, P S. (2022). Ecto and endoparasites of dairy animals. Technical Bulletin (/DEE/FFP/2022/08) (Punjabi). Published under Farmer First Programme, ICAR New Delhi by Directorate of Extension Education, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana.

iii. Singh, J, Bedi, J S, Singh, A and Brar, P S. (2022). African Swine Fever. Directorate of Extension Education, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana.

iv. Singh, J and Brar, P S. (Eds.) (2022). Poultry Farming on Small Scale. (in Punjabi). Directorate of Extension Education, Guru Angad Dev Veterinary and Animal Sciences University, (ISBN 978-93-5636-032-7).

2. Pamphlets/Folders published

i. Anonymous. (2022). Brucellosis: An endemic disease of human and animal health importance!!! ਬਰੂਸੋਲੋਸਿਸ: ਮਨੁੱਖੀ ਅਤੇ ਜਾਨਵਰਾਂ ਦੀ ਸਿਹਤ ਦੀ ਮਹੱਤਤਾ ਦੀ ਇੱਕ ਸਥਾਨਕ ਬਿਮਾਰੀ!!! Centre for One Health.

ii. Anonymous. (2022). Bovine tuberculosis: A neglected and underreported zoonosis!!! ਬੋਵਾਈਨ ਟਿਊਬਰਕਲੋਸਿਸ: ਇੱਕ ਅਣਗੌਲਿਆ ਅਤੇ ਘੱਟ ਰਿਪੋਰਟ ਕੀਤਾ ਗਿਆ ਜ਼ੂਨੋਸਿਸ !!! Centre for One Health.

iii. Anonymous. (2022). COXIELLOSIS (Q- FEVER): A hidden Menace!!! ਕੋਕਸੀਲੋਸਿਸ (ਕਿਊ-ਫੀਵਰ): ਲੁਕਿਆ ਹੋਇਆ ਖਤਰਾ !!! Centre for One Health.

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E. TV/Radio Talks

University has liaison with electronic media for flashing various livestock related interventions and precautions for disease control and seasonal correct management practices. University experts deliver TV talks regularly on Door darshan/ Cable networks/ private channels on current & seasonal topics related to livestock and fish farming. On an average one talk is delivered/broadcast in a week. The comprehensive list of TV/Radio talks has been given below.

S.No.	Name of the Faculty Member	Date of the Talk	Title of the Talk
Department of Animal Nutrition			
1	J S Hundal	10.05.2022	Pashua layi turi/prali urea nal sodhke varto; FM Radio, Bathinda
2		05.8.22	Behtar sehat sambhal layi pashuan di khurak da mahatav; Mera pind mere khet Live at Jalandhar Doordarshan at 5.30 pm
Directorate of Livestock Farms			
3	G K Mavi	17.01.2023	Importance of clean milk production; FM Radio, Bathinda
4	Navdeep Singh	23.08.2022	Mausmi tnaw da pashu prajanan te asar; FM Radio, Bathinda
5		24.11.2022	Dairy farm da adhunikikaran; AIR, Jallandhar
6	R K Dhaliwal	17.01.2023	Dairy vich aurtan da yogdan; FM Radio, Bathinda

Department of Livestock Production Management			
7	K S Sandhu	16.05.2022	Garmian de mausam ch pasuan lai khuraki parbandh ate dekhbhal; AIR, Patiala
8		17.03.2023	Garmian doran pashuan de sambh sambhal; AIR, Jallandhar
Department of Livestock Product Technology			
9	Nitin Mehta	14.10.2022	Meat utpadan di gunvatta vadha ke munafa laena; Akashwani, Ludhiana
Department of Veterinary & Animal Husbandry Extension			
10	R K Sharma	19.01.2023	Kandi ilake layee pashu pallan sahooltan; AIR, Jalandhar
11	J Singh	24.01.2023	Nutritonal requirement of high yielding dairy animals; AIR, Patiala
Department of Veterinary Microbiology			
12	Gurpreet Kaur	05.04.2022	Tu Jaan walian Bimarian te Bachao; AIR, Patiala
13	D Narang	01.07.2022	Pashuan diyan laag waliyan bimarian ate bachav; AIR, Patiala
Department of Veterinary Parasitology			
14	Paramjit Kaur	16.04.2022	Garmian te barsat vich pashuan da prajivian ton bachao; FM Radio, Bathinda
15		08.07.2022	Garmian te barsat vich pashuan da makhian, machran tey chichra ton bachao; AIR, Patiala
16	Harkirat Singh	28.02.2023	Pashuan nu kiram rahit karan de dhang ate faidey; FM Radio, Bathinda
Department of Veterinary Pharmacology and Toxicology			
17	S Singla	02.08.2022	Pashuan ch zeharwaad: lachan te bachao; FM Radio, Bathinda
18		21.02.2023	Pashu khurak vich rahind khund di varto de nuksan; FM Radio, Bathinda
19	S K Sharma	12.01.2023	Pashuan ‘ch zeharwaad; AIR, Jallandhar
Department of Veterinary Gynecology and Obstetrics			
20	A K Singh	18.05.2022	Pashu prajanan layi nar pashu di chon; Akashwani, Ludhiana
21		04.10. 2022	Gabhan pashu di suae ton pahilan te baad di saambhaal; FM Radio, Bathinda
Department of Veterinary Surgery and Radiology			
22	Navdeep Singh	10.03.2023	Pashuan vich tuttian hadian nu theek karan layi aadhunik vidhian; AIR, Patiala
23	J Mojindroo	18.06.2022	Barsatan ch pashu zakhma da sahi ilaz; AIR, Jalandhar

Department of Veterinary Medicine			
24	Neetu Saini	14.02.2022	Kuttiyan vich dil diyan bimariya teh ilaj; FM Radio, Bathinda
Department of Veterinary Pathology			
25	K Gupta	07.03.2023	Paltu te hor janvaran vich testan rahi bimari di janch and stateek ilaj; FM Radio, Bathinda
Teaching Veterinary Clinical Complex			
26	R S Singh	12.04.2022	Mastitis and prevention in dairy cows, AIR, Bathinda
Centre For One Health			
27	Simranpreet Kaur	17.02.2023	Saaf Suthra dudh utpadan; DD Jallandhar
28	Randhir Singh	07.02.2023	Pashu illaaz wich davaiyan di sahi varton; AIR, Patiala
29	Rajnish Sharma	30.06.2022	Pashuan ton manukhan nu hon wale rog; AIR, Jalandhar
30		07.07.2022	Zoonoses bimarian ton rokhtham ate bacha; AIR, Jalandhar
31		26.12.2022	Pashuan di khatrnak bimari hlkaa ate iston bchaa de nukte; AIR, Jalandhar
Animal Disease Research Centre			
32	Vishal Mahajan	09.01.2023	Vaccination in animals & facilities provided by ADRC; Akashwani, Ludhiana
33	M. S. Bal	19.01.2023	Pashu bimarian di janch sabandi unnat vidhian; DD, Jalandhar
College of Veterinary Sciences, Rampuraphul			
34	Amit Sharma	17.05.2022	Soor palan ek lahemand kitta; FM Radio, Bathinda

College of Dairy Science and Technology			
36	Inderpreet Kaur	18.04.2022	Dudh utpada di arthikta te mandikaran; Akashwani, Ludhiana
37		01.06.2022	World Milk Day & Dairy Development in Punjab; AIR, Jalandhar
38		12.07.2022	Dairy kitte nu uddam wjo kive viksat kariye; DD, Jalandhar
39		25.11.2022	National Milk Day; AIR, Jalandhar
College of Fisheries			
40	Vaneet Inder Kaur	13.06.2022	Care of fish ponds during monsoon; Akashwani, Ludhiana
41		28.06.2022	Water Quality Management of fish ponds with special reference to monsoon season; GADVASU YouTube Channel

42	Ajeet Singh	23.09.2022	Macchi de processing rahin amdan 'ch wadha; AIR, Patiala
43	Prabjeet Singh	07.10.2022	Shrimp Farming; DD, Jalandhar
44		15.06.2022	Care of fish ponds during summers; AIR, Jalandhar
45	S N Datta	12.04.2022	Prospect of Pangas culture in Punjab; Apni Kheti
46	Sarabjeet Kaur	06.02.2023	Integrated Fish Farming; DD, Jalandhar
47		08.11.2022	Sardiyaan vich machi di samb sambhaal; FM Radio, Bathinda
48	Grishma Tewari	06.05.2022	Summer management of fish culture; AIR, Patiala
College of Animal Biotechnology			
49	S S Sodhi	28.06.2022	Nasal sudhar rahin soor palan ate munafa; DD, Jalandhar
50	S Singh	28.11.2022	Pashu palan ch ubhhar rahian bimarian; AIR, Jalandhar.
KVK and RRTCs			
51	Vikas Phulia	13.05.2022	Garmian vich machhi palan sambandhi suchajja parbandh; AIR, Patiala
52		22.07.2022	Barsaat de mausam vich machhi palan parbandh; AIR, Patiala
53	S Paul	11.09.2022	Broiler murgion mein lichi bimari : Lachhan aur upchar; DD, Kisan, New Delhi
54	Parul Gupta	19.11.2022	Kheti ate pashu palan vich aurtaan di mahatatta; AIR, Patiala
55	Munish Sharma	14.10.2022	Garelu bageechi vich sabjiyan di kashat; AIR, Patiala
56	Harmeet Kaur	07.06.2022	Kirrian di roktham ate sehatmand vatavaran layi yatan; AIR, Patiala

F. Expert visits

University scientists have undertaken expert visits to various parts of ths state on different occasions. These visits have been enumerated below:

S. No.	Date	Department of Visiting Experts	Venue of Visit	Purpose of Visit
1.	10.07.2022	CoF	Kali Bein, Kanjli Wetland, District-Kapurthala	To attend fish mortality outbreaks
2.	20.08.2022	Microbiology	Villages of Fatehgarh Sahib	To attend LSD outbreak
3.	20.01.2023	COVS, RampuraPhul	VP & RRTC, Kaljharani	For identifying goats for culling

G. Utility Services provided by university

Various departments and outstations of the university provide following utility services to different categories of livestock, poultry and fish farmers and other stakeholders.

i. Specialized diagnosis of diseased conditions of various livestock, pet, wild animals and birds.

ii. Specialized treatment for various livestock, pet, wild animals and birds.

iii. Provision of veterinary health services in the surrounding villages through ambulatory van.

iv. Blood transfusion and hemodialysis in small animals

v. Sale of mastitis diagnostic reagents, BTB cards and SLS Paddles.

vi. Sale of area specific mineral mixture, urea molasses multi-nutrient blocks (UMMB), Bypass Fat, eggs, semen straws live germ plasm

vii. Sale of germ plasm of Sahiwal and Crossbred Cattle; Murrah and Nili Ravi buffalo; Layer and Broiler birds; Beetal goat, Pig, Rabbit etc.

viii. Supply of male cow and buffalo calves for breeding purposes

ix. Service of Sahiwal cattle embryo transfers at farmers' door step

x. Sale of university literature

xi. Sale of Azolla inoculums

xii. Sale of mastitis detection kits, rumenal magnets, milk adulteration testing kits

xiii. Sale of vegetable kits, vermicompost, mushroom, vegetables, fruits, eed of different crops, honey, fruit fly traps

xiv. Testing of faecal, blood, semen samples etc.

xv. Soil and water testing

University Library and Networking

The University Library is equipped with state-of-the-art infrastructure and facilities to support the trinity of academic, research and extension activities of the University. The Koha (Open-Source Library Management Software) is being used for automating its various in-house operations *vis-à-vis* user services including circulation, creation of membership cards, database management for the books, journals, theses etc. The library manages its own website *i.e.,* Cyberary to provide user friendly access to its e-resources, services and other important information. The Online Public Access Catalogue (OPAC) of the library serves as a gateway for users to explore information resources collection of library including books, journals and theses from their gadgets. During the year 2022-23, the University Library purchased 745 print books for library and constituent colleges in the subjects of veterinary science & animal husbandry, dairy science & technology, fisheries and animal biotechnology. The University library is a member of Consortium for e-Resources in Agriculture (CeRA) providing access to about 4000 journals in Agricultural Sciences including Veterinary Sciences, Animal Husbandry, Livestock Management & Poultry Sciences, Fisheries and Aquaculture, Dairy Technology, Biotechnology, Animal Nutrition and allied subjects. E-Newsletter of the University Library is published quarterly to acquaint the academic fraternity of the University with the arrival of latest information resources to library. The University Library also publishes e-Newsletter of the University highlighting teaching, research and extension activities of the University.

The University Library has developed and maintains an institutional repository; wherein articles published by the faculty and other important documents are preserved for reference. The repository has been customized to retrieve articles by NAAS Rating and Impact Factor. The digital contents available on the repository are accessible to the University fraternity for better comprehension of the teaching and research activities. The University Library also assists faculty in utilization of anti-plagiarism software 'Ouriginal' to ensure academic integrity as envisaged in Anti-Plagiarism Policy of the University. User accounts are created in Ouriginal Plagiarism Detection Software and assistance is provided to the faculty in uploading/managing the manuscripts and generation of Similarity Index report(s).

Networking and other IT Activities

Optical Fiber Network was extended by laying 12 Core Optical Fiber Cable (OFC) extending the University network to provide the intranet/internet facility in G8 hostel and the existing new Girls' Hostel. Networking was extended to the offices of the Registrar and the Comptroller as per the installed workstations. Scientist Home building was connected with the university network through Optic Fiber Cable and the internet facility on a Wi-Fi network for Scientist Home/NRI Hostel was established. To meet the demands of a Hybrid Teaching-Learning environment at college levels in the University, existing 100Mbps internet lease line was upgraded to 200Mbps and network was extended to new buildings. For providing the uninterrupted internet connectivity, power backup with 1 KVA Online UPS was upgraded for the network switches at three places.

Student-Parent Portal was developed for providing the information to the students and/or parents through a single gateway regarding registration dates, academic calendar, date sheet, attendance, results, notices, scholarships, and other related aspects. Existing on-premises Mail Server was upgraded to Google Cloud Server (Gmail) on the University domain. The Server-Client based Antivirus including patch management for the University Library was setup. A 75 inches Ultra HD Smart LED was procured to display digital images and movies in Educational Museum.

Directorate of Students Welfare and Estate Office

Sports and Cultural Activities Wing

University has created facilities to promote the sports activities among the students. Large number of students (both boys and girls) from constituent colleges has shown keen interest in sports activities. Cultural Activities Wing of the Directorate has been entrusted with the responsibility to promote the cultural and co-curricular activities amongst the students, sharpening their skills in the fields of fine arts, theatre, drama etc. and to provide them a platform to articulate their creativity. To achieve this objective, the wing organized regular camps, seminars, meetings and interactions with eminent artists/personalities from the field of art and culture and facilitated the student participation in cultural programmes in and out of the University. During the period under report the students actively participated in cultural activities and won various prizes. The Cultural Activities Wing of the University also organized functions to celebrate Independence Day and Republic Day. Students showed their talents by presenting patriotic songs and skits during the said celebrations.

University teams participated in various Inter-University Tournaments listed below:

Guru Angad Dev Veterinary & Animal Sciences University Badminton (M&W) team participated in North Zone Inter-University Badminton (M&W) Championship held at MDU, Rohtak, Haryana from 22.12.2022 to 27.12.2022.

Guru Angad Dev Veterinary & Animal Sciences University Football (M) team participated in North Zone Inter-University Football (M) Tournament held at GNA University, Phagwara, Punjab (PB) from 16.12.2022 to 24.12.2022.

Guru Angad Dev Veterinary & Animal Sciences University Volleyball (M) team participated in North Zone Inter-University Volleyball (M) Tournament held at MJPRU, Bareilly, Uttar Pradesh from 21.12.2022 to 25.12.2022.

Guru Angad Dev Veterinary & Animal Sciences University Basketball (M) team participated in North Zone Inter-University Basketball (M) Tournament held at Jamia Millia Islamia, New Delhi from 25.12.2022 to 31.12.2022.

Guru Angad Dev Veterinary & Animal Sciences University Swimming (M&W) team participated in All India Inter-University Swimming (M&W) Tournament held at Kalinga Institute of Social Sciences, Bhubaneswar (Odisha) from 26-12-2022 to 29-12-2022.

Guru Angad Dev Veterinary & Animal Sciences University Table Tennis (W) team participated in North Zone Inter-University Table Tennis (W) Tournament held at University of Delhi from 28.12.2022 to 30.12.2022.

Guru Angad Dev Veterinary & Animal Sciences University Table Tennis (M) team participated in North Zone Inter-University Table Tennis (M) Tournament held at University of Delhi from 02.01.2023 to 04.01.2023.

Guru Angad Dev Veterinary & Animal Sciences University Chess (M) team participated in North Zone Inter-University Chess (M) Tournament held at University of Delhi from 13.02.2023 to 15.02.2023.

All India Inter Agricultural University Sports and Games meet:

Guru Angad Dev Veterinary & Animal Sciences University Athletics (M&W), Basketball (M&W), Badminton (M&W) and Table Tennis (M&W) teams Participated in 21st All India Inter Agricultural University Sports & Games Meet 2022-23 held at CCSHAU, Hisar (HR) from **20-24 February, 2023** and bagged following awards:

Shot Put (M) ---------- Gold Medal
Badminton (W) ---------- Gold Medal
Basketball (M) ---------- Silver Medal
Badminton (M) ---------- 4th Position

All India Inter-Veterinary Colleges Badminton (M&W), Professional Quiz & Table Tennis (M&W) Tournament held at GBPUA&T Pantnagar, Uttarakhand from 31.10.2022 to 02.11.2022 and bagged following awards:

Badminton (M) ---------- Gold Medal

Activities of Cultural wing and NSS unit

11th Inter-College Youth Festival 2022-23 was organized from 13-10-2022 to 20-10-2022. Students from different colleges participated in the events and bagged several prizes:

Sr. No.	Students name	College	Position	Year
1.	Anuragdeep Kaur	CODST	Best Artist (Fine Arts)	2022
2.	Amaanat Kaur	COF	Best Speaker	
3.	Ajayveer Singh Sandhu	COF	Best Speaker	
4.	Suneha Mandal	COF	Best Singer	
5.	Karandeep Sama	COVS	Best Actor	
6.	Amaanat Kaur	COF	Best Actor	
7.	Diksha	CODST	Best Actor	
8.	Chinky Thaman	KCVAS	Best Dancer	
9.	Gagandeep Singh	COF	Best Dancer	

Punjab State Inter University Youth Festival 2022 held at Punjabi University Patiala from December 10-12, 2022. University contingent participated in several events and bagged laurels for University.

Sr. No.	Students name	College	Position	Year
1.	Sehajpreet	COVS	2nd Position in Elocution	2022
2.	Harphool	COVS Rampura phull	2nd Position in Clay Modelling	2022
3.	Deep Kamal	CODST	3rd Position in Collage	2022
4.	Anuragdeep	CODST	3rd Position in Poster	2022

Participation in 16th Inter University National Debate Competition at G.B. Pant University of Agriculture &Technology, Pant Nagar (UK) held from January 14-15, 2023.

Four students from College of Veterinary and Animal Sciences, Ludhiana and Rampura Phull, namely Adarsh Bhambri, Kanwarsher Singh Gill, Karanveer Singh and Sehajdeep Kaur had participated in the National Debate Competition.

36th North Zone Inter Varsity Youth Fest in University of Jammu, Jammu from January 31 to February 4, 2023.

Sr. No.	Students name	College	Position	Year
1.	Paramnoor Singh	KCVAS	4th Position in Photography	2023
2.	Ajayveer Singh	COVS Ludhiana	5th Position in Debate	2023
3.	Adarsh Bhambri	COVS Rampuraphull	5th Position in Debate	2023

The cultural contingent won following prizes at 21st All India Agricultural Universities Youth Festival 2022-23 held from March 13-17, 2023 at University of Agricultural Sciences, Bangalore.

- First position in One Act Play
- Second in Procession
- Third in Group Song Indian
- Fourth in Collage Making

Details of students who won prizes at All India Inter Agri 2022-23

Sr. No.	Students name	College	Position	Year
1.	Sehajpreet	COVS	1st Position in One Act Play	2023
2.	Gagandeep Singh	COF	3rd in Group Song	2023
3.	Ishant Bansal	COVS	3rd in Group Song	2023
4	Suneha Mandal	COF	1st Position in One Act Play and 3rd in Group Song	2023
5	Deep Kamal	CODST	1st Position in One Act Play	2023
6	Bhawna Kamboj	CODST	1st Position in One Act Play	2023
7	Gourav Dogra	COVS	1st Position in One Act Play and 3rd in Group Song	2023
8	Karandeep Sama	COVS	1st Position in One Act Play	2023
9	Muskan Sarangal	COVS	1st Position in One Act Play and 3rd in Group Song	2023
10	Bipasha Basil	COABT	1st Position in One Act Play and 3rd in Group Song	2023
11	Simranjeet Singh	COVS	1st Position in One Act Play	2023

Republic Day & Independence Day Celebrations

Sr. No.	Republic Day & Independence Day	Year
1.	Every Year Republic Day & Independence Day is celebrated with great Pomp and Show	2022-2023

National Service Scheme (NSS)

Talk on Environment to Save Soil:

Event	Year
Expert Talk on Environment with a focus on Save Soil as a part of 50th anniversary of Earth Day on March 30, 2022 at Seminar Hall, MSVH (first floor), Clinics, Silver Jubilee Block, Ludhiana.	2022

Poster Making Competition on Alcohol Addiction & Drug Abuse:

Event	Year
Poster Making Competition on Alcohol Addiction & Drug Abuse amongst Youth on 11th May 2022 at Silver Jubilee Block.	2022

Seminar on Alcohol Addiction & Drug Abuse chaired by Cabinet Minister

Event	Year
Seminar on Alcohol Addiction & Drug Abuse amongst Youth on 12th May 2022 at Silver Jubilee Block, chaired by Sh. Kaushal Kishor, Minister of State, Housing & Urban Affairs, Government of India.	2022

Session on Mantras on Mind Management

Event	Year
Session on Mantras on Mind Management was held on June 8, 2022 at Lecture Hall (first floor), Small Animal Clinic. The Session was chaired **by Mr. Sanchit Jain, Faculty and State Head, Art of Living Youth Programmes**.	2022

Partition Horrors Remembrance Day

Event	Year
A walk-in digital exhibition of partition pictures was shown on '**Partition Horrors Remembrance Day'** on August 10, 2022 at Virtual Classroom at College of Dairy Science and Technology, Ludhiana.	2022

Webinar on Food Health Planet

Event	Year
Vegan Outreach society organised a Certification Webinar on the impact of our diet on the environment, animals and our health while celebrating the Azadi ka Amrit Mahotsav on September 28, 2022.	2022

Digital exhibition

Event	Year
A digital exhibition on 'Sardar Patel – The Architect of Unification' was held on November 2, 2022 at Virtual Classroom at College of Dairy Science and Technology, to celebrate the life and contributions of Sardar Vallabhbhai Patel	2022

Interaction on Drug Prevention and Treatment

Event	Year
Interaction on Drug Prevention and Treatment with **Brig. Kuljit Singh from Heartfulness Education** on November 30, 2022 from at Auditorium, College of Animal Biotechnology	2022

10 days Adventure Camp

Event	Year
Renu Kumari, COF and Renee Thephail, CODST attened NSS Adventure Camp from October 7-16, 2022 held at Atal Bihari Vajpayee Insititute of Mountaineering and Allied Water Sports Centre, Pong Dam, HP.	2022

7 days National integration Camp

Event	Year
Aayushi Bhalla COVS Rampura Phul and Harmandeep Singh COVS Rampura Phul for National Integration camp held from May 20-26, 2022 at Chitkara University, Rajpura District.	2022

Voter's day Pledge

Event	Year
NSS volunteers and NCC cadets administered Voter's Day pledge at GADVASU Campus on January 25, 2023	2023

NSS Special Camp

Event	Year
7 days NSS Special camp from 06-02-2023 to 12-02-2023 with the Theme of Youth for Green Initiative and Skill Development in Punjab- *"Pradushan mukt vatavaran te hunar vikas nu pranaye Punjab de naujvan*" organised at GADVASU, Ludhiana in which 60 NSS Volunteers participated from CODST, COF, COABT and COVS	2023

Basic Life Support Training Programme

Event	Year
Hands on skill learning programme on 07-02-2023 was organised at Silver Jubillee block, GADVASU, Ludhiana in which 100 NSS Volunteers participated from CODST, COF, COABT and COVS to take training on saving life with bare hands without equipment by doctors from Clio Hospital, Ludhiana.	2023

NSS Cleanliness Drive

Event	Year
15 days NSS Cleanliness Drive from 11-03-2023 to 25-03-2023 organised Silver at GADVASU, Ludhiana in which 70 NSS Volunteers participated from CODST, COF, COABT and COVS worked on different days to paint the tree trunks, collect waste and beautify campus at Silver Jubilee, Scientist Home and COVS block.	2023

Jal Sewa at Pashu Palan Mela

Event	Year
NSS volunteers from CODST and COABT served water / Jal Sewa to the farmers and visitors at Pashu Palan Mela from March 24-25, 2023	2023

NSS Special Camp

Event	Year
7 days NSS Special camp from 30-3-2023 to 5-04-2023 with the Theme of Youth for Environment Conservation organised at GADVASU, Ludhiana in which 50 NSS Volunteers participated from CODST.	2023

NCC TRAINING ACTIVITIES

Various NCC Training activities performed by the NCC cadets of 1 Punjab R&V Sqn NCC, GADVASU- Ludhiana between 01/04/2022 to 31/03/2023 are listed below:

- 03 cadets participated in Republic Day camp w.e.f. 31/12/2022 to 04/2/2023 at New Delhi and competed in various equestrian events and won 3 Runner up trophies, 2 gold, 3 silver, 1 best show jumper trophy in different equestrian events of show jumping, Dressage, Hacks, Top Score etc.
- 04 cadets attended the Army Attachment Camp held at RVC centre and College Meerut in November, 2022.
- 25 cadets appeared for NCC "C" certificate exam held on 19/02/2023 at SCD Govt. College, Ludhiana.
- 87 cadets appeared for NCC "B" certificate exam held on 12/02/2023 at COVS, Ludhiana.
- NCC cadets took part in various activities like swachchta abhiyaan, Water Conservation, Run for fun etc in which various activities like awareness rallies pertaining to the social causes were done.
- Weapon training and firing practices were conducted for all the cadets.
- Cadets were imparted rigorous training in Horse man ship.

Cadets during practice in camp

Cadets during Firing practice in camp

Cadets during Quiz Competition in camp

Cadets with Trophies at Republic Day Camp

Cadet Yuvraj Singh during action at Republic Day Camp

Infrastructure developed

S. No	Department	New Intfrastructure/ renoivation of existing infrastructure*	Name of new instruments/ equipment purchased	Month and year of purchase
College of Veterinary Science, Ludhiana				
1	Directorate of Livestock Farms	Animal weighing Unit and Weighing bridge	Tractor and Molasses Tank	July 2022
		Individual housing pens Shed no 7 and Cooling/ sprinkling area at AI centre Shed no 8	-	September 2022
		Holding area (Buffaloes), Line milking parlour for buffaloes,	New rectangular feeder for small ruminants, Mobile calf milk feeding unit, Calf hutches (16 nos.) , Bulk Milk Chiller 1000 Litre and Hoof trimming chute for bulls	March 2023

2	Teaching Veterinary Clinical Complex	Interventional Ultrasonography Lab for procedures like thoracocentesis, pericardiocentesis and taking US guided biopsy of vital organs; Ultrasound Unit	Ultrasound machine BPL X cube 70, Veterinary specific Dialysis tables, Bronchoscope and Rhinoscope for Endoscopy unit	March 2023
		Double pass fully automatic ultrapure RO plant for Dialysis (upgraded existing manual single pass RO plant to Double pass RO plant with full automation)		
		Clinical diagnostic laboratories at KVK Barnala, Mohali, Booh, RRTC Talwara	ECG Machine-2 Laryngoscope-2 Pulse oxymeter-2 Fluid warmer-2 Veterinary Anaesthesia Machine-2	March 2023
3	Animal Disease Research Centre		Gel Electrophoresis system with power pac	December 2022
4	Department of Gynaecology and Obs		Tube Rotator	November 2023
			Water Bath stainless steel casing and interior 10L	January 2023
4	Department of Livestock Products Technology		Bowl Chopper	March 2023
			Meat Mincer	March 2023
5	Veterinary Anatomy		Bacteriological incubator, Vertical Mini Dual Gel electrophoresis and X Ray Viewer	
6	Veterinary Pathology		Tissue Embedding system, EZ retriever system, Refrigerated Micro Centrifuge, Florescence Reader, Gel Doc and Co2 Incubator	

Animal Weighing Unit

Weighing Bridges

Molasses Tank

Individual housing pens Shed no 7

Cooling/sprinkling area at AI centre Shed no 8

Holding area (Buffaloes)

Rectangular feeder for small ruminants

Mobile Calf Milk Feeding Unit

Calf Hutches

Line Milking Parlour

Bulk Milk Chiller

Interventional Ultrasonography Lab

Clinical diagnostic laboratories

Veterinary specific Dialysis tables

Bowl Chopper

Meat Mincer

College of Fisheries

S. No	New Intfrastructure/ renoivation of existing infrastructure*	Name of new instruments/equipment purchased	Month and year of purchase
1	Capacity Building Resource Centre for Intensive Aquaculture Technologies in Punjab: Re-Circulatory Aquaculture System (RAS) and Biofloc Aquaculture System (BFAS)		January 2023
2	Fish-cum-Duck Farming Unit – R & D Model Established at Instructional cum Research Farm, COF	Digital Tray Dryer, Weighing Balance, Sealing Machine, Feed Pelletizer, Mixer-Grinder and Pulverizer, Fabrication of Machine for preparation of Duckweed /Azolla compost/Fertilizer sticks, Accessories of Feed Analysis Equipment, Display Cabinet, Deep Freezers (2)	
3		Fish Processing Items: Air Fryer Digital, Induction , Barbeque (Electric), Barbeque (Charcoal), Hand blender, Food Processor, Microwave Cooktop	

RAS and BFAS constructed in 'Capacity Building Resource Centre for Intensive Aquaculture Technologies' established at College of Fisheries, Punjab under Pradhan Mantri Matsya Sampada Yojana (PMMSY) of DOF, Government of India. The Centre was inaugurated by Dr. Jatindra Nath Swain, Secretary, DOF, GOI in the presence of Sh. Sagar Mehra, Joint Secretary, DOF and Dr. Inderjeet Singh, Vice Chancellor on 7 January 2023.

Re-circulatory Aquaculture System (RAS)

Biofloc Aquaculture System (BFAS)

Fish-cum-Duck Farming Unit – R & D Model Established at Instructional cum Research Farm

RRTC, Talwara

S. No	New Intfrastructure/renoivation of existing infrastructure*	Name of new instruments/ equipment purchased	Month and year of purchase
1.	Bamboo Poultry cage for demonstration of backyard poultry farming		April, 2022
2.	Upgraded existing software by purchasing domain		March 2023
3.	Change of feeding alley shed non 2-3		March 2023
4.	Fish pond of the size of 25 X 20 meters	Fencing of pond and purchase of net for covering pond for protecting the fish seeds from predation.	June 2022

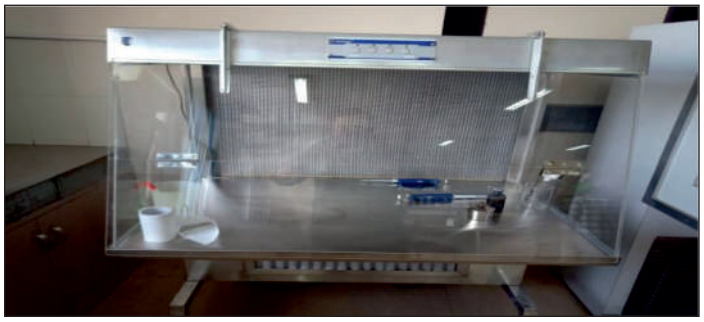
KVK, Mohali

S. No	New Intfrastructure/ renoivation of existing infrastructure*	Name of new instruments/ equipment purchased	Month and year of purchase
	KVK Farm Development		

College of Dairy Science and Technology

S. No	Department	New Intfrastructure/ renoivation of existing infrastructure*	Name of new instruments/ equipment purchased	Month and year of purchase
1	Dairy Technology		Laminar air flow, BOD incubator and Bacteriological Incubator	March 2023

2	Dairy Engineering		Double Jacketed Electric Batchpast, Hot Plate Coil Type, Spray dryer co current spray nozzles (without needle), Refrigerator and Microwave Oven 25sc4	
3	Experimental Dairy Plant		Can seaming machine, Bulk milk cooler, Hand blender and Mixer Grinder, Walk in cold chamber, Pinnacle ice box and Kent room ozone air disinfectant	
4	Dairy Chemistry		vertical chemical storage cabinets, Micro processed controlled Photo meter and Vortex mixer and waterproof ph pocket tester	
5	Dairy Microbiology		Incubator with orbital shaker, Tablet making machine, Freezer Dryer (Lyophylizer), Thermometer, Cover Slips & Occular Micro meter erma	



Laminar Air Flow

Incubator wirh orbital shaker

Tablet making machine

Freeze Dryer (Lyophylizer)

College of Animal Biotechnology

S. No	Department	New Intfrastructure/ renoivation of existing infrastructure*	Name of new instruments/ equipment purchased	Month and year of purchase
1	College of Animal Biotechnology		Tissue homogenizer BOD Cooling incubator and Incubator	
			Refrigerators (Vertical refrigerator, Ver. Freezer, Horizontal Freezer)	August 2022
			Vortex Shaker, Ph Meter, SpinWin and Table top centrifuge	September 2022
			Deep freezers and Refrigerators	November 2022 March 2023
			Nucleic acid extraction system and Blotting apparatus	November 2022
			Electrophoresis systems (Vertical and horizontal)	October 2022
			Laminar Air Flow, Lab Working Tables (CRL)	January 2023
			Dancing Shaker , Microcentrifuge (2) Dry Bath and Vortex Shaker	March 2023

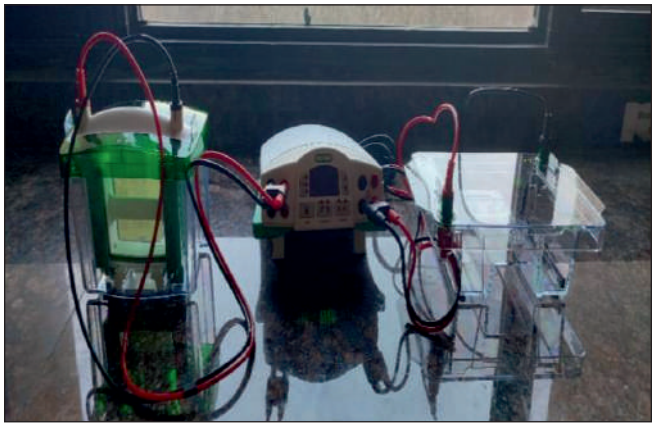
College of Veterinary Sciences, Rampura Phul

S. No	Department	New Intfrastructure/ renoivation of existing infrastructure*	Name of new instruments/ equipment purchased	Month and year of purchase
1	Livestock Products Technology		Hot Water Bath	November, 2022
			Digital pH meter	December, 2022
			Impulse Sealer, Deep Freeze	March, 2023
2	CIF		Ultra deep freezer -80° C and CO_2 Incubator	November, 2022
			Table top high-speed microcentrifuge 2ml for CIF	January, 2023
			Gel electrophoresis (Vertical and Horizontal) for CIF	March, 2023
3	Veterinary Surgery and Radiology	Establishment of Dental Lab	Dental Instruments for tooth extraction and periodontitis and electrical tooth rasper for large animals	March, 2023

		Establishment of Physiotherapy Lab	Ultrasound Therapy, Electric stimulator, Short-wave or micro-wave diathermy unit with disc pad and coil Electrodes and Infra-red lamps	March, 2023
		Establishment of Demonstration Operation Theater for Students	V- top operating table, Anaesthesia machine OT lights, UV- lights for sterilization of OT, Dressing table	March, 2023
		Establishment of Undergraduate Practical Classroom	White board, Teacher desk, Teacher table, Student chairs	March, 2023
		Establishment of orthopedics operative facility for small and large animals (Bone pinning and Bone plating)	Orthopedic Instruments for Bone Plating and Bone Pinning	March, 2023
		Establishment of Rabies ward	Cage confinement facility	March, 2023
4	Veterinary pathology	Clinical Pathology Laboratory, Museum, Post mortem room and Histopathology Laboratory		
5	Veterinary Medicine	Veterinary Medicine laboratories	Oxygen concentrators-3, Electronic monopan balance-2, Infusion Pumps-3, Transilluminator with 20D lens-2, Blood Pressure apparatus-2, Laminar flow-1, Urine analyzer-1, Refractometer (handheld)-2, Electrical conductivity meter-1, Centrifuge machine-1no, Neubauer slides, Vernier calliper and Pipettes,	February-March, 2023
6	Veterinary Gynaecology and Obstretics	Undergraduate lab	Digital pH meter, Ovulation detector for small and large animals	December, 2022
		Phantom hall and palpation room	Inverted microscope	January, 2023
		Semen lab	Stage warmer for microscope	February, 2023

		Multimedia class room for UG	Electrical thawing unit, electrical mortuary, deep freezer	February, 2023
		Andrology and AI lab	Digital AI gun	March, 2023
7	Veterinary Parasitology	Parasitology Lab	-20 degrees deep freezer, Weighing Balance Digital and Double door refrigerator	March, 2023
8	Livestock Production Management	Multipurpose novel sow pen	-	March, 2023
9	Veterinary and Animal Husbandry Extension Education	Audio-Visual Lab	Digital podium, Interactive Panel, Digital floor standee	March, 2023

Central Instrumentation Facility



Gel electrophoresis (Vertical and Horizontal) for CIF

Table top high-speed microcentrifuge 2ml for CIF

Ultra-deep freezer -80° C

CO_2 Incubator

Oxygen concentrators

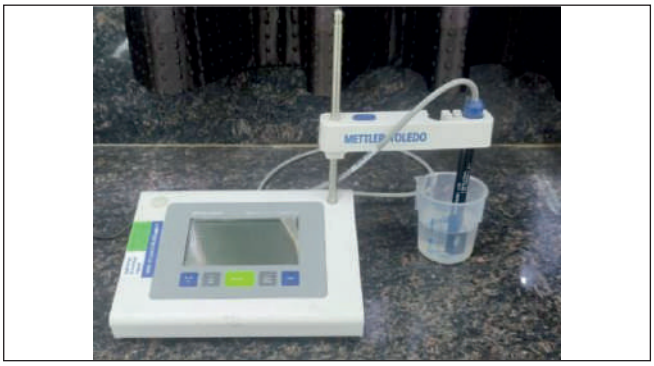
Transilluminator with 20D lens

Electronic monopan balance

Infusion Pumps

Laminar flow

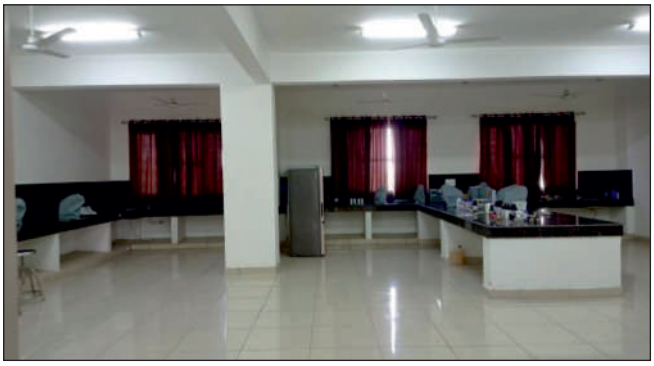
Urine analyzer



Electrical conductivity meter

Centrifuge machine

Pathology Museum



Clinical Pathology Laboratory

Tissue Processing Laboratory

Establishment of Physiotherapy Lab

Establishment of Demonstration Operation Theater

Small animal (Gynaecology) O.T.

Undergraduate lab (VGO)

Large Animal Digital X-Ray Machine with Long Length Imaging System and CR System

State of the art Audio-visual lab

Multipurpose novel sow pen

Awards/Honors/Fellowships by Faculty

a. Awards/Honours/Recognitions

S. No	Name of the Faculty	Detail of the Award/Honour/other Recognitions	Date of the Award
College of Veterinary Science, Ludhiana			
Department of Animal Nutrition			
1	Dr. J S Hundal	Best Researcher Award of the university	January 26, 2023
		Associate Fellow of National Academy of Dairy Science	October 29, 2023
		Appreciation award for project (Rs 39.6 Lac) from Reliance Industries Limited, Mumbai	2022-24
		Appreciation award for project (Rs 14.0 Lac) from SS Waste link Sustainability Services Pvt Ltd, New Delhi.	2022-24
Department of Animal Genetics & Breeding			
2	Dr Simarjeet Kaur	Breed conservation award-2022 (1st Rank) conferred by ICAR-NBAGR, Karnal under Institution category during the celebrations of Kisan Divas.	December 23, 2022
3	Drs Simarjeet Kaur, Neeraj Kashyap, Puneet Malhotra and Varinder Pal Singh	Best oral presentation award for research paper, "Management of service period to maximize the milk production in murrah buffaloes" during the National Symposium of Society for Veterinary & Animal Husbandry Extension (SVAHE) at CSK HPKV, Palampur	May 8, 2022
4	Drs Simarjeet Kaur, Puneet Malhotra, R.S. Grewal and S.S. Sooch	Best poster presentation award for research paper, "Livestock sector: As potential renewable energy resources" during the National Symposium of SVAHE at CSK HPKV, Palampur	May 8, 2022
5	Dr Simarjeet Kaur	Jury member during the poster sessions in the 4th National Symposium of SVAH at CSK HPKV, Palampur.	May 7, 2022
		Co-Chairman in the poster session at National Symposium on "Animal Genetic Resources Management for Rural Livelihood Enhancement" & XX Annual Convention of Society for Conservation of Domestic Animal Biodiversity at College of Veterinary & Animal Sciences, Parbhani.	February 23, 2023

6	Drs Gurjot Kaur Mavi, P Singh and Harmeet Singh	Prof. Suresh S. Honnappagol- National Young Scientist Award for best paper presentation during the XVIII Annual Convention of Indian Society for Advancement of Canine Practice at Udaipur, Rajasthan	September 22-24, 2022
	Drs Gurjot Kaur Mavi, P P Dubey and R S Grewqal	Best paper presentation award during 19th International Biennial Conference of Animal Nutrition Society of India (ANSICON-2022) at Guru Angad Dev Veterinary & Animal Sciences University, Ludhiana.	November 16-18, 2022
7	Dr. Saroj Kumar Sahoo	Best poster presentation (2nd prize) and acted as Co-chairman in National Quiz competition during National conference on 'Futuristic Approach to Viable Animal Production vis-a vis Climate and Calamity Challenges" and Annual convention of ISAPM at OUAT, Bhubaneswar	January 20, 2023
Department of Livestock Production & Management			
8	Drs Daljeet Kaur Mandeep Singla RaviKant Gupta	Felicitation awards from the association in admiration of their contribution and active in different technical sessions of the National conference on 'Futuristic Approach to Viable Animal Production vis-a vis Climate and Calamity Challenges" and Annual convention of ISAPM at OUAT, Bhubaneswar.	January 20, 2023
Department of Livestock Product Technology			
9	Dr OP Malav	Certificate of Recognition/Award of honor for acting as Co-Chairperson in the technical session during 19th ANSICON-2022 at Guru Angad Dev Veterinary & Animal Sciences University, Ludhiana.	November 16-18, 2022
10	Dr Nitin Mehta	Award of Membership of National Academy of Veterinary Sciences (India)	June 20, 2022
		Associate fellowship National Academy of Dairy Science (India)	October 29, 2022
11	Kantale R. A., Nitin Mehta, O.P. Malav, Ajeet Singh and Sunil Kumar.	Best oral research paper presentation Award to "Development and quality evaluation of functional protein enriched multigrain bread incorporated with chicken meat powder and fish protein isolate". In Indian Ecological Society Fisheries and Aquaculture Conference 2023 (IESFAC) organized by the university, Ludhiana, Punjab	February 22-24, 2023

Department of Veterinary Anatomy			
12	Dr Varinder Uppal	Dr V R Bhamburkar award for 'Anatomist of the Year' conferred at 36th Annual Convention of Indian Association of Veterinary Anatomists (IAVA) and International Symposium at College of Veterinary and Animal Science, Navania, Udaipur.	December 20-22, 2022
13	Dr Kritima Kapoor	Dr K S Roy award and medal for best paper presented entitled "Immuno expression of Bax and Bcl2 in cyclic corpus luteum of Indian Buffalo" during 36th International Symposium of IAVA, at College of Veterinary and Animal Science, Navania, Udaipur.	December, 20-22, 2022
		Best PhD thesis award for research work entitled "Histomorphochemical, ultrastructural characterisation and immune regulation of corpus luteum in Indian buffalo" in 3 days international conference organized by ICAR-IGFRI, Regional Research Station, Srinagar, ICAR-NAHEP, Birsa Agricultural University, Ranchi and NADCL, Baramulla, UT of J&K.	September 28-30,2022
14	Dr Devendra Pathak	Fellow of Indian Association of Veterinary Anatomists conferred at 36th Annual Convention of Indian Association of Veterinary Anatomists (IAVA) and International Symposium at College of Veterinary and Animal Science, Navania, Udaipur	December 20-22, 2022
Department of Veterinary and Animal Husbandry Extension			
15	Dr Jaswinder Singh	National Young Scientist Award by Indian Society for Advancement of Canine Practice at National Congress in Canine Practice and XVIII Annual Convention at Udaipur, Rajasthan.	September 22 - 24, 2022
		Best Extension Worker Award by the university	January 26, 2023
		First IDA Best research article award published in the category of Dairy Economics, Extension and Management for year 2020 in Indian Journal of Dairy Science	February 01, 2023
16	Dr Y S Jadoun	Best poster presentation award in ANSICON-2022 organised at Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana	November 16-18, 2022.
		"NAVS Membership Award" from National Academy of Veterinary Sciences (India) during 20th Convocation-cum-Convention held at Nagpur Veterinary College, MAFSU, Nagpur.	June 20-21, 2022

Department of Teaching Veterinary Clinical Complex			
17	Dr Swaran Singh Randhawa	Fellowship of Indian Society for Veterinary Medicine for the Year 2020	February 2023.
18	Drs Gurpreet Singh Preet, Surbhi Gupta, Swaran Singh Randhawa, Shabnam Sidhu and Sushma Chhabra	First prize in poster presentation on clinical case report. "Rhinoscope assisted nasal leech removal in a dog" during conference organized by Indian Society of Veterinary Medicine at GBPUAT Pantnagar	February 22-24, 2023
19	Dr Randhir Singh	ISVM appreciation award during conference organized by Indian Society of Veterinary Medicine at GBPUAT Pantnagar	February 22-24, 2023
Department of Veterinary Parasitology			
20	Dr N K Singh	Awarded Fellow of the National Academy of Dairy Sciences, India (NADSI) for 2021	October 29, 2022
		25th MVC-NCVP Mid-career Excellence Award-2021 by the Indian Association for the Advancement of Veterinary Parasitology (IAAVP) during the XXXI National Congress of Veterinary Parasitology, Bhubaneswar.	December 06, 2022
21	Dr L D Singla	Best poster presentation award as a co-author for "The Indian gerbil, *Tatera indica* as reservoir of arthropod vectors and their risk in transmission of diseases to humans and animals." in 10th National Seminar on Agriculture and More: Beyond at SKUAST, Srinagar	May 28, 2022
		Dr B.P. Pandey Memorial Oration Award from Indian Society of Parasitology (ISP) during 31st National Congress of Parasitology held at Madras Veterinary College, TANUVAS, Chennai	November 12, 2022
		Best oral presentation (2nd) for the paper "Molecular epidemiology, phylogenetic analysis and risk assessment of *Theileria annulata* in bovines of Punjab" during 31st National Congress of Parasitology held at Madras Veterinary College, TANUVAS, Chennai	November 12, 2022
		Best oral presentation award as a co-author for paper entitled, "Beeswax derived albendazole loaded solid lipid nanoparticles for targeted drug delivery in *Haemanuchus contortus* in bovines of Punjab during the during 31st National Congress of Parasitology held at Madras Veterinary College, TANUVAS, Chennai	November 12, 2022

		Nominated Editor National Academy of Veterinary Science (India) during 15th GC Meeting of NAVS(I).	December 09, 2022
22	Dr Harkirat Singh	Pashudhan Samriddhi India Award 202″ under category Saga of 75 Veterinarians Transforming India [PSIAASC04/22]	September 01, 2022
		Best oral presentation award (Ist) in Session III in 31st National Congress of Veterinary Parasitology and National symposium on ″Green Management of Animal Parasite to Enhance Livestock Production, Livelihood and One Health″ organized by College of Veterinary Science & Animal Husbandry, OUAT, Bhubaneswar	December 08, 2022
		Certificate of Appreciation in recognition of exemplary services rendered in the landscaping wing of the University	January 26, 2023
23	Dr Alveena Ganai	Young Scientist award in in "International conference on Latest Trends and Innovations in Pharmaceutical and Biosciences" Kota, Rajasthan	March 18, 2023
		Best Scientific oral presentation Award in "International conference on Latest Trends and Innovations in Pharmaceutical and Biosciences" Kota, Rajasthan	
Department of Veterinary Pathology			
24	Dr Kuldip Gupta	Fellowship of Indian Association of Veterinary Pathologists, 2021	November 17-20, 2022
		Certificate of appreciation for delivering Invited lecture entitled "Interpretation of leukogram findings", during the ICVP Training Session organized by Indian College of Veterinary Pathologists	August 19, 2022
25	Drs K Gupta S.K Tatyarao, P Syal and S Pallvi	Best case presentation award of paper "A case of atypical cutaneous tuberculosis with systemic involvement in pigeons" presented in Online ICVP- Open Award Session, Organized by Indian College of Veterinary Pathologists	December 04, 2022
26	Drs Amarjit Singh K Gupta L Geeta Devi	Certificate of appreciation by Dr. C.M. Singh Endowment Trust Bareilly, for organizing National webinar on 'Advances of Veterinary Sciences' during Platinum Jubilee year of Indian Independence (1947-2022) Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana	June 30, 2022

27	Dr. Omer Khalil Baba	Golden achievers award by council for Academic performance & Appraisal, Delhi	September 11, 2022
Department of Veterinary Gynaecology and Obstetric			
28	Dr Parkash Singh Brar	Awarded Fellowship of National Academy of Veterinary Sciences (India).	June 20, 2022
		Awarded Fellowship of National Academy of Dairy Sciences (India).	May 26, 2022
29	Dr Mrigank Honparkhe	Awarded Membership of National Academy of Veterinary Sciences (India)	June 20, 2022
30	Dr Ajeet Kumar	Selected as Editor, Indian Journal of Animal Reproduction in General Body Meeting of Indian Society for the Study of Animal Reproduction. (ISSAR) held at Jabalpur	November 17, 2022
31	Dr S S Dhindsa	Best poster award in the 4th National conference by Society for Veterinary and Animal Husbandry Extension at CSKHPVK, Palampur.	May 6-8, 2022
Department of Veterinary Surgery & Radiology			
32	Dr Ashwani Kumar	Best paper presentation award for the paper, "Overexpression of heat shock protein 90A in canine mammary Tumours" at National symposium on' "Innovative approach and strategies for animal biochemistry and biotechnology towards holistic development in animal health and productivity organized by College of Veterinary Science NDVSU, Jabalpur.	January 5-6, 2023
33	Drs S K Mahajan A Kumar V Sangwan	Letter of appreciation from Ms Anuradha Desai, Chairperson Venkys India for successful cataract Surgery on their pet dog	October 15, 2022
34	Drs J Mohindroo S K Mahajan Tarunbir Singh	Dr. A.K. Bhargava Memorial Gold Medal for Best research paper published in the Indian Journal of Veterinary Surgery (2020), entitled "Ultrasonographic morphometry of gastrointestinal tract in dogs" in 45th Annual Congress of Indian Society for Veterinary Surgery at Nagpur.	January 11-13, 2023
Department of Veterinary Physiology			
35	Dr Chanchal Singh	Best poster award for the paper "Assessment of growth, haemato-biochemical, micromineral and antioxidant parameters associated with weaning in pigs" at the Annual Convention of SVBBI organized by the College of Veterinary Science and Animal Husbandry, NDVSU, Jabalpur	January 06, 2023

		Best paper award (2nd) for the paper "Effect of Whey based milk replacer as alternative to sow milk on piglets health and growth" at the Annual Convention of SVBBI organized by the College of Veterinary Science and Animal Husbandry, NDVSU, Jabalpur	
Centre of One Health			
36	Dr Randhir Singh	Best Researcher Award 2022 by Guru Angad Dev Veterinary & Animal Sciences University, Ludhiana	January 26, 2023
37	Dr Pankaj Dhaka	Best Teacher Award of College of Veterinary Science, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana.	September 16, 2022
		Appointed as an Associate Editor for the CABI One Health Journal.	December 15, 2022 -March 14, 2023
		Fellowship from Mérieux Foundation and Université de Paris to participate the 3rd edition of the Antimicrobial Resistance Course: One health challenge at Les Pensières Center for Global Health, Veyrier-du-Lac, France.	
		Best paper presentation award (Track 03). Development and Assessment of Awareness Module on Antimicrobial Resistance and Prevention for School Students in Punjab, India during "One World, One Health" organized by PREVENT IT consortium at Chitkara University, Chandigarh	December 07, 2022
Department of Veterinary Medicine			
38	Dr D K Gupta	Chairman, Oral Presentation Session (III), National Conference of Association of Mastitis	October 20, 2022
		Judge, Dog Show organized by SKUAST-Jammu	November 20, 2022
College of Dairy Science & Technology			
39	Dr Santosh Kumar Mishra	Associate fellowship National Academy of Dairy Science (India)	October 29, 2022
40	Drs Gopika Talwar, Mohit Singla and Nitika Goel	Best paper award for paper "Development and evaluation of mozzarella cheese manufacturing prototype at cottage scale" during 12th Convention of IDEA and National Seminar on "Engineering Interventions in Dairy Processing for Self-Reliant India" at College of Dairy Science, Warud, Maharashtra	December 15-16, 2022

41	Dr Gajannan P. Deshmukh	Best oral presentation at 12th convention of Indian Dairy Engineering Association held at Pusad entitled "Design and development of mechanical Unit for dry-crystallisation of PaladaPayasam- Indian Sweet Delicacy"	December 15-16, 2022
42	Dr Manvesh Kumar Sihag	First best paper award for "A comparative study of the S-values of cow and buffalo ghee calculated using equations specified in ISO (17678) method of determining the milk fat purity by gas chromatographic analysis of triglycerides" at 49th Dairy Industry Conference held at Gandhinagar, Gujarat.	March 16-18, 2023
43	Dr Inderpreet Kaur	Award as a Convener in the Conference on "Fisheries and Aquaculture: An Ecological Perspective" organized by Indian Ecological Society Fisheries and Aquaculture Conference (IESFAC-2023) at Ludhaina.	February 24, 2023
44	Dr Nitin S. Wakchaure	Team Manager Felicitation Award during the 21st Agri Unifest Youth Festival by Dr. S. V. Suresha, Hon'ble Vice-Chancellor of the University of Agricultural Sciences, Bangalore	March 15, 2023
45	Dr Sunil Kumar	Patent Granted – Buffalo Milk Protein Concentrate & Method of Manufacturing thereof.	May 06, 2022
		Associate Fellowship National Academy for Dairy Sciences (India)	October 29, 2022
College of Fisheries			
46	Dr Vaneet Inder Kaur	Fellow, Indian Ecological Society (IES), PAU, Ludhiana	Oct 14, 2022
47	Dr Abhed Pandey	Best poster award during National Seminar on "Contemporary Issues in Fisheries and Aquaculture" organized at GBPUA&T, Pantnagar	May 20, 2022
48	Dr Abhishek Srivastava	Best oral presentation award' during National Seminar on "Contemporary Issues in Fisheries and Aquaculture" organized at, GBPUA&T, Pantnagar	May 20, 2022
49	Dr Amit Mandal	Best presentation award for poster 'Effects of dietary partial replacement of fish meal by de-oiled castor cake on growth performance, immune-haematological status, digestive enzymes activity, and flesh quality of GIFT Tilapia (*Oreochromis niloticus*)'in Indian Ecological Society Fisheries & Aquaculture Conference held at university, Ludhiana	February 22-24, 2023

50	Dr Sachin O Khairnar	Young Extension Scientist Award-2022, Society of Fisheries and Life Sciences, Mangaluru	July 31, 2022
51	Dr S N Datta	Honorary Fellow, Society of Life Sciences during National Seminar on "Contemporary issues in fisheries and aquaculture" organized at GBPUA&T, Pantnagar	May 20, 2022
		'Fellow - Indian Ecological Society' during Indian Ecological Society Conference 2023 (IESFAC 2023) organized by College of Fisheries, Ludhiana	February 24, 2023
		Best Teacher Award – College of Fisheries, Ludhiana	January 26, 2023
52	Dr Prabjeet Singh	'Visiting Researcher Fellowship' by International Centre of Excellence in Seafood Science and Innovation, Prince of Songkla University, Hat Yai, Thailand	August 15-30,2022
		'Honorary Fellow, Society of Life Sciences' during National Seminar on "Contemporary Issues in Fisheries and Aquaculture" organized by College of Fisheries, GBPUA&T, Pantnagar	May19-20, 2022
		'Fellow, Indian Ecological Society' during IESFAC 2023 organized by College of Fisheries, Ludhiana.	February 22-24, 2023
53	Dr Ajeet Singh	'Honorary Fellow, Society of Life Sciences' during National Seminar on "Contemporary Issues in Fisheries and Aquaculture" organized at GBPUA&T, Pantnagar	May 19-20, 2022
		Best award for poster entitled 'Nutritional and textural characteristics of fish protein powder and fiber enriched biscuits' during IESFAC 2023 organized by College of Fisheries, Ludhiana	February, 22-24, 2023
54	Dr Vijay Kumar Reddy S	Best award for poster entitled 'Quality attributes of biscuits supplemented with protein isolates from Pangas processing waste' during IESFAC 2023 organized by College of Fisheries, Ludhiana,	February 22-24, 2023
College of Animal Biotechnology			
55	Dr Satparkash Singh	Best oral award for presentation entitled "qPCR-based expression analysis of hsp15 gene of *Leptospira interrogans* under stress and its molecular characterization" during XXXIV Annual Convention of IAVMI organized at LUVAS, Hisar.	May 27-28, 2022

56	Dr Niraj Kumar Singh	Best award for poster entitled "Development of lentivirus transduced stable mammalian cell line expressing Japanese encephalitis virus-like particle (JE-VLP)" during XXXIV Annual Convention of IAVMI organized at LUVAS, Hisar.	May 27-28, 2022
57	Drs. Saugandhika S, Vishal Sharma V, Khatak K	Best paper award for the article: 'Illustrating the past, present and future perspective of human embryo culture media'. 2022. *Animal Reproduction Update*. Vol. 1, Issue 2.	April 07,.2022
58	Dr Ratan K Choudhary	Appreciation Award by the Guru Angad Dev Veterinary and Animal Sciences University (2023)	January 26, 2023
59	Dr B V Sunil Kumar	University Best Teacher award for the College of Animal Biotechnology	January 26, 2023
60	Dr YPS Malik	Membership in the sub-committee of the "Committee for the Control and Supervision of Experiments on Animals" for selection of CCSEA nominees by Department of Animal Husbandry and Dairying, Ministry of Fisheries, Animal Husbandry and Dairying, Govt. of India	June 09, 2022
		Fellow Award of National Academy of Veterinary Nutrition and Animal Welfare (NAVNAW)	September 21, 2022
		Policy member in the pharmaceutical stewardship group in World Veterinary Association	2022
		Member of Veterinary Council of India to make a road map for the Continued Veterinary Education programme.	2022
		Fellow of National Academy of Dairy Sciences (India), 2022	October 29, 2022
		Dr. V. S. Alwar Memorial Best Scientist Award of National Academy of Biological Sciences in the field of Veterinary and Fisheries	January 23, 2023
		Chairmanship of the *Picobirnaviridae* Family Group in the World Health Organization (WHO) and membership of the WHO Prioritization Advisory Committee (PAC) of epidemic and pandemic threat.	2023
		Sabin Vaccine Institute Travel Grant Award for attending the 14th International Rotavirus Symposium	March 14-16, 2023

61	Dr Adarsh Mishra	Dr. M.L. Kulkarni Award for the work entitled "Immunoinformatics of infectious laryngotracheitis (ILT) virus glycoproteins" during XXXIV Annual Convention of Indian Association of Veterinary Microbiologists and Specialists in Infectious Diseases (IAVMI) organized at LUVAS, Hisar, Haryana	May 28, 2022
62	Dr Adarsh Mishra	Best oral award for presentation entitled "Immunoinformatic analysis of structural capsid protein of porcine parvovirus 1 and porcine parvovirus 2" during 26th Punjab Science Congress organized at Sri Guru Granth Sahib World University, Fatehgarh Sahib, Punjab	February 09, 2023
63	Dr Vishal Sharma	Best poster presentation award (3rd) in International workshop on "Genome Editing for Food Security and Environmental Sustainability" in university.	February 27 to March 03, 2023
College of Veterinary Science Rampura Phul			
64	Dr Gaurav Kumar	Gold medal in Indian Society for Veterinary Surgery (Radiology and Imaging Session Award-2021) Conference held at Nagpur Veterinary College, MAFSU, Nagpur	January 11-13, 2023
65	Dr Naveen Kumar Verma	Gold medal in Indian Society for Veterinary Surgery (Anaesthesiology Session Award-2021) Conference held at Nagpur Veterinary College, MAFSU, Nagpur	January 11-13, 2023
66	Dr. Mehak Mahant	Gold medal in Indian Society for Veterinary Surgery (Small Animal Surgery Session) Conference held at Nagpur Veterinary College, MAFSU, Nagpur	January,11-13 2023
67	Dr Chetna Mahajan	Golden Achievers Award-2022 from Council for Academic and Performance Appraisal, New Delhi in the field of Veterinary Physiology and Biochemistry.	September 11,2022
68	Dr Amit Challana	Best Teacher Award- 2023 of COVS, Rampura Phul, Bathinda	January 26, 2023
69	Dr Jay Prakash Yadav	Best PhD Student Award (Bronze) for the academic year 2018-19, conferred on 10th convocation of Indian Veterinary Research Institute, Bareilly.	August 23, 2022
70	Dr. Maninder Singh	Best poster award (2nd) during 1st National Conference of Association of Mastitis, DUVASU, Mathura	October 19-20, 2022

		Best poster award (3rd) at International Symposium and XVIII Annual Conference of IAVPHS at ICAR Research Complex for NEH region, Umiam, Maghalaya	December 1-2, 2022
71	Dr. Pratikshya Panda	IVRI-Outstanding Female Student award 2021, conferred on 10th convocation of Indian Veterinary Research Institute, Bareilly	August 23, 2022
		Best PhD thesis award-2021 at 5th annual conventions of NAVNAW 2022 held at Jabalpur.	September21, 2022
72	Dr. Sandeep Kaswan	Second best oral presentation award at National Conference & 29th Annual Convention of ISAPM held at OUAT, Bhubaneswar	January 20, 2023
73	Dr. Afroz Jahan	Best PhD thesis award-2023 in 8th International Conference on "Recent Advances in Agriculture, Animal Husbandry, Sciences & Technology for Sustainable Entrepreneurship held at Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh	March 26, 2023
		Young Woman Scientist award-2023 in 8th International Conference on "Recent Advances in Agriculture, Animal Husbandry, Sciences & Technology for Sustainable Entrepreneurship held at. Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh	
74	Dr. Kapil Kumar Gupta	Best paper presentation award-2022 in Veterinary Internal and Preventive Medicine Society and National Symposium held at Ayodhya by Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya.	May 07, 2022
		Best Ph.D thesis award-2022 in 3rd Annual Convention of Veterinary Internal and Preventive Medicine Society and National Symposium held at Kamdhenu University.	October 07, 2022
75	Dr Gurpreet Singh	Honor Code/ Competency Certificate In agMOOCs six-week online course on Statistical Techniques for Agriculturists	July 26, 2022
		Honor Code/ Competency Certificate In agMOOCs six-week online course on Fluid Therapy and Management of Clinical Syndrome in Cattle and Small Ruminants	

76	Dr Amit Sharma	Co-Chairman in technical session of 19th ANSICON-2022 on theme "Nutritional Technologies to Augment Livestock, Poultry, Canine and Fish Production for Global Competitiveness" at Guru Angad Dev Veterinary & Animal Sciences University, Ludhiana.	November 17, 2022
		Member, poster judging committee in 4th National Conference of SVAHE at CSK HPKVV, Palampur (HP).	May 07, 2022
77	Dr Yashwant Singh	Excellence in Teaching Award during ICAAAS, 2022 at Shimla.	June 14,2022
		Awarded Kajali Sheep Breed Registration certificate at NAAS, New Delhi by Hon'ble Union Minister of Agriculture, GOI and DDG, ICAR.	February 16, 2023

Awards and Honours by students

S. No	Name of the Student	Detail of the Award/Honour	Date of the Awards
College of Veterinary Science, Ludhiana			
Department of Animal Genetics & Breeding			
1.	Sehajpal Singh Dhillon, S. Kaur, CS Mukhopadhyay and SK Dash	Best poster Presentation Award for Paper, "Identification of SNPs in the MAPK4 gene coding sequence and their association with mastitis susceptibility/ resistance in Nili Ravi Buffaloes during National Symposium of SVAHE organized at CSK HPKV, Palampur	May 6- 8, 2022
Department of Veterinary Anatomy			
2	Roop Kiran	Dr. V. Ramakrishna Silver Jubilee Medal & Award for Best Oral Presentation in the session Anatomical Techniques at XXXVI Annual Convention of Indian Association of Veterinary Anatomists (IAVA) and International Symposium held at College of Veterinary and Animal Science, Navania, Vallabhnagar, Udaipur.	December 20-22, 2022
3	Sarma Manikant S A V	Dr. K.L. Suri Medal & Award for Best Poster Presentation at XXXVI Annual Convention of IAVA and International Symposium held at College of Veterinary and Animal Science, Navania, Vallabhnagar, Udaipur.	December 20-22, 2022

4	Amit Poonia	Dr Yashwant Singh Medal for best paper in Ultrastructure at at XXXVI Annual Convention of IAVA and International Symposium at College of Veterinary and Animal Science, Navania, Vallabhnagar, Udaipur.	December 20-22, 2022
Centre for One Health			
5	Manjeet Sharan, Pankaj Dhaka, J.S. Bedi and Randhir Singh	Best MVSc thesis award during International Symposium 2022 cum XVIIIth Annual Conference of Indian Association of Veterinary Public Health Specialists (IAVPHS) organized by ICAR Research Complex for NEH Region, Umium, Meghalaya	December 01-02, 2022
		Best paper presentation award (Track 04) for "Effect of lactic acid bacteria against biofilm former multidrug-resistant *Staphylococcus aureus* isolates of foods of animal origin" by during International conference on "One World, One Health" organized by PREVENT IT consortium at Chitkara University, Chandigarh.	December 07, 2022
6	Deepthi Vijay	Best Ph. D thesis award of IAVPHS-2022 for thesis title "Study on antimicrobial usage, resistance and residues in dairy herds of Punjab using a One-Health approach" during International Symposium on "Zoonotic and Transboundary Diseases: Breaking the chain through multidisciplinary approach" and XVIII Annual Conference of IAVPHS organized by ICAR Research Complex for NEH Region Umiam, Meghalaya.	December 01-02, 2022
7	Anil Patyal, JPS Gill, JS Bedi and RS Aulakh	Dr. P D Deshpande Best Research Paper on epidemiology Award (2020) for work on knowledge, attitude and practices (KAP) towards aflatoxins contamination in animal feed and milk among dairy farmers in Punjab, India at IAVPHS annual conference held at ICAR Research Complex for NEH region, Umiam, Meghalaya	December 01-02, 2022
8	Atul Kumar, JPS Gill, JS Bedi and PK Chuneja	Dr. PD Deshpande Best Research Paper on epidemiology Award (2018) for work on health risks associated with antibiotics and pesticides in honey: knowledge, attitude and practices of beekeepers in India at IAVPHS annual conference at ICAR Research Complex for NEH region, Umiam, Meghalaya.	December 01-02, 2022

9	Anamika Sahu	Awarded travel grant to attend International Symposium on "Zoonotic and Transboundary Diseases: Breaking the Chain through Multidisciplinary Approach" and XVIII Annual Conference of IAVPHS organized by ICAR Research Complex for NEH Region Umiam, Meghalaya	December 01-02, 2022
10	Shubham Koundal	Awarded student travel grant award to attend International Symposium on "Zoonotic and Transboundary Diseases: Breaking the Chain through Multidisciplinary Approach" and XVIII Annual Conference of IAVPHS organized by ICAR Research Complex for NEH Region Umiam, Meghalaya	December 01-02, 2022
11	Gourab Basak	3rd Poster presentation award at International Symposium on "Zoonotic and Transboundary Diseases: Breaking the Chain through Multidisciplinary Approach" and XVIII Annual Conference of IAVPHS organized by ICAR Research Complex for NEH Region Umiam, Meghalaya.	December 01-02, 2022
		NEC Merit Scholarship awarded for higher professional courses by Ministry of Development of North Eastern Region, Govt. Of India.	2022-2023
12	Hina Malik	Best Innovative Idea, during "Antimicrobial Resistance Dx Bootcamp" organized by IIT Delhi in collaboration with The University of Edinburgh and University of the Arts, London	March 28-29, 2022.
13	Hina Malik	International conference on "One World, One Health" organized by PREVENT IT consortium at chitkara University, Punjab Dec 2022	December 06-07, 2022
14	Neha Parmar	2nd Best Oral at International Symposium on "Zoonotic and Transboundary Diseases: Breaking the Chain through Multidisciplinary Approach" and XVIII Annual Conference of IAVPHS organized by ICAR Research Complex for NEH Region Umiam, Meghalaya.	December 01-02, 2022
15	Shumaila Taskeen	2nd Best Oral Presentation at International Symposium on "Zoonotic and Transboundary Diseases: Breaking the Chain through Multidisciplinary Approach" and XVIII Annual Conference of IAVPHS organized by ICAR Research Complex for NEH Region Umiam, Meghalaya.	December 01-02, 2022

Department of Veterinary Medicine			
16	Tanvika	Smt. Ramwati & Sri Deviram Varshney gold medal for post graduate research in canine medicine-2022 awarded at 39th Annual Convention of ISVM Feb 22-24, 2023, Pantnagar.	February 22-24, 2023
		1st position in the oral presentation for the research paper entitled "Thoracic and abdominal aortic alterations in dogs affected with systemic hypertension" at 39th Annual Convention of ISVM at Pantnagar.	
		1st position in the poster presentation of the research paper entitled "Diagnostic features of rare hypertrophic cardiomyopathy in pugs" at 39th Annual Convention of ISVM at Pantnagar.	
17	Surbhi	1st position in the oral presentation of the research paper entitled "Clinical management of acral lick dermatitis in dogs with comparison of fluoxetine and clomipramine treatment" awarded at 39th Annual Convention of ISVM, Pantnagar.	February 22-24, 2023
		1st position in the poster presentation of the case report entitled "Vitamin a responsive dermatosis in a 7-year-old dog: gross, cytological and histopathological findings" at 39th Annual Convention of ISVM, Pantnagar.	
		Appreciation award at 39th Annual Convention of ISVM, Pantnagar.	
18	Jasnit	1st position in the oral presentation of the research paper entitled "Comparative efficacy of different regimens in canine monocytic ehrlichiosis" awarded at 39th Annual Convention of ISVM, Pantnagar.	February 22-24, 2023
		Appreciation award at 39th Annual Convention of ISVM, Pantnagar.	
19	Habbu Aishwarya Sunder	2nd Best oral presentation award (II) in 1st National Conference of Association of Mastitis. DUVASU Mathura	October 20, 2022
Veterinary Microbiology			
20	Karanvir Singh	First Best Research Article in the category of "Dairy Production" for the year 2019	March 18, 2023

21	Sudhir K Prajapati	3rd position for oral paper presentation entitled "Detection of tuberculous mycobacteria in trans-tracheal washes of cattle and buffaloes with respiratory distress" at International Symposium on "Zoonotic and Transboundary Diseases: Breaking the Chain through Multidisciplinary Approach" and XVIII Annual Conference of IAVPHS organized by ICAR Research Complex for NEH Region Umiam, Meghalaya.	March 28-29, 2023.
22	Pallvi Slathia	2nd position for poster presentation entitled "Detection of nontuberculous mycobacterial species in mastitic milk samples from cattle and buffaloes by PCR-Restriction fragment length polymorphism (PRA) at the Indian Ecological Society International conference-2022 at Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu	October 13-15, 2022
Department of Veterinary Pathology			
23	Kanle Shivani Tatyarao	ICVP 2nd Best Case presentation award in International Veterinary Pathology Congress-2022	November 17-20, 2022
Department of Veterinary Pharmacology & Toxicology			
24	Zarzoliani	Second prize for oral presentation for in the "Toxicology of Xenobiotics" session in XXII Annual conference of ISVPT 2022 held at Namakkal, Tamil Nadu	November 02-04, 2022
Department of Veterinary Surgery & Radiology			
25	Kush Karan, Ashwani Kumar, Arun Anand, Pallavi Verma, Vandana Sangwan	Best clinical article for the journal, "Indian Journal of Veterinary Medicine" for the Year 2021	Feb 22-24, 2023
Department of Veterinary Animal Husbandry & Extension Education			
26	D S Deshmukh	Best poster presentation award to paper entitled "Factors affecting adoption of dairy enterprise in Punjab" in 4th national conference of SVAHE held at CSKHPKV, Palampur, HP	May 06-08, 2022
27	Harmandeep Singh	Best thesis award in 4th national conference of SVAHE held at CSKHPKV, Palampur, HP	May 06-08, 2022
		Best paper award, 2020 for article Published in Indian Journal of Dairy Science awarded in 49th Dairy Industry Conference at Gandhinagar, Gujrat	March 18, 2023

28	Parteek Singh	Best poster presentation award to presentation entitled "A study on problems faced by general and commercial dairy farmers of Punjab" in 4th national conference of SVAHE held at CSKHPKV, Palampur, HP	May 06-08, 2022
		Best poster presentation award to presentation entitled "Procurement Pattern and Constraints of Punjab Dairy Farmers" in 19th biennial ANSICON 2022 on "Nutritional technologies to augment livestock, Poultry, canine and fish production for global competitiveness" organised by Department of Animal Nutrition, GADVASU, Ludhiana	November 16-18, 2022
29	Niharika Thakur	Best oral presentation award (2022). A study on feed formulation during transitional period by dairy farmers of Punjab in 4th national conference of SVAHE held at CSKHPKV, Palmpur, HP	May 06-08, 2022
		Best oral presentation award to presentation entitled " A study on various nutritional modifications done during transitional period by dairy farmers of Punjab" in 19th biennial ANSICON 2022 on "Nutritional technologies to augment livestock, Poultry, canine and fish production for global competitiveness" organised by Department of Animal Nutrition, GADVASU, Ludhiana	November 16-18, 2022
Department of Livestock Production Management			
30	Rudra Narayan Babu	'Dr. N.S.R Sastry Young Scientist Award' at 29th Annual Convention of Indian Society of Animal Production & Management (ISAPM)-2023	January 20, 2023
31	Vanlalmangaihsanga	Award' at 29th Annual Convention of Indian Society of Animal Production & Management (ISAPM)-2023 at Odisha University of Agriculture & Technology, Bhubaneswar	January 2023
		Best oral presentation **to** 'Effect of weaning age and creep feeding programme on the growth performance of Piglets'in 19th Biennial International conference of Animal Nutrition Society of India (ANSICON-2022) on "Nutritional technologies to augment livestock, Poultry, canine and fish production for global competitiveness" organised by Department of Animal Nutrition, GADVASU, Ludhiana	November 16-18, 2022

32	Sarishti Katwal	1st prize for their oral presentations at 29th Annual Convention of Indian Society of Animal Production & Management (ISAPM)-2023	January 20, 2023
33	Gurpreet Kaur	2nd prize for their oral presentations at 29th Annual Convention of Indian Society of Animal Production & Management (ISAPM)-2023	January 20, 2023
34	Ankush Gautam	Best oral presentation in research paper entitled 'Hatchabiliy of Vanraja Chicken Eggs of Varying Size' at 19th Biennial International conference of Animal Nutrition Society of India (ANSICON-2022) at Department of Animal Nutrition, GADVASU, Ludhiana	November 18, 2022
35	Aditi Gupta	Best digital poster in research paper entitled 'Effect of whole milk and milk replacer feeding on dry matter intake and digestion of nutrients in murrah buffalo calves' at 19th Biennial International conference of Animal Nutrition Society of India (ANSICON-2022) at Department of Animal Nutrition, GADVASU, Ludhiana	November 18, 2022
Department of Teaching Veterinary Clinical Complex			
36	Jasnit Singh	Indian Society for Veterinary Medicine (ISVM) appreciation award-2023 during 39th Annual Convention of ISVM & National Symposium-2023.	February 24, 2023
37	Jasnit Singh, Raj Sukhbir Singh & Harkirat Singh	Best poster presentation award during 39th Annual Convention of ISVM & National Symposium-2023	February 24, 2023
Department of Physiology & Biochemistry			
38	Himalaya Bhardwaj	Best poster award-First Place for research paper 'Overexpression of heat shock protein 90α in canine mammary tumors' at the Annual Convention of SVBBI organized by College of Veterinary Science and Animal Husbandry, NDVSU, Jabalpur	January 5-6, 2023
		Second best poster award for the research paper 'Heat shock protein-90α as a diagnostic serum marker of canine mammary tumors' at the Annual Convention of SVBBI organized by College of Veterinary Science and Animal Husbandry, NDVSU, Jabalpur	

Department of Animal Nutrition			
39	Onkar Jindal	Best poster presentation award at 19th Biennial International conference of Animal Nutrition Society of India (ANSICON-2022) at Department of Animal Nutrition, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana	November 18, 2022
40	Manpreet	ANSI award for best M.V.Sc. thesis at 19th Biennial International conference ANSICON-2022	November 18, 2022
41	Gourav Biswas	Best poster presentation award at 19th Biennial International conference ANSICON-2022	November 18, 2022
42	Gaikwad Vishal Pandurang	Best poster presentation award at 19th Biennial International conference ANSICON-2022	November 18, 2022
43	Jujhar Singh Sidhu	Best poster presentation award at 19th Biennial International conference ANSICON-2022	November 18, 2022
College of Dairy Science & Technology			
44	Ankit Kumar Deshmukh	Best poster award on "Effect of ultrasonication on mechanical properties of biodegradable cup' in 12th Convention of IDEA and National Seminar on "Engineering Interventions in Dairy Processing for Self-Reliant India" Organized by College of Dairy Science, Warud, Maharashtra	December 15-16, 2023
45	Harsimran Kaur Gill	Best oral presentation in International Conference VIBCON, with a theme of "Transforming Livestock Economy through Innovations in Immunology and Biotechnology organized by COABT, Ludhiana	February 4-5, 2022
46	Ashritha B	Best oral presentation in SVAHE- 4th National Conference organized by College of Veterinary Science, Palampur	May 6-8,2022
47	Viji P C,	Best poster presentation in SVAHE- 4th National Conference organized by College of Veterinary Science, Palampur	May 6-8,2022
48	Avinash, Chandra Gautam	Best oral presentation in VII International Conference in Hybrid Mode on "Global Research Initiatives for Sustainable Agriculture & Allied Sciences (GRISAAS-2022)" organised by ASTHA Foundation at Birsa Agricultural University, Ranchi, Jharkhand, India	November 21-23, 2022
49	Shubham Kumar	Best poster presentation at College of Food and Dairy Technology, TANUVAS, Chennai-52	January 4-6,2023

College of Fisheries			
50	Ranjeet Singh	Young Scientist award' and 'Best Poster Presentation' on 'Utilization of Shatavari- as an aphrodisiac fish feed supplement for most widely cultured fish, common carp' in National Seminar on 'Contemporary issues in Fisheries and Aquaculture" and 10th Annual Session of organized by College of Fisheries, GBPUA&T, Pantnagar	May 20, 2022
51	Deepa Bhatt	'Young Scientist award' for her poster presentation on 'Ameliorating efficacy of turmeric against aflatoxin toxicity in fish'in National Seminar on 'Contemporary issues in Fisheries and Aquaculture" and 10th Annual Session of The Society of Life Sciences' organized by organized by College of Fisheries, GBPUA&T, Pantnagar	May 20, 2022
52	Taranpreet Singh	Best poster presentation award' for poster entitled 'Assessment of suitable carbohydrate source for striped catfish (*Pangasianodon hypophthalmus*) culture in biofloc system for ecological vability'in Indian Ecological Society Fisheries & Aquaculture Conference (IESFAC) held at Ludhiana	February 24, 2023
53	Mohit Kamboj	'Best poster presentation award' for poster entitled 'Reproductive performance and salinity tolerance of ornamental swordtail (*Xiphophorus helleri*) reared in inland saline water' in IESFAC	February 24, 2023
54	Khushvir Singh	'Best poster presentation award' for poster entitled 'Change in fatty acid profile of live food Rotifer *Brachionus calyciflorus* through enrichment with HUFA and Vitamin C' in IESFAC	May 20, 2023
55	Sumeet Rai	'Best poster presentation award' during National Seminar on "Contemporary issues in Fisheries and Aquaculture" organized by College of Fisheries, GBPUA&T, Pantnagar	May 20, 2023
		'Best poster presentation award' for poster entitled 'Protective efficacy of an Ooally administered phage cocktail against *Aeromonas hydrophila* Infection in *Labeo rohita* in IESFAC	February 24, 2023

56	Tanuj	Best paper presentation award for paper entitled 'Importance of vaccine and dietary supplements in aquaculture: Special reference to brood fish' at 19th Biennial International conference of ANSICON-2022 at Department of Animal Nutrition, Ludhiana	November 18, 2023
57	Sahil	Best poster presentation award for 'First record of life history traits of *Puntius terio* (Hamilton, 1822) and *Amblypharyngodon mola* (Hamilton 1822) from Indian Waters: The tributary of Ganga River -Burhi Gandak' in IESFAC	February 24, 2023

Participation of faculty in Conferences/ Symposia/ Workshop/ Trainings etc. (2022-23)

Sr. No.	Name of the Conferences/ Symposia/ Workshop/ Trainings	Organizing agency, place and date	Name of the Faculty Member who attended the meeting
		INTERNATIONAL	
Overseas			
		College of Veterinary Science, Ludhiana	
1	International training program on fFarm Biosecurity and Antimicrobial Resistance	ICAR-NAHEP for training program at Ghent University, Belgium from December 15 2022 to March 14 2023	Dr. Pankaj Dhaka
2	3rd Edition of the antimicrobial resistance course (AMR): One health challenge	Mérieux Foundation and Université de Paris, Les Pensières Center for Global Health, Francefrom November 7-11, 2022	
3	Third BETTER meeting, Biosecurity enhanced through training evaluation and raising awareness	Ghent University, Belgium from February 7-8 2023	
4	Science meets Industry: Joint ArMoR Cluster meeting: Reducing antimicrobial use in livestock	Wageningen University and Research, The Netherlands on February 16, 2023.	
5	Completion of course 'Understanding antimicrobial resistance in food and agriculture'	Digital course organized by FAO, on January 15, 2023	
6	Basic Scientific Writing Workshop 2022	Halal Products Research Institute, UPM, Malaysia on March 8, 2022	Dr Pavan Kumar
7	Advanced Scientific Writing	Halal Products Research Institute, UPM, Malaysia on March 29, 2022	
8	Training on Clinical approach to a neurologic patient	College of Veterinary Medicine, University of Wisconsin-Madison, USA from March 1-21, 2023	Dr. Raj Sukhbir Singh
9	World Buiatrics Congress	World Buiatrics Association, Madrid, Spain from September 4-8, 2022	Dr. D.K. Gupta, Dr B K Bansal
10	ICAR (IDP-NAHEP) fellowship to attend one month International training at	Department of Clinical Sciences, Swedish University of Agricultural Sciences from Sweden. December 01- 31, 2022	Dr Ashwani Kumar Singh

11	ICAR (IDP-NAHEP) three months International training	Department of Veterinary Biomedical Sciences, University of Saskatchewan, Canada from September 08- December 27, 2022	Dr Mrigank Honparkhe
College of Fisheries			
12	ICAR-NAHEP international training on 'Capacity building in intensive aquaculture systems'	University of Arkansas, United States, from September 01 – November 29,2022	Dr. S. N. Datta
College of Dairy Science and Technology			
13	ICAR-NAHEP for training	School of Agriculture & Food Science, The University of Queensland, Australia from August 15 2022 to February 15 2023	Dr. Sunil Kumar
International Conferences/Workshop held in India			
College of Veterinary Science, Ludhiana			
1.	International Workshop on Genome Editing for Food Security and Environmental Sustainability	Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana in collaboration with McGill University, Canada, University of Saskatchewan, Canada and PAU, Ludhiana, February 27 -March 03, 2023	Dr. JS Bedi, Dr. Simranpreet Kaur, Dr. Randhir Singh, Dr. Sasmita Barik, Dr Devendra Pathak, Dr. Jyoti, Dr Alveena Ganai, Dr. Gurpreet Kaur, Dr. Mudit Chandra, Dr. Paviter Kaur, Dr. Tania Gupta
2.	International conference on "One World, One Health"	PREVENT IT consortium at Chitkara University, Chandigarh on December 6 -7 2022.	Dr. Pankaj Dhaka
3.	Online certificate course on "Infectious Disease Transmission Models for Decision Makers"	John Hopkins University, Feb 16, 2023	Dr. Pankaj Dhaka
4.	Hands-on-Training on 'Advanced biotechnological approaches to augment productivity in poultry for ensuring food and nutritional security'	International Livestock Research Institute and ICAR, New Delhi at ICAR-Directorate of Poultry Research (DPR), Hyderabad, September 20 – 24 2022	Dr P P Dubey

5.	19th Biennial International Conference of Animal Nutrition Society of India	Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, 16-18th November, 2022	Drs. Ramandeep Kaur Dhaliwal, Ashwani Kumar Singh, Yashpal Singh, D S Malik, Kulvinder Singh Sandhu, Sanjay Choudhary, OP Malav, Udeybir Singh, JS Hundal, Amit Sharma, Sandeen Uniyal, Digvijay Singh, Jaswinder Singh, Y.S Jadoun
6.	Workshop of animal welfare progress in India under the flagship of International Society for ethology	CSIR-Institute of Genomics and Integrative Biology, January28, 2023	Dr. Kulvinder Singh Sandhu, Dr. Sanjay Choudhary
7.	3 days International Conference of ICAR-NAHEP, Birsa Agricultural University, Ranchi and NADCL, Baramulla, UT of J&K.	ICAR-IGFRI, Srinagar, September 28 -30, 2022	Dr Kritima Kapoor
8.	International virtual training programme on Advances on Biomedical Research	NTR College of Veterinary Science, Gannavaram, November 2 -4, 2022,	Dr Varinder Uppal, Dr Neelam Bansal,
9.	International Conference on blended learning ecosystem for higher education in agriculture	ICAR New Delhi, March 21 -23, 2023	Dr Opinder Singh, Dr Devendra Pathak
10.	Teaching Workshop	IDP-NAHEP, GADVASU, Ludhiana, March 14-22, 2023,	Dr Harkirat Singh
11.	Conference on Latest Trends and Innovations in Pharmaceutical and Biosciences.	Carrier Point School of Pharmacy, Kota, Rajasthan March 18, 2023.	Dr. Alveena Ganai
12.	Conference on Rabies One Health, Zero Deaths	Madras Veterinary College, Chennai, September 27, 2022	Dr. L. Geeta Devi
13.	International Veterinary Pathology Congress- 2022	Indian Association of Veterinary Pathologist, Hyderabad, November 17 -20, 2022	Dr. Amarjit Singh
14.	International Conclave on Pashu Ayurveda in 9th World Ayurveda Congress & Arogya Expo.	World Ayurveda Congress, Panjim, Goa, December, 10 2022.	Dr. V. K. Dumka

College of Dairy Science Technology			
1.	International Workshop on Genome Editing for Food Security and Environmental Sustainability	Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana in collaboration with McGill University, Canada, University of Saskatchewan, Canada and PAU, Ludhiana, February 27 – March 03, 2023	Dr. Manvesh Kumar Sihag
College of Fisheries			
2.	International Conference on "Nutritional Technologies to Augment Livestock, Poultry, Canine and Fish Production for Global Competitiveness	Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, November 16 -18, 2022.	Dr Abhishek Srivastava, Dr. Vikas Phulia
3.	International Conference on "Responsible Aquaculture & Sustainable Fisheries Interact	College of Fisheries, Central Agricultural University Lembucherra, Tripura, December 13 -16, 2022	Dr Amit Mandal
College of Animal Biotechnology			
1.	XXVIII Annual Scientific Conference of Bangladesh Society for Veterinary Education and Research	Bangladesh Agricultural University, Mymensingh, Bangladesh; May 28 -29, 2022	Dr. YPS Malik
2.	International Conference of Indian Virological Society (VIROCON 2022)	SKUAST-K, Srinagar, November 5 -6, 2022	
3.	International Workshop on Genome Editing for Food Security and Environmental Sustainability	Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana in collaboration with McGill University, Canada, University of Saskatchewan, Canada and PAU, Ludhiana, February 27 – March 03, 2023	Dr. Vishal Sharma, Dr CS Mukhopadhyay, Dr. B.V. Sunil Kumar, Dr. Satparkash Singh, Dr. Simrinder Singh Sodhi
College of Veterinary Science, Rampura Phul			
1.	International Conference on One World, One Health.	Chitkara University, Punjab, December 6 – 7, 2022	Dr. Maninder Singh, Dr. J. P. Yadav, Dr. Afroz Jahan
2.	20th International Society for Animal Hygiene Congress	International Society for Animal Hygiene, October 5 – 7, 2022	Dr Sandeep Kaswan, Dr. Sreekala S. Mohandas

3.	36th annual convention of the Indian Association of Veterinary Anatomists and International Symposium.	CAVS, Navania, Udaipur, December 20 -22, 2022.	Dr. Amit Challana
4.	First Research Conference on Antimicrobial Resistance and Antimicrobial Use in Food Animals in Asia and the Pacific	FAO and Chulalongkorn University, Online, February 6 -8, 2023	Dr. J.P.Yadav
5.	19th biennial International Conference on "Nutritional Technologies to Augment Livestock, Poultry, Canine and Fish Production for Global Competitiveness	Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, November 16 - 18, 2022.	Dr Amit Sharma and Dr Yashwant Singh
6.	International Conference on "Innovative and Current Advances in Agriculture & Allied Sciences	SSDAT & H.P.U, Shimla, June 12-14, 2022	Dr. Yashwant Singh
7.	International Conference on Blended Learning Ecosystem for Higher Education in Agriculture.	ICAR, New Delhi, March 21-23, 2023	
RRTC, Talwara			
1	Nutritional Technologies to Augment Livestock, Poultry, Canine and Fish Production for Global Competitiveness	Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, November 16-18, 2022	Dr. Hujaz Tariq, Animal Scientist
KVK, Mohali			
1	International Conference on Innovative and Current Advances in Agriculture and Allied Sciences	Himachal Pradesh University, Shimla, H.P., June 12-14, 2022,	Dr B. S. Khadda Dr Shashi Pal Dr Munish Sharma Dr Harmeet Kaur
2	International Conference on Global Research Initiatives for Sustainable Agriculture & Allied Sciences	Birsa Agricultural University, Ranchi, Jharkhand, November 21 to 23, 2022,	Dr. Balbir Singh Khadda

Confrences/Symposia/Workshops/Trainings (other than extension Trainings) organized

S. No	Name of Conferences/Symposia/ workshops/ trainings	Organizing Agency	Date
College of Veterinary Science, Ludhiana			
Department of Animal Genetics & Breeding			
1.	Three days Hands on training program on "Molecular Techniques in Animal Genetics"	Strengthening and Development of Higher Education in India" under ICAR	March 09-11, 2023
Department of Veterinary Physiology and Biochemistry			
2.	Hands on training on techniques in veterinary biochemistry for disease diagnosis in animal	Strengthening and Development of Higher Education in India" under ICAR Sub-component, "Schedule Caste-Sub Plan	March 10-11,2023
Expert Lecture and practical demonstration to the trainees during the Hands on Training on "Techniques in Veterinary Biochemistry for Disease Diagnosis in Animals"			
3.	Hands on training on blood profiling for disease assessment in animals	Strengthening and Development of Higher Education in India" under ICAR Sub-component, "Schedule Caste-Sub Plan	March 17-18, 2023
Expert Lecture and practical demonstration to the trainees during the Hands on Training on Blood Profiling for Disease Assessment in Animals"			

Department of Veterinary Pathology			
4.	National webinar on 'Advances of Veterinary Sciences' during Platinum Jubilee year of Indian Independence (1947-2022)	Dr. C.M. Singh Endowment Trust, Bareilly, UP	May 30, 2022
5.	Hands on training on postmortem examination in Animals	ICAR-01 Strengthening and Development of Higher Agricultural Education in India	February 07, 2023
6.	Hands on training on Collection, preservation and dispatch of morbid material for diagnosis of animal disease	ICAR-01 Strengthening and Development of Higher Agricultural Education in India	February 08, 2023
7.	Lectures and Hands on training "Entrepreneurship training in diagnostic veterinary pathology'	Institutional Development Plan for Improved Learning Outcome, Skill and Entrepreneurship (IDP)-NAHEP	March 10,13 and 15, 2023
Department of Veterinary Pharmacology and Toxicology			
8.	Hands on training on current trend of 3R's in laboratory animal experimentation	Strengthening and Development of Higher Education in India" under ICAR sub-component "Schedule Caste – Sub Plan	February 23-24, 2023
9.	Hands on Training on "Extraction techniques and phytochemical screening of medicinal plants"	Strengthening and Development of Higher Education in India" under ICAR sub-component "Schedule Caste – Sub Plan	March 6-7, 2023
10.	Three day "Workshop by Industry Experts/ Faculty" for undergraduate students of College of Veterinary Science, GADVASU Ludhiana	Strengthening and Development of Higher Education in India" under ICAR sub-component "Schedule Caste – Sub Plan	November 01-03, 2022
Department of Veterinary Anatomy			
11.	Hands on Training Gross Anatomical Techniques to Preserve Specimens under ICAR-1: Strengthening and Development of Higher Agricultural Education in India under Sub-Component-Scheduled Caste- Sub Plan	Under ICAR-1: Strengthening and Development of Higher Agricultural Education in India under Sub-Component-Scheduled Caste- Sub Plan	March 16, 2023

12.	Hands on Training on Tissue Processing and Histomorphological Techniques	-Do-	March 17, 2023
13.	Hands on Training on Histochemistry	-Do-	March 20, 2023
Department of Veterinary & Animal Husbandry Extension Education			
14.	Imparting Skill among youth for Scientific Rearing of Livestock (online)	MANAGE, Hyderabad and GADVASU,Ludhiana	May 18-20, 2022
15.	Nutritional and Health Management of Dairy Animals (online)	-Do-	August 03-05, 2022
Department of Teaching Veterinary Clinical Complex			
16.	*Workshop:* Lameness in dairy animals-Causes and alleviation"	Guru Angad Dev Veterinary and Animal sciences University	June 12, 2022
17.	Advanced equine management course for Veterinary Cadre Officers of ITBP	Guru Angad Dev Veterinary and Animal sciences University	Oct 10 to 21, 2023
18.	Industry expert /faculty programme by Virbac India	Guru Angad Dev Veterinary and Animal sciences University	October 11-12,2022
19.	Training on Techniques in Emergency and critical care management of small animal patients by Dr. Amandeep Chohan, Clinical Associate Professor, UC Davis School of Veterinary medicine	IDP- NAHEP	February 3-10, 2023
Department of Veterinary Microbiology			
20.	Training on Molecular Biology technique I and II	Under ICAR-1: Strengthening and Development of Higher Agricultural Education in India under Sub-Component-Scheduled Caste- Sub Plan	March 14 and 15, 2023
21.	Training on Conventional Microbiological techniques	Under ICAR-1: Strengthening and Development of Higher Agricultural Education in India under Sub-Component-Scheduled Caste- Sub Plan	March 15, 2023

Department of Veterinary Parasitology			
22.	Soft skill development for undergraduate students of B.VSc & A.H. 2020	Institutional Development Programme for improved learning outcome, skills and entrepreneurship (IDP-NAHEP-ICAR-89"	January 09-12, 2023
23.	Hands-on training on " Acaricide Resistance Detection and Mitigation for Sustainable Tick Control"	ICAR-I: Strengthening & Development of higher Agricultural Education in India under sub-component "Scheduled Caste-Sub Plan"	February 22, 2023
24.	Hands-on training on " Nucleic Acid Based Detection of Parasitic Diseases of Companion Animals "	ICAR-I: Strengthening & Development of higher Agricultural Education in India under sub-component "Scheduled Caste-Sub Plan"	February 24, 2023
Department of Veterinary Gynaecology & Obstetrics			
25.	Advanced Insights on Theriogenology to Ameliorate Reproductive Health of Domestic Animals	Under the auspices of Centre of Advance Faculty Training of ICAR	January 18 to February 07, 2023.
26.	Augmentation of Fertility in Buffaloes for participants from Nepal	ILRI Nairobi, Kenya	November 28-December 06, 2022

27.	Dr Ido Braslavsky (Visiting International Professor)	NAHEP-IDP	5.02.23 to 17.02.23
28.	Dr Bikash Sahay (Visiting International Professor)	NAHEP-IDP	21.2.2023 to 1.03.2023
29.	Dr Radha Shankar Narayanan (Students skill development)	NAHEP-IDP	27.02.2023 to 03.03.23
30.	Dr Shivi Maini (Industry expert)	NAHEP-IDP	21.09.2023
31.	Dr Vandana Bhasin (Students skill development)	NAHEP-IDP	31.10.2022 to 4.11.2022
32.	Dr Sanjay S. Awaghate (Academia-Industry interface)	NAHEP-IDP	12.10.2022
33.	Dr R. Suresh Kumar (Student Entrepreneurship Training)	NAHEP-IDP	10.10.2022 to 14.10.2022
34.	Dr Mahak Singh Student (Entrepreneurship Training)	NAHEP-IDP	17.10.22 to 21.1022
35.	Mr Tajinder Singh (Student Entrepreneurship)	NAHEP-IDP	03.10.2022 to 07.10.2022
36.	Mr Ajay Patel (Industry Expert)	NAHEP-IDP	20.09.2022
37.	Mr Anmol Dhamija (Students skill development)	NAHEP-IDP	27.09.2022 to 01.10.22
38.	Mr Ramesh Jindal (Academia-Industry interface)	NAHEP-IDP	15.09.2022
39.	Dr Prakash Kalarickal (Industry Expert)	NAHEP-IDP	16.09.2022
40.	Dr Gurpreet Kaur (Students skill development)	NAHEP-IDP	19.09.2022 to 23.09.2022
41.	Mr. Inder Jeet Mittal (Students skill development)	NAHEP-IDP	25.07.2022 to 29.07.2022
42.	Dr. G N Purohit (Guest Faculty)	NAHEP-IDP	01.08.2022 to 05.08.2022
Department of Veterinary Surgery & Radiology			
43.	Training on Small animal Soft tissue Surgery	ICAR-22, AINP DIMSCA	28 Feb to 2 March 2023
44.	Training on Small Animal Ultrasonography	ICAR-22, AINP DIMSCA	14-16 March 2023
45.	International Workshop on Avain Medicine and Surgery by Dr Jalila Binti Abu, Faculty of Veterinary Medicine, UPM, Malayasia	NAHEP-IDP	21-27 Aug 2022

46.	Guest faculty under IDP for UG students skill development. Dr M Raghunath, Professor, Veterinary Surgery and Radiology, Shri Vnekateshwara Veterinary University, Andhra Pradesh	NAHEP-IDP	10.10.22 to 14.10.22
Department of Veterinary Medicine			
47.	Entrepreneurship Training for undergraduate students of College of Veterinary Science,	NAHEP-IDP	14.11.2022 to 18.11.2022
48.	Hands on Training on clinical Procedures in Small animal Practices	ICAR-I: Strengthening & Development of higher Agricultural Education in India under sub-component "Scheduled Caste-Sub Plan" (ICAR-SCSP)	16 and 17 March, 2023
49.	Hands on Training on cardiac evaluation in small animal practice	ICAR-SCSP	20 and 21 March, 2023
Department of Centre for One Health			
50.	Industry expert/faculty meet Dr. Ajay Kumar, Chief Technical Officer, Eco Paryavaran Pvt. Ltd Dr. Vikram Saini, Associate Professor, Department of Biotechnology, AIIMS, New Delhi Dr. Anil Jaiswal, Manger Agricultural Services, Nestle, Moga	IDP-NAHEP	6th July 2022
51.	The Future of Work: Preparing the Young Veterinary Workforce in India for Possible Disruptions Dr. Miftahul Islam Barbaruah, Director VetHelpline Pvt. Ltd. India	IDP-NAHEP	7th June 2022
52.	Organization of School students visit to Centre for One Health to mark World Health Day.	IDP-NAHEP	6th April 2022
53.	Workshop on wareness on Antimicrobial Resistance and Career Scopes in Veterinary Sciences to 11th and 12th students at GGN Public School, Ludhiana	Superheroes Against Superbugs	16 May 2022

54.	One Health awareness Day at PAU Secondary School, Ludhiana	IDP-NAHEP	05.11.2022
Department of Animal Nutrition			
55.	19th biennial international conference of Animal Nutrition Society of India (ANSICON 2022)	Animal Nutrition Society of India and Department of Animal Nutrition GADVASU	16-18th Feb 2023
Livestock Production Management			
56.	5 day training programme on "Judging of different Dairy Animals" by Dr. R S Yadav from International Institute of Veterinary Research from Bahu Akbarpur	IDP-NAHEP	18-22 July,2022
Livestock Products Technology			
57.	Student's Entrepreneurship training Programme	IDP-NAHEP	August 01-05, 2022.
58.	Training Programme on "Value Addition of Pork	Department of Livestock Products Technology	Oct 18-20, 2022.
59.	Student's Skill Development Programme	ICAR-SCSP	Oct 03-04 and 06-07, 2023.
60.	Student's Skill Development Programme from	IDP-NAHEP	Jan 9-12, 2023.
61.	Entrepreneurship Development Programme on Processing and Value Addition of Meat	IDP-NAHEP	Feb 22-24, 2023.
62.	Hand on training on Value addition and quality evaluation of meat and its products	ICAR-SCSP	March 01, 2023.

Animal Disease Research Centre			
63.	Dr. Hazilawati Binti Hamzah, Associate Professor & Deputy Dean Academic and Student Affairs, Universiti Putra Malaysia, Malaysia	IDP-NAHEP	August 21-27, 2022
64.	Dr. Gad Baneth, Professor & Director, Koret School of Veterinary Medicine, Hebrew University, Israel	IDP-NAHEP	February 05-11, 2023
Directorate of Livestock farms			
65.	One Day Workshop on Climate Change and Animal Production in Punjab Organized by Directorate of Livestock Farms	Under NAFCC, Towards climate resilient livestock productution system in Punjab	September 13, 2022
66.	Milking Competition of Nili Ravi Buffaloes	Directorate of Livestock Farms, Guru Angad Dev Veterinary and Animal Sciences University	
Human Resource Management Centre			
67.	Expert Lectures on How to write a perfect research article for submitting in a high impact journal? And Important tips to write synopsis, thesis and dissertation by Dr Naresh Rakha, Fellow Senior Scientific Officer, Indian Institute of Technology, Ropar	Human Resource Management Centre, Guru Angad Dev Veterinary and Animal Sciences University	14-15.07.2022

68.	Two days workshop on Hygienic Practices at workplace for Class IV employees of the university	Directorate HRMC in collaboration with Centre for One Health of Guru Angad Dev Veterinary and Animal Sciences University	22-23.11.2022
69.	Expert Lecture on Basic Life Support Training Program & All You Need to Know: Advancement in Medical Sciences. Dr Venus Bansal, Dr Vikas Bansal, Dr Mehak Bansal and Dr Gurpreet Kochar, CLIO, Orrison Hospital, Ludhiana	Guru Angad Dev Veterinary and Animal Sciences Universityin collaboration with CLIO, Orrison Hospital, Ludhiana	7.02.2023
70.	One day workshop on Development of Soft Skills for Entrepreneurship among Agri-graduates	ICAR-National Academy of Agricultural Research Management, Hyderabad	18.02.2023
College of Dairy Science& Technology			
71.	One week Internship programme on Marketing of Milk & Milk Products of veterinary students.	College of dairy Science and Technology.	May 8 to 15, 2022
72.	National Workshop on "Budgetary requirements of "Livestock sector of Punjab".	IDP-NAHEP.	9th May, 2022
73.	One day Hands on Training on Ghee	College of dairy Science and Technology.	5th May, 2022

74.	One day Hands on Training on "Dairy Processing Machinery"	College of dairy Science and Technology	11th October, 2022
75.	Coordinator of Dairy, Fodder and Animal Nutrition of Srction on "Pehli Sarkar Milni"	Punjab Agricultural University and Guru Angad Dev Veterinary and Animal Sciences University	9th February, 2023
College of Fisheries			
76.	Indian Ecological Society "Fisheries & Aquaculture Conference – An Ecological Perspective" (IESFAC-2023)	Indian Ecological Society, Ludhiana, Punjab, India. Along with National Fisheries Development Board (NFDB), Hyderabad and National Bank for Agriculture and Rural Development, Chandigarh as parters. Sponsored by Punjab State Council for Science and Technology	February 22-24, 2023
College of Animal Biotechnology			
77.	Hands-on training on "Microbiological Techniques for Pathogen Detection".	ICAR-SCSP	Feb 09, 2023
College of Veterinary Science, Rampura Phul			
78.	Three days Refresher Training programme on "Diagnosis of Poisoning cases and infectious diseases in Animals" for Veterinary Surgeons & Officers of Animal Husbandry Department	-	November 10-12, 2022
Three days Refresher Training programme on "Diagnosis of Poisoning cases and infectious diseases in Animals"		Refresher Training to Para-vets of H.P. on Artificial Insemination	

79.	Training regarding use of 'Digital Repository of the University'	-	February 06 and 08,2 023
80.	Refresher Training to Para-vets on Artificial Insemination	Himachal Pradesh Livestock & Poultry Development Board	15/11/2022-18/11/2022
81.	Refresher Training to Para-vets on Artificial Insemination	Himachal Pradesh Livestock & Poultry Development Board	06/12/2022-09/12/2022
82.	Refresher Training to Para-vets on Artificial Insemination	Himachal Pradesh Livestock & Poultry Development Board	20/12/2022-23/12/2022
83.	Refresher Training to Para-vets on Artificial Insemination	Himachal Pradesh Livestock & Poultry Development Board	Rampura Phul, 03/01/2023-06/01/2023
84.	Refresher Training to Para-vets on Artificial Insemination	Himachal Pradesh Livestock & Poultry Development Board	14/03/2023-17/03/2023

Invited Lectures Delivered by Faculty

(a) Outside Campus

S.No.	Name of the Faculty and Detail of the Lectures
1.	Dr. Narinder Singh. • Application of sexed sorted semen and embryo transfer technology for genetic improvement of cattle and buffaloes at LUVAS, Haryana on May 21, 2022.
2.	Dr. M Honparkhe • Use ultrasonography in female bovine reproduction. In training by Department of Veterinary Gynaecology and Obstetrics, DUVASU, Mathura on January 29, 2023.
3.	Nitin Mehta. • Value Addition of Meat and Entrepreneurship Development. In VAP Induction programme on at NIFTEM, Kundli December 16, 2022. • Processing and value addition of meat for entrepreneurship development at SKUAST, Jammu on January 17, 2023. • Value addition of eggs for enhanced income generation at SKUAST, Jammu on January18, 2023.
4.	J. S. Hundal. • Potential of microalgae protein biomass as feed ingredient in pet foods by Indian Society for Advancement in Canine Practices at Navania, Rajsthan on September 22-24,2022. • Silage quality, testing and its determinants at 3rd India Agri Progress Expo, Sahenwal, Ludhiana January 20-22, 2023
5.	Dr. Udeybir Singh. • Role of Green Fodder in Dairy Farming and Present Scenario at 3rd India Agri Progress Expo, Sahenwal, Ludhiana January 20-22, 2023.
6.	Ashwani Kumar. C-Arm guided Titanium elastic nailing for long bone fracture fixation in dogs at winter school ICMR, Winter School and SKUAST-K on February 27,2023.
7.	J Mohindroo • Systematic approach to read thoracic radiographs in small animals and Systematic approach to read abdominal radiographs in small animals on at Awadh Pet Practioners Asssociation, Lucknow November 11-13, 2022. • Practical tips for reading radiographs of the vertebral column in small animals and Practical tips for reading radiographs of abdominal radiographs in small animals. At 12th Federation of Small Animal Practitioners Association of India and 19th WASAVA India CE at Guwahati, Assam on February 18-19, 2023. • Tips and tricks for interpretation of skull radiographs in small animals. In webinar Oriheal Life Sciences and Indian Veterinary Association on January 20, 2023.
8.	Dr Swaran Singh Randhawa • Lumpy Skin Disease ifs and Buts. Carus Laboratories Pvt. Ltd., Karnal, Haryana (Online).
9.	Gurpreet Singh Preet. • One day Seminar for dairy farmers by Department of Animal Husbandry, Jammu on February 28, 2023.

10.	Asmita Narang and Swaran Singh Randhawa • Important respiratory problems and its management in horses. In online workshop on 'General health problems in equine practice and its management' by Kamdhenu University, Navsari, Gujarat from July 25 – 30, 2022
11.	L.D.Singla • Trade mark and trade secrets online training on IPR organized by COVSc, NDVSU, Mhow on June 06, 2022 (On line). • Teaching and research journey in Parasitology. In National Congress of Parasitology Madras Veterinary College Chennai from November 10-12, 2022. • Vector borne haemo-parasitic zoonosis: research progress in India. International Conference on the Growth of Biological sciences in 21st Century at Punjabi University, Patiala. • How to run a successful dairy farm by managing parasitic infections at Agriculture Information, Bangalore on February 17, 2023.
12.	Alveena Ganai • Improved dairy farm practices, production and proper management system. Krishi Bhawan, Department of Animal Husbandry, Jammu. Jammu on February 28, 2023.
13.	Kuldip Gupta • Interpretation of Leukogram findings. Indian College of Veterinary Pathologist, India August, 2022 (Online).
14.	V. K. Dumka. • Integrating Pashu Ayurveda in Health Systems through a One Health Approach. International Conclave on Pashu Ayurveda in 9th World Ayurveda Congress & Arogya Expo at Panjim, Goa on December 10,2022.
15.	Jasbir Singh Bedi • Monitoring and detection of pesticide, heavy metals and antibiotic residues in products of animal origin on March18,2023 at Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidhyalaya Evam Go Anusandhan Sansthan, Mathura, U.P.
16.	Simranpreet Kaur. • Laboratory techniques used for detection of adulteration in milk and milk products on March 20, 2023 at Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidhyalaya Evam Go Anusandhan Sansthan, Mathura, U.P.
17.	Randhir Singh. • Global trends in emerging zoonotic diseases during XVIII Annual Conference of Indian Association of Veterinary Public Health and Specialist at ICAR Research Complex for NEH Region, Umiam, Meghalaya from December 1-2, 2022.
18.	Pankaj Dhaka. • An Introduction to Participatory Epidemiology at Epidemiology Unit, Ghent University Ghent University (Campus Dunant) On February 24, 2023.
19.	Y.P.S Malik • Tackling Emerging Viral Zoonosis using One Health Approach. In Winter School on "Antimicrobial peptides (AMPs) as an alternative to antibiotics: Hands on training for designing, chemical synthesis, characterization and applications of synthetic AMPs" at IVRI Bareilly, UP from January 24- February 13, 2023.

	• Immunological interventions and the role of antibodies in protection and improvement of animal health: An appraisal" 7 days Karyashala on "Biosecurity, Biosafety, Capacity and Capability Building" Working with Infectious Agents (BBCCB-2023)" at CSIR -Institute of Microbial Technology (IMTECH), Chandigarh Chandigarh from January 16-22, 2023. • Emerging transboundary animal viral infections, lessons learned from current outbreaks" in 63rd Annual International Conference of Association of Microbiologists of India on Microbial Technologies for Sustainable Biosphere at Maharshi Dayanand University, Rohtak, Haryana from February 2-4, 2023. • Biotechnology reshaping livestock health and production in 26th Punjab Science Congress Sri Guru Granth Sahib World University, Fatehgarh Sahib, Punjab from February 7-9, 2023. • Molecular epidemiology of transboundary and emerging zoonotic diseases. In International satellite Symposium of Indian Virological Society by Assam Agricultural University, Khanapara on February 16, 2023. • Lumpy skin disease in Punjab" in National Workshop on Lumpy skin disease in India: Current scenario and Future Challenges by ICAR-NIVEDI, Bengaluru on January 27, 2023.
20.	Satparkash Singh • Emerging diseases of livestock. in training for veterinary officers under ASCAD scheme of Department of Animal Husbandry Punjab at PTU Kapurthala on March 15, 2023.
21.	B.B. Singh • Brucellosis control strategies in India. Brainstorming Session on "Brucellosis and Policy Intervention for its Control At U.P. Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go Anusandhan Sansthan, Mathura on December 2, 2022.
22.	C.S. Mukhopadhyay • Genetics. Capacity Building Programme for Senior Secondary Level Biology teachers in Police DAV School. Ludhiana July 9, 2022 (Online).
23.	S. Sivakumar • Theoretical Aspects and Demonstration & Practical Aspects of Equipments and Specifications of Machineries in Milk and Milk Products Processing at Rajiv Gandhi Institute of Veterinary Education and Research, Puducherry March18, 2022. • Current trends in development of functional dairy products. In Advanced Entrepreneurial Skill Development Programme (Advanced E-SDP) on "Processing, Preservation and Marketing of Milk as Functional Food at SKAUST,Srinagar on December 23, 2022.
24.	Inderpreet Kaur • Sustainable Agriculture from food and Dairy Perspective and Internship Programme of Bachelor students International Collaboration of Department of Computer Science for the Internship Programme of Bachelor students IIT Ropar On September 27, 2022. • Milk Price Discovery: What is the rightful worth of Farmers' milk?" Webinar on "Milk Pricing System" organized by Jordbrukare, India on November 4,2022.
25.	Vijay Reddy • Fish Protein Isolates- An Innovative Way of Utilizing Seafood Processing Waste at Central Institute of Fisheries Technology, Kochi, Kerala, Faculty of Fisheries, Rangil, Ganderbal (SKUAST-Kashmir) on May 25, 2022 (Online).

26.	Abhed Pandey • Freshwater Pearl Culture for Entrepreneurship Development by Cotton University, Assam October 21, 2022 (Online).
27.	Vikrant Sudan • Sarcocystosis and its zoonotic implications XXXI National Congress of Veterinary Parasitology OUAT, Bhubaneshwar 6-8 December, 2022.
28.	Sandeep Kaswan • Behavioural approaches for managing stall-fed goats .In national Webinar on Sathya Zero Grazing with multiple partners on November 06, 2022. • Advanced Feeding Strategies for the upliftment of Goat Farmers. In National Conference "SVAHE –IV" (2022) at CSKHPKV, Palampur on May 07, 2022.
29.	• Om Prakash Choudhary. SEM and its applications in biological sciences on January 5, 2023 Online. • Dr. Priyanka MALDI-TOF-MS and its applications in microbiology on January 5, 2023 Online. At Sathyabama Institute of Science and Technology, Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai from January 02-06, 2023.
30.	Amit Sharma. • Pig farming for sustainable agriculture in paddy-wheat crop production system of Punjab: A Review to address current agriculture crises. In conference of Society of Veterinary and animal Husbandry Extension CSKHPKVV, Palampur from 6-8 May, 2022.
31.	Amit Sharma • Dairy animal management for clean milk production: For animal welfare and production, • farmer's economy and consumer's health on February 01, 2023. • Biosensing technologies for dairy animal management and welfare February 02, 2023 • Feeding strategies for stall fed goat production systems; behavioral and welfare and performance aspects February 03, 2023. • Role of pig production in pink revolution of India: SWOT analysis February 04, 2023 • Welfare issues of Cage layer and their remedial measures for improving production performance on February 13, 2023. • Principles for designing and construction of ideal housing for pigs in reference to tropical Indian climate on February 14, 2023. • As Expert lecture Under IDP-NAHEP project at DUVASU, Mathura.
32.	Yashwant Singh • Sheep production system in changing climate scenario: a need of paradigm shift for promoting entrepreneurship among rural youth. In 4TH National Conference of Society of Veterinary and Animal Husbandry Extension at CHPKKV Palampur (HP)from May 06-08, 2022. • Prospects and Challenges in sheep production in areas under Intensive agriculture system. In International conference on "Innovative and current advances in agriculture and allied sciences by HPU, Summer Hill, Shimla from June 12-14, 2022.

b) On Campus

S. No.	Name of the Faculty and Detail of the Lectures
1.	Vishal Mahajan. Infectious infertility in buffaloes. In the international training on "Augmentation of Fertility in Buffaloes" by Department of Veterinary Gynaecology & Obstetrics on November 30, 2022.
2.	Simarjeet Kaur. Selection criteria of breeding bulls. In the international training on "Augmentation of Fertility in Buffaloes" by Department of Veterinary Gynaecology & Obstetrics on December 05, 2022.
3.	Navdeep Singh. Latest diagnostic and therapeutic approaches to manage uterine torsion and incomplete cervical dilatation in bovine. In training on "Advanced insights on theriogenology to ameliorate reproductive health of domestic animals by Department of Veterinary Gynaecology & Obstetrics, Ludhiana from January 18-February 07, 2023.
4.	Mandeep Singla. Economics of goat farming and record keeping and Visit to goat farm. Handling restraining of goats by Department of Extension Education, Ludhiana on December 14, 2022.
5.	Ravi Kant Gupta. Mitigating stress/ameliorative measures for sustained (re) production under changing climatic scenario and Management of breeding bulls to optimize reproductive efficiency. In ILRI sponsored training at uniersity, Ludhiana from November 28- December 06, 2022.
6.	M. Honparkhe • Fertility evaluation of dairy animals throughultrasonography on January 18, 2023 • Recent updates on bovine cystic ovarian follicles on January 20, 2023 Ajeet Kumar • Mechanism of cryodamage in sperm during freezing andthawing January 24, 2023 • Modulation of Ice (re)-crystallization during semen cryopreservation for better sperm survival on January 27, 2023. A.K. Singh • Advances in swine fertility management and future prospects on January 23, 2023 • Effect of different additives on semen quality of bulls on January 25, 2023. Amarjeet Bisla • Improving postpartum uterine health using alternatives toantimicrobials in dairy animals on January 19, 2023 • Applications of metallic nanoparticles in semen biology January 23, 2023. Amit Kumar.Flow cytometric evaluation of semen- An update on February 01,2023. Jugraj Singh Mahal. Post mating induced endometritis in mares on January 19, 2023 Bilawal Singh. Exogenous supplementation of melatonin to augment buffalo reproduction In CAFT training by Department of Veterinary Gynaecology & Obstetrics, GADVASU, Ludhiana from
7.	Ajeet Kumar • Update on semen cryopreservation of buffalo bulls on November 30, 2022. • Semen evaluation: traditional and newer approaches on December 01, 2022. • Breeding soundness evaluation of bulls: a perquisite to better herd conception on December 01, 2022. • Scope of sexed semen in buffalo industry on on December 05, 2022.

	S. Prabhakar. Dystocia in buffaloes with special reference to uterine torsion on November 29,2022. Amarjeet Bisla. • Understanding follicular dynamics for better conception rate in buffaloes on November 28,2022. • Improving uterine defence using immonomodulators-an alternative to antibiotic therapy on November 29,2022. Jugraj Singh Mahal. Functional subfertility in buffaloes with special reference to cystic ovarian degeneration on November 29,2022. Amit Kumar. Handling and transport of frozen semen for optimal fertility under field conditions on December 06, 2022. In training programme by Directorate of Extension Education and Department of Veterinary Gynaecology & Obstetrics, Ludhiana from November 28-December 06,2022.
8.	Amarjeet Bisla. Practical approaches to counter the common reproductive disorders in dairy animals. In training by Directorate of Extension Education, GADVASU, Ludhiana MANAGE, Hyderabad on August 26, 2022.
9.	D. S. Malik. Housing Management for dairy Animals. In training on commercial dairy farming at PAMETI on May 10,2022.
10.	Kulvinder Singh Sandhu. Calf management. In training on commercial dairy farming at PAMETI on May 11,2022.
11.	J.S. Hundal. Use of agricultural waste as animal feed at Workshop by PAMETI, Ludhiana on May 09,2022.
12.	Manjinder Sharma. Application of stem cells for toxicity testing on February 23, 2023 and Demonstration of *in vitro* techniques for monitoring environmental chemicals on February 24, 2023 In training under "ICAR-1, Strengthening & development of higher education in India by Veterinary Pharmacology & Toxicology, Ludhiana.
13.	• N Umeshwori Devi and V Sangwan Basics of Ultrasound and Knobology on March 14, 2023. • Pallavi Verma Hands on Practice on Ultrasound Machine on March 14, 2023. • SK Mahajan, Arun Anand and Ashwani Ultrasonography of liver, spleen and gall bladder and ultrasound guided FNAC/Biopsy on March 15, 2023. • Pallavi Verma and Jasmeet S Khosa. Ultrasonography of Urogenital system on March 15, 2023. • J Mohindroo and Tarunbir Singh Ultrasonography of fine structures (Adrenals, Lymph nodes and pancreas) on March 16, 2023. • Navdeep Singh and Harmanpreet S Sodhi Echocardiography on March 16, 2023. In training "Small Animal Ultrasonography" Under ICAR-22, AINP DIMSCA at VSR from March 14-16, 2023.
14.	Swaran Singh Randhawa. • Periparturient metabolic/production disorders in dairy animals. In CAFT training Advanced Insights on theriogenology to ameliorate reproductive health of domestic animals by Department of Veterinary Gynaecology and Obstetrics on February 07, 2023 • Diagnosis and treatment of lameness in dairy animals. In workshop on Lameness in dairy animals- causes and alleviation by Directorate of Extension Education on July 12, 2022.

15.	Khushpreet Singh .Approaches for breeding soundness evaluation in farm male animals on 25.01.2023.In CAFT training on Advanced insights on theriogenology to ameliorate reproductive health of domestic animals from by Dept. of Vety. Gynaecology & Obstetrics from January 18-Febraury 7, 2023
16.	Devendra Pathak. Immunohistochemistry: A valuable tool in the localization of biomarkers of reproduction and fertility. In CAFT training "Advanced insights on theriogenology to ameliorate reproductive health of domestic animals from by Dept. of Vety. Gynaecology & Obstetrics from January 18-Febraury 7, 2023
17.	Sujata Turkar. Advanced equine management course for Veterinary Cadre Officers of ITBP at TVCC, Ludhiana from October 10-13, 2022.
18.	D.K. Gupta Udder health of dairy animals Progressive Dairy Farmers Association, Punjab at PAU on October 13, 2022
19.	A.P. S Brar, B.S. Sandhu, Kuldip Gupta, N.D. Singh, O.K. Baba and Jagmeet Kaur. Online short course on Poultry Science. In collaboration with Department of Livestock Production Management June 06-10, 2022.
20.	A.P.S. Brar. Systemic necropsy examination in animals –I. • N.D. Singh. Systemic necropsy examination in poultry. • S. Deshmukh. Collection, preservation and dispatch of morbid material for disease diagnosis. In hands on training on under NAHEP, ICAR by Department of Veterinary Pathology on February 07,2023.
21.	• N.D. Singh and L. Geeta Devi. Collection, preservation and dispatch of tissues for disease diagnosis • Kuldip Gupta. Processing of tissue for histopathological diagnosis • Omer K Baba and L Geeta Devi. Collection, preservation, dispatch and processing of tissues for histopathological diagnosis In hands on training under NAHEP, ICAR by Department of Veterinary Pathology on February 08, 2023.
22.	Mudit Chandra .Molecular tools in diagnostic parasitology. In hands on training on under NAHEP, ICAR by Department of Veterinary Parasitology on February 24, 2023.
23.	Jasbir Singh Bedi. Zoonoses and Biosecurity importance in Piggery. In workshop on Pig diseases and health management by College of Animal Biotechnology, Ludhiana on July 28, 2022.
24.	Simranpreet Kaur. Procedures for proper handling of the waste at the workplace. In workshop on "Hygienic practices at the workplace" for class IV employees of veterinary university , Ludhiana from November 15-16, 2022.
25.	Satparkash Singh. Reproductive problems in pigs due to bacteria. In workshop on Pig diseases and health management by College of Animal Biotechnology, Ludhiana on July 28, 2022.
26.	S Sivakumar • Comparison of past and present approaches in manufacture of traditional & dairy products: Scope and opportunities on January 24, 2023. • A glimpse of recent technological interventions in fat rich dairy products on January 31, 2023. In training under ICAR Scheme by Department of Food Technology, PAU, Ludhiana from January, 2023

27.	Rekha Chawla Packaging perspective of fermented and fortified dairy products and Fortified dairy products: opportunities and demand: Indian perspective at PAMETI, PAU, Ludhiana on November 24, 2022.
28.	S Sivakumar.Visit to Commercial Dairy Plant And Status and challenges in quality control in small and medium dairy processing units on July 13, 2022. In Skill Development Programme under NAHEP on 'Farm Mechanization for Post-Harvest Operations ICAR-CIPHET, Ludhiana from July 01-30, 2022.
29.	Anju Boora Khatkar. Food Safety and Standards Authority of India (FSSAI) at MSME-Development and Facilitation office, Ludhiana on February 20, 2023.
30.	Inderpreet Kaur • Budgetary requirements of livestock sector of Punjab Department of Dairy Economics & Business Management, Ludhiana on May 09, 2022. • Future strategies for profitable and dairying. National seminar on Future strategies for profitable and dairying organized by Indian Dairy association on July16, 2022 (Online). • Aquaculture as a prospective diversification component for sustainability & profitability in Punjab. In conference of society organized by College of Fisheries, February 25-27, 2023.
31.	Nitin S. Wakchaure. Clean milk production. In training by PAMETI, PAU Ludhiana on May 12,2022.
32.	Varinder Pal Singh. Economics and Marketing of milk and milk products in training programme on value addition of milk and milk products for women in dairy farming Boparai Kalan on March 13-17, 2023.
33.	Sunil Kumar Quality certification of milk & milk products. In training at PAMETI, PAU, Ludhiana on May 05, 2022.
34.	Yashwant Singh. Success Stories in Natural Farming. In training on Creating awareness about Natural Farming' by PAMETI Ludhiana from June, 16-28, 2022.
35.	Harmeet Kaur • Pest management in rabi season crops BY Department of Agriculture Badarpur on March 01, 2023 • Pest management in rabi crops BY Department of Agriculture Chandiala, Derabassi, March 15, 2023

Distinguished Visitors at Krishi Vigyan Kendras

S. No	Name and other details of the visitor	Date(s) of Visit
1.	Dr Prakash Singh Brar, Director of Extension, Dr S. Rampal, DSW cum E.O. visited at KVK, Barnala	26.04.2022
2.	Dr. Inderjeet Singh, Vice-Chancellor, Ludhiana visited at KVK Mohali, farm	04.06.2022
3.	Dr. P. S. Brar, Director Extension Education visited at KVK Mohali farm	29.07.2022
4.	Dr Inderjeet Singh Vice Chancellor visited at KVK, Barnala	13.10.2022
5.	Mr Adrianus Johannes Martinus, PUM/ Netherland at KVK Mohali, farm	28- 29.01.2023
6.	Mrs. Punamdeep Kaur (IAS) and Deputy commissioner, Barnala visited at KVK, Barnala	16.03.2023

Mrs. Punamdeep Kaur Deputy Commissioner, Barnala at KVK, Barnala

Dr Inderjeet Singh, Hon'ble Vice-Chancellor Dr Prakash Singh Brar, DEE at KVK, Barnala

Dr. Inderjeet Singh, Vice-Chancellor, Dr S. Rampal, D.S.W cum E.O. at KVK, Barnala

Dr. Inderjeet Singh,Vice-Chancellor, Ludhiana visited at KVK Mohali

Dr. P. S. Brar, DEE, Ludhiana at KVK Mohali farm

Mr Adrianus Johannes Martinus, PUM/ Netherland at KVK Mohali, farm

Distinguished Visitors at Guru Angad Dev Veterinary & Animal Sciences University, Ludhiana

S. No.	Name and other details about the visitor	Date (s) of the visit
1	Sh. Banwari Lal Prohit Governor Punjab, Dr. Umesh Chandra Sharma, President VCI and Sh. Tarun Shridhar, IAS (Retd.), Former Secretary, Department of Animal Husbandry, Dairying and Fisheries, Govt. of India,	20.04.2022
2	Mr. Surinder Singh Dhindsa, Member, Board of Management, of university visited dairy farm of the institute	22.04.2022
3	Sh. Nabha Kumar Saraniya Member of Parliament, Lok Sabha, Kokrajhar Constituency, Assam and Sh. Bidyut Kumar Baruah, Asstt. General Manager, Agricultural and Processed Food Products Export Development Authority, Ministry of Commerce & Industry, Govt. of India visited University Dairy Farm	30.04.2022
4	Mr. Tjreed Dijkstra, Dairy Expert from PUM Netherland visited Dairy farm	17.05.2022
5	Dr. Jatinder Kaur Arora, Executive Director, Sh. Pritpal Singh, Additional Director and Dr. Rupali Bal, Scientist from Punjab State Council for Science & Technology	18.05.2022
6	Dr. Jaswinder Singh, Associate Professor, Department of Plant Science, Faculty of Agricultural and Environmental Sciences, McGill University, Canada	02.05. 2022
7	Cabinet Minister Sh. Kuldeep Singh Dhaliwal, Minister of Animal Husbandry, Dairying & Fisheries inaugurated New 150 animal shed at Directorate of Livestock Farms	20.05.2022
8	Dr. Hosahalli Ramaswamy, Professor, Department of Food Science, McGill University, PQ, Canada as guest faculty visited CODST	23.05. 2022
9	Dr. Dhrubajyoti Sharma, Senior District Fisheries Development Officer, Assam, Mr. Sanjib Chodhury, Deputy Director of Fisheries, Assam; Mr. Trailokya Saloi, District Fishery Development Officer, Nalbari and Mr. Bhaskar Jyoti Nath, District Fishery Development Officer, Morigaon visited College and Instructional-cum-Research Farm at COF	11.06.2022
10	Sh. D.S. Bains, Founder and former VC of Guru Angad Dev Veterinary and Animal and Sciences University	13.07.2022
11	A team from NABARD with Sh. Raghunath, B, CGM, NABARD along with Mr. Shushil Kumar, AGM, Mr. Devinder Kumar and Mr. Sanjeev Kumar, Cluster Officer, NABARD	18.07.2022
12	Dr. KML Pathak, Former Deputy Director General (Animal Science), ICAR and Vice Chancellor, DUVAS), Mathura and Chairman of Indian Chamber of Food and Agriculture (ICFA)	25.07.2022
13	Dr. Baljit Singh, Vice-President Research, University of Saskatchewan, Canada	27.07.2022 - 02.08.2022
14	Mr Laljit Singh Bhullar Cabinet Minister for Animal Husbandry, Fisheries and Dairy Development and Transport Department, visited COVS, Rampura Phul	01.08.2022
15	Dr. Ashok Kumar, Assistant Director General, Animal Health, ICAR	18.08.2022

16	Dr Jalila Binti Abu, Professor and Associate Dean Faculty of Veterinary Medicine, UPM, Malaysia	21-27.08.2022
17	Dr. O.P. Chaudhary, IFS, Joint Secretary, National Livestock Mission and Chairman, Animal Welfare Board of India visted College of Fisheries	18.10.2022
18	Shri Jatindra Nath Swain, IAS, Secretary and Shri Sagar Mehra, Joint Secretary, Department of Fisheries, Animal Husbandry and Dairying, Government of India	07.01.2023
19	Professor Dr. Soottawat Benjakul, Director, International Centre of Excellence in Seafood Science and Innovation (ICE-SSI) Prince of Songkla University (PSU), Thailand under ICAR-NAHEP	01-05.11.2022
20	Dr. Kartik Baruah, Associate Professor, Research Group Leader, Aquaculture Nutraceuticals Research Group, Swedish University of Agricultural Sciences (SLU), Sweden under ICAR-NAHEP	01-05.11.2022
21	Dr Anthony Richard Blencowe, Group leader of Applied Chemistry and Translational Biomaterials at the University of South Australia	08-19.11.2022
22	Dr. Guddeti Sreenivasa Reddy, Senior Vice President (Retired), Indian Immunologicals Limited, Rakshapuram, Gachibowli Post, Hyderabad	18.11.2022
23	Dr. Souvik Ghosh Professor & Director, One Health Centre for Zoonoses and Tropical Veterinary Medicine, Ross University School of Veterinary Medicine, West Indies as international guest faculty at Centre of One Health	20-25.11.2022
24	Dr. Habibar Rehman, Representative of South Asia, International Livestock Research Institute & Former DDG ICAR, Government of India visited CODST, Ludhiana	05.12. 2022
25	Dr Ashutosh Verma, Professor of Microbiology, Lincoln Memorial University, USA as international guest faculty at Centre of One Health	05-13.12.2022
26	Dr. Praveen Malik, C.E.O., Agrinnovate, India at College of Animal Biotechnology, Ludhiana	20.01.2023
27	Dr. Amandeep Chohan, Clinical Associate Professor at teaching veterinary clinical complex, UC Davis School of Veterinary medicine, USA	03-10.02.2023
28	Dr. Fabienne D. Uehlinger, Associate Professor. Western College of Veterinary Medicine, University of Saskatchewan, Canada visited at Veterinary Medicine	24.02.2023 -03.03.2023
29	Dr. Rubin Joe, Associate Professor and Graduate Chair Department of Microbiology, University of Saskatchewan	26.02.23- 03.03. 2023
30	Dr. Abdulwahab Kammon Director General at National Research Center for Tropical and Transboundary Diseases (NRCTTD), Libya as International Professor under IDP– NAHEP at department of Veterinary Pathology	06-11.03.2023
31	Dr. B. N. Tripathi Deputy Director General (Animal Science), ICAR, New Delhi	29.03.2023
32	Dr. Rameshwar Singh, Vice Chancellor, Bihar Animal Sciences University visited CODST, Ludhiana	30.03. 2023

L TO R Dr. Umesh Chandra Sharma, Sh. Tarun Shridhar, Sh. Banwarilal Purohit, Dr. Inderjeet Singh, Dr. H.S.Banga at 2nd Convocation of the University

Vice Chancellor honoring HE Sh. Banwarilal Purohit Governor of Punjab during Second Convocation of Varsity

Chief Minister S. Bhagwant Singh Mann inaugurating the Pashu Palan Mela and interaction with farmers on 23 September, 2022

Hon'ble Joint Secretary Sh. Sagar Mehra, Ministry of Fisheries, Animal Husbandry and Dairying, GOI, New Delhi inaugurating the Capacity building Resource Centre

Dr. R.P. Saigal (Chief Guest), Dr. Inderjeet Singh, Dr. Subhash Chander (Director Animal Husbandry Punajb), Dr. K.K. Baxi, Dr. J.P.S. Gill, Dr. S.P.S. Ghuman and Dr. Pathak on May 01, 2002 during the Alumni Meet

Dairy expert Mr. Tjeerd Dijkstra PUM Netherland in the interaction meeting

S. Dhaliwal inaugurated the climate resilient animal shed for 150 animals.

Professor Dr. Soottawat Benjakul Director, International Centre of Excellence in Seafood Science and Innovation (ICE-SSI) Prince of Songkla University (PSU), Thailand.

Dr. Kartik Baruah, Research Group Leader, Aquaculture Nutraceuticals Research Group, Swedish University of Agricultural Sciences (SLU), Sweden at College of Fisheries

Jaswinder Singh, McGill University, Canada facilitated by Dr. JPS Gill, Director of Research and Dr. YPS Malik, Dean, COABT

Dr. KML Pathak, Former Deputy Director General (Animal Science), ICAR and Vice Chancellor, DUVAS), Mathura at COABT

Dr. O.P. Chaudhury, Joint Secretary and Chairman, Animal Welfare Board of India

Dr. Rameshwar Singh, VC, BASU, Patna at CODST

Mr Raghunath B, Chief General Manager, National Bank for Agriculture and Rural Development (NABARD) along with Mr Shushil Kumar, AGM, Mr Devinder Kumar and Mr Sanjeev Kumar, Cluster Officer, NABARD during an assessment and interaction in contemplated projects which can be mutually beneficial for overall development of farming community

Dr. O.P. Chaudhary, Joint Secretary, National Livestock Mission and Chairman, Animal Welfare Board of India formally inaugurated the youth festival as chief guest.

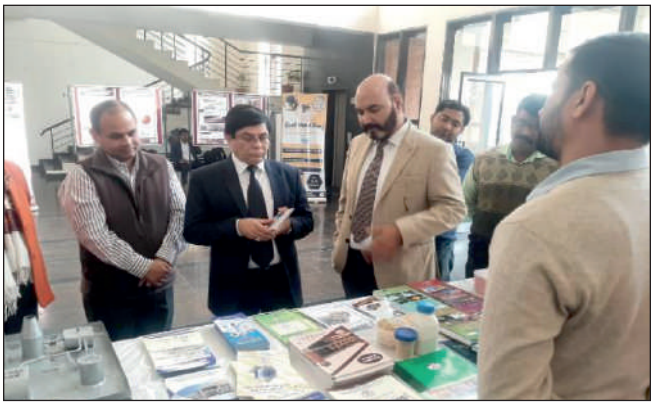
Dr. Baljit Singh, Vice-President Research, University of Saskatchewan, Canada at COVS, Ludhiana

Dr. Ashok Kumar, Assistant Director General (Animal Health) ICAR with faculty of COABT

Dr. H Rahman visiting College of Animal Biotechnology

Dr. Praveen Malik at College of Animal Biotechnology, Ludhiana

Delegation from Department of Fisheries, Assam



Dr. Habibar Rehman, South Asia, International Livestock Research Institute

Dr. O. P. Chaudhary, Joint Secretary, National Livestock Mission, with worthy Vice-Chancellor Dr Inderjeet Singh at COF

Mr Laljit Singh Bhullar, Cabinet Minister for Animal Husbandry, Fisheries and Dairy Development and Transport Department at Rampura Phul

VISIT ABROAD:

S. No.	Name of the Faculty	Place of visit	Dates (s) of Visit	Purpose of the visit
1.	Dr Ajeet Kumar	Hebrew University of Jerusalem, Israel	22.03.2022 -21.06.2022	To attend three months International training under IDP-NAHEP
2.	Dr M Honparkhe	Department of Veterinary Biomedical Sciences, University of Saskatchewan, Canada	26.09.2022 - 29.12.2022	To attend three months International training under IDP-NAHEP,
3.	Dr A K Singh	Department of Clinical Sciences, Swedish University of Agricultural Sciences, Sweden	01.12.2022- 31.12.2022	To attend one month International training at under IDP-NAHEP,
4.	Dr. Wagh Rajesh Vishwanath	Seoul, South Korea	11.08.2022- 11.02.2023	International Level Faculty Training Programme under IDP- NAHEP, projects
5.	Dr. Navdeep Singh	Cornell University, Ithaca, New York, USA	20.09. 2022 -19.12.2022	To get training on interpretation of CT and MRI in veterinary patients
6.	Dr Anuradha Gupta	Federal University of Minas Gerais, Brazil	25.11.2022- 10.12. 2022	Inter institutional Collaboration under IDP-NAHEP, projects
7.	Dr. D.K. Gupta	Madrid Spain	1-11.09.2022	To attend World Bariatric Congress
8,	Dr. B K Bansal	Madrid Spain	1-11.09.2022	To attend World Bariatric Congress

9.	Dr. S.P.S. Saini	University of Pittsburgh PA in U.S.A.,	27.09-2022 -18.10.2022	International training under the NAHEP-IDP for faculty
10.	Dr N K Singh	Addis Ababa, Ethiopia	8-10.03.2023	To attended the FAO Acaricide Resistance Management of Livestock Ticks Kickoff Meeting
11.	Dr. Sushma Chhabra	Hebrew University Veterinary Teaching Hospital, Israel	16-30.01.2023	Faculty international training under IDP- NAHEP, projects
12.	Dr. Jasbir Singh Bedi	Royal Veterinary College, London, UK	28.03.2023-02.04.2023	Project meet with the investigators from UK and India
13.	Dr. Pankaj Dhaka	Faculty of Veterinary Medicine, Department of Internal Medicine, Reproduction and Population Medicine, Ghent University, Belgium	15.12.2022 - 14.03.2023	03 months International training programme for faculty under the IDP-NAHEP
14.	Dr Yashpal Singh Malik	Bali, Indonesia	14-16.03 .2023	To Presented paper at the 14th International Rotavirus Symposium
15.	Amandeep Sharma	Southern Illinois University, Carbondale, USA	15.10.2022 - 15.01.2023	International faculty training under IDP NAHEP
16.	Sunil Kumar	School of Agriculture and Food Science at The University of Queensland, Brisbane, Australia	15.09.2022-15.02.2023	International faculty training under IDP- NAHEP
17.	Dr. Prabjeet Singh	International Centre of Excellence in Seafood Science and Innovation (ICE-SSI), Faculty of Agro-Industry, Prince of Songkla University (PSU), HatYai, Thailand	15-30.08.2022	'Visiting Researcher Fellowship' under University Re-inventing Program'
18.	Dr. S. N. Datta	Center of Excellence in Aquaculture and Fisheries, Department of Aquaculture and Fisheries, University of Arkansas at Pine Bluff, Arkansas, United States	01.09.2022-29.11.2022	International faculty training under IDP- NAHEP

19.	Dr Swaran Randhawa	Koret School of Veterinary Medicine, Hebrew University of Jerusalem, Israel	16-30.01 2023.	"Hands on training about Emergency and critical care of pets at Veterinary Hospital" under IDP-NAHEP, projects
20	Dr Rajsukhbir Singh	College of Veterinary Medicine, University of Wisconsin-Madison, Madison, USA	1-21.03.2023	Training-Clinical approach to a neurologic patient under IDP- NAHEP, projects

International and National Linkages

International Partners

- Asymmetrex LLC. Boston, USA - Developed a Stem Cell Android Mobile Based Application
- International Centre of Excellence in Seafood Science and Innovation (ICE-SSI), Prince of Songkla University (PSU), Thailand – MoU for Student/Faculty Exchange and Collaborative Research
- Southern Illinois University, Carbondale, USA – Scientist from University Appointed as Adjunct Faculty
- University of South Australia - PhD Student Research
- School of Agriculture & Food Science, The University of Queensland, Brisbane, Australia - Faculty Research
- Massey University, New Zealand - PhD Student Research
- Preventing Zoonotic Disease Emergence (PREZODE), France – Muti-Institutional (Collaborative) Research
- Lincoln Memorial University (LMU), Harrogate (Tennessee), USA - MoU for Collaborative Research

National Partners

- Central Council for Research in Ayurvedic Sciences (CCRAS), Ministry of Ayush, Government of India. - Research
- National Institute of Technology, Rourkela - Research Collaboration (MoU) under Impacting Research Innovation and Technology (IMPRINT) Scheme of the Ministry of Human Resource Development, Government of India
- Sri Venkateswara Veterinary University, Andhra Pradesh - Research Collaboration
- ICAR-NRC on Pig, Rani, Guwahati - Research Collaboration
- ICAR- National Dairy Development Research Institute (NDRI), Karnal - Research Collaboration
- Post-Graduate Institute of Medical Education and Research, Chandigarh - Research Collaboration
- Dayanand Medical College and Hospital, Ludhiana - Research Collaboration
- IVRI, Izatnagar, RAJUVAS Bikaner, DUVASU Mathura and TANUVAS Chennai in the All India, Network Program on Diagnostic Imaging and Management of Surgical Conditions in Animals – Research Collaboration
- TANUVAS and IVRI - DBT Canine - Network Research Scheme
- Small Animal Clinician Association (SACA), Chandigarh - For Conducting Continuing Education Programs for Small Animal Clinicians
- IIT Delhi - Research Collaboration
- National Institute of Technical Teachers Training & Research (NITTTR), Chandigarh – Research
- ICAR institutes - CIFRI, CIFA, CIBA, DCFR, CIFT, CMFRI, MPEDA: Educational Tour of B.F.Sc.4th year students under student READY Program and PG/PhD/ Faculty Research
- Punjab Agricultural University (PAU): PG/Ph.D. Research and Teaching

- ICAR-Central Institute of Post-Harvest Engineering & Technology (CIPHET) - Research/Training
- Centre for Development of Advanced Computing (C-DAC), MeiTY, Mohali - Research and Training
- Punjab Agricultural Management and Extension Training Institute (PAMETI), PAU, Ludhiana - Collaborative Training Programs for Farmers and Students
- IIT, Ropar, ICAR-CIPHET & Nestle - For Internship Program of B. Tech. Students
- DBT Welcome Trust lecture series - For UG-PG Student Teaching & Research
- Bhabha Atomic Research Centre (BARC), Mumbai, Maharashtra - Research Collaboration
- Farm Advisory Service Scheme - KVK Scientists Act As Resource Person for Kisan Melas, Block Level Camps Organized by FASS in Coordination with State Department of Agriculture & ATMA
- Punjab Dairy Development Board - Organizing Training Programs, Member of Scientific Advisory Committee of KVK, KVK Scientists act as Resource Person for Kisan Melas, Block level Camps Organized by State Department
- CDPO Tarn Taran (Different Blocks) - Training Programs
- ATMA/NMSA -Trainings provided, KVK Scientists Act As Resource Person for Kisan Melas, Block Level Camps Organized by State Department and Extension Activities
- NABARD- - Member of Scientific Advisory Committee of KVK and Resource Person in Training Programs
- Agriculture Skill Council of India - Skill Development Training
- Soil Conservation Department- Member of Scientific Advisory Committee of KVK
- Harvest Plus: Collaborative Extension Programs in District Tarn Taran
- ICAR-Agricultural Technology Application Research Institute (ATARI), Zone-1, Ludhiana: Financial, Technical, Backstopping
- State Department of Agriculture - Organizing Training Programs, Member of Scientific Advisory Committee of KVK, KVK Scientists act as Resource Person for Kisan Melas, Block Level Camps Organized by State Department
- State Department of Fisheries - Organizing Training Programs, Member of Scientific Advisory Committee of KVK, KVK Scientists Act as Resource Person for Kisan Melas, Block Level Camps Organized by State Department
- State Department of Animal Husbandry - Organizing Training Programs, Member of Scientific Advisory Committee of KVK, KVK Scientists Act as Resource Person for Kisan Melas, Block Level Camps Organized by State Department
- State Department of Horticulture - Organizing Training Programs, Member of Scientific Advisory Committee of KVK, KVK Scientists act as resource person for Kisan Melas, block level camps organized by State department
- Department of Soil and Water Conservation - Training Programs, Member of Scientific Advisory Committee of KVK, KVK Scientists Act as Resource Person for Kisan Melas, Block Level Camps Organized by State Department

Research Publications (along with NAAS Rating 2022):

S. No	Publication Details	NAAS
1.	Abass, G., Dubal, Z. B., Rajak, K. K., Kale, B. M., Raorane, A., Dudhe, N., Malla, B. A., Desai, D., Sinha, D. K., Vinodh Kumar, O.R., & Malik, Y. S. (2022). Molecular characterization of porcine rotavirus A from India revealing zooanthroponotic transmission. *Animal Biotechnology*, *33*(6), 1073-1085.	8.28
2.	Aggarwal, D., Dumka, V., Saini, S., & Sharma, M. (2022). Abamectin induced toxicity and its amelioration by Aegle marmelos in rats. *The Pharma Innovation Journal*, *11*(1), 1074-1081.	5.23
3.	Aggarwal, D., Dumka, V. K., Saini, S. P. S., & Sharma, M. (2022). Antioxidant, antibacterial and muscle relaxant activity of leaf extract of *A. marmelos* and *J. zeylanica*. *Journal Of Veterinary Pharmacology and Toxicology*, *20*(2), 50-57.	4.43
4.	Ahmed, J. Q., Maulud, S. Q., Dhawan, M., Choudhary, O. P., Jalal, P. J., Ali, R. K., Tayib, G.A., & Hasan, D. A. (2022). MicroRNAs in the development of potential therapeutic targets against COVID-19: A narrative review. *Journal of Infection and Public Health*, *15*(7), 788-799. DOI: 10.1016/j.jiph.2022.06.012 1876-0341/© 2022	9.72
5.	Ali, T. M., Narang, R., Dubey, P. P., Kaur, S., Malik, D. S., & Sandhu, S. K. (2022). Association between meteorological variables and milk yield traits in crossbred dairy cattle under subtropical climate. *International Journal of Bio-Resource and Stress Management*, *13*(5), 430-437. DOI:10.23910/1.2022.2665a	5.11
6.	Aneja, V., Sangwan, V., Kumar, A., Anand, A., Singh, T., & Bansal, N. (2022). Comparative ultrasonographic morphometry of reticulum from six windows in water buffaloes with diaphragmatic hernia. *Large Animal Review*, *28*(2), 73–81. 6.56	-
7.	Bal, S. S., Leishangthem, G. D., Sethi, R. S., & Singh, A. (2022). P-coumaric acid ameliorates fipronil induced liver injury in mice through attenuation of structural changes, oxidative stress and inflammation. *Pesticide Biochemistry and Physiology*, *180*, 104997.	9.96
8.	Awad, A. M., Kumar, P., Ismail-Fitry, M. R., Jusoh, S., Aziz, A. B. M. F., Sazili, A. Q. (2022). Overview of Plant Extracts as Natural Preservatives in Meat. *Journal of Food Processing and Preservation*, e16796. DOI: 10.1111/jfpp.16796.	8.19
9.	Bajwa, C. S., Singh, N., Dhindsa, S., Singh, P., & Malik, V. S. (2022). Blood biochemical alterations following peritoneal lavage and drainage in caesarean operated cattle. *The Pharma Innovation Journal*, *11*(4), 1654-1656.	5.23
10.	Bansal, V., & Veena, N. (2022). Understanding the role of pH in cheese manufacturing: General aspects of cheese quality and safety. *Journal of Food Science and Technology*, 1-11. DOI: https://doi.org/10.1111/1541-4337.12524	8.70
11.	Bansal, V., Kanawjia, S. K., Khetra, Y., Debnath, A., & Deshmukh, G. (2022). Steady and dynamic rheological properties of cheese dip: Effect of milk proteins, fat and cheddar cheese. *Measurement: Food*, *8*,100066.DOI: 10.1016/j.meafoo.2022.100066	-

12.	Begum, G., Singh, N. D., Leishangthem, G. D., & Banga, H. S. (2022). Amelioration of bleomycin induced pulmonary fibrosis through attenuation of epithelial mesenchymal transition by Salvianolic acid B in mice. *Veterinaria Italiana, 58*(1), 87-101. DOI: 10.12834/VetIt.1703.9039.2	7.10
13.	Bhardwaj, H., Singh, C., & Nayyar, S. (2022). Assessment of adverse effects of lead, nickel and cadmium on biochemical parameters, antioxidants status and metallothionein expression in buffaloes slaughtered at local abattoir. *Indian Journal of Animal Research, 56*(2), 145-152.	6.40
14.	Brar, K. S., Ansal, M. D., & Singh, P. (2022). Socio-economic progress of shrimp farming in Punjab. *Indian Journal of Ecology*, *49*(2), 582-589. DOI: 10.55362/IJE/2022/3564	5.79
15.	Basra, K., & Choudhary, R. K. (2022). Canine mammary tumor fine needle aspirate cytology and identification of tumor types. *Acta Scientific Agriculture*, *6*(6), 23-28. DOI: 10.31080/ASVS.2022.04.0417	7.01
16.	Bhat, A. M., Soodan, J. S., & Singh, R. (2022). Effectiveness of an internal teat sealant in preventing new intra mammary infections in dairy cattle during dry period. *Veterinarski Arhiv*., *92*(1), 11-16.	6.5
17.	Bhat, A. M., Randhawa, S. S., Mohindroo, J., & Sharma, S. (2022). Ocular manifestations associated with Rhodococcus equi infection in a foal. *Indian Journal of Veterinary Medicine*, *42*(1), 61-64.	4.57
18.	Bhatt, D., & Pandey, A. (2022). Aflatoxins and their Repercussions in Aquaculture: A Review. *Fishery Technology*, *59*, 69–78.	5.82
19.	Bisla, A., Gulia, N., Honparkhe, M., & Kumar, A. (2022). First report on uterine intussusception as a cause of dystocia in German shepherd dog. *Exploratory Animal and Medical Research*, *12* (02), 277-280.	5.85
20.	Bisla, A., Honparkhe, M., & Srivastava, N. (2022). A review on applications and toxicities of metallic nanoparticles in mammalian semen biology. *Andrologia*, *54*(11), e14589. DOI:10.1111/and.14589	8.78
21.	Bisla, A., Rautela, R., Katiyar, R., Kumar, A., Ghosh, S. K., & Srivastava, N. (2022). Semen discard rate at fresh and post-thaw stages in Indian riverine buffalo (*Bubalus bubalis*). *The Indian Journal of Animal Reproduction*, *43*(1), 35-42.	Nil
22.	Bouchard, É., Sharma, R., Hernández-Ortiz, A., Buhler, K., Al-Adhami, B., Su, C., Fenton, H., G.-Gouin, G., Roth, J. D., Rodrigues, C. W., & Pamak, C. (2022). Are foxes (*Vulpes* spp.) good sentinel species for Toxoplasma gondii in northern Canada? *Parasites Vectors*, *15*, 115. DOI: 10.1186/s13071-022-05229-3.	9.88
23.	Brar, R. P. S., Kaur, S., Kashyap, N., Mukhopadhyay, C. S., & Malhotra, P. (2022). Study on Effect of Various Non-Genetic Factors on Performance Traits of Murrah Buffaloes. *Buffalo Bulletin*, *41*(4). DOI: 10.56825/bufbu.2022.4143157.	6.17
24.	Kumar, B. T., Thakur, N., Sharma, C., Holeyappa, S. A., Tyagi, A., & Singh, A. (2022). Effect of dietary chitosan nanaoparticles on immune response and disease resistance against *Aeromonas hydrophila* infection in tropical herbivore fish (rohu, *Labeo rohita*). *Aquaculture International*, *30*, 2439–2452. DOI: 10.1007/s10499-022-00910-x.	9.88

25.	Buragohain, L., Dutta, R., Bharali, A., Sen, S., Barman, N. N., Borah, P., Saikia, D. P., Kumar, S., Malik, Y. S., Pawar, S., & Bora, D.P. (2022). Draft Genome Sequence Analysis of the Genotype II African Swine Fever Virus from India. *Microbiology Resource Announcements*, *11* (11), e0022722. DOI: 10.1128/mra.00227-22.	6.89
26.	Chadda, A., Jadoun, Y. S., Singh, J., & Kansal, S. K. (2022). Knowledge and adoption of scientific dairy farming practices among the women beneficiaries of self-help group promoting institutes. *Indian Journal of Dairy Science*, *75*(6), 579-584. DOI: 10.33785/IJDS. 2022.v75i06.015.	-
27.	Chahal, K., Pathak, D., Singh, O., Sharma, A., & Gupta, K. (2022). Histoenzymic localization of phosphatases, oxidoreductases and nonspecific esterase in the uterus of canines collected after ovariohysterectomy. *Acta Scientific Veterinary Sciences, 4*(6), 75-83. DOI: 10.31080/ASVS.2022.04.0415.	-
28.	Chandra, S., Kamboj, M. L., Singh, M., Singh, R., & Lathwal, S. S. (2022). Feeding practices and availability of storage space for feed and fodder in Gaushalas of Haryana. *Indian Journal of Animal Sciences*, *92*(4), 523-526.	6.32
29.	Chaudhary, V., Katyal, P., Panwar, H., Kaur, J., Aluko, R. E., Puniya, A. K., & Poonia, A. K. (2022). Antioxidative, anti-inflammatory, and anticancer properties of the red biopigment extract from Monascus purpureus (MTCC 369). *Journal of Food Biochemistry*, *46*(9), e14249. DOI: 10.1111/jfbc.14249	8.72
30.	Chaudhary, V., Katyal, P., Panwar, H., Puniya, A. K., & Poonia, A. K. (2022). Evaluating anti-microbial and anti-oxidative potential of red biopigment from *Monascus purpureus*. *Environment Conservation Journal*, *23*(1&2), 83-93. DOI: 10.36953/ECJ.021833-2131	5.66
31.	Chaudhary, V., Katyal, P., Poonia, A. K., Kaur, J., Puniya, A. K., & Panwar, H. (2022). Natural pigment from Monascus: The production and therapeutic significance. *Journal of Applied Microbiology*, *133*(1), 18-38. DOI: 10.1111/jam.15308	9.77
32.	Chawla, R., Shanmugam, S., Bedi, J. S., Yadav, D. N., & Anurag, R. (2022). Integrative approach of MAP and active antimicrobial packaging for prolonged shelf-life of composite bottle gourd milk cake. *Coatings*, *12*(8), 1204. DOI: 10.3390/coatings1208.1204	8.88
33.	Choudhary, A. K., Sood, P, Rahi, S., Yadav, D.S., Thakur, O.C., Srinta, K.R., Dass, A., Singh, Y.V., Kumar, A., Vijaykumar, A., Bhupenchandra, I., Dua, V.K., Shivadhar, Bana, R.S., Pooniya, V., Sepat, S., Kumar, S., Rajawat, M.V.S., Rajanna, Harish, M.N., Varatharanjan, T., Kumar, A. and Tyagi, V. (2022). Rice Productivity, Zn Biofortification, and Nutrient-Use Efficiency as Influenced by Zn Fertilization Under Conventional Transplanted Rice and the System of Rice Intensification. *Frontier in Environmental Sciences*, doi: 10.3389/fenvs.2022.869194.	10.58
34.	Choudhary, O. P., Priyanka, Fahrni, M. L., Metwally, A. A., & Saied, A. A. (2022). Spillover zoonotic 'Langya virus': is it a matter of concern? *Veterinary Quarterly*, *42*(1), 172-174. DOI: 10.1080/01652176.2022.2117874	9.32

35.	Choudhary, O. P., Priyanka, Saied. (2022). COVID-19 vaccination in animals: A strategy for combating the global outbreak. *International Journal of Surgery*, 105106848. DOI: 10.1016/j.ijsu.2022.106848	21.30
36.	Choudhary, R. K., & Zhao, F. Q. (2022). Invited Review: Stem cells in mammary health and milk production. *Current Stem Cell Research & Therapy*, *17*(3), 207-213. DOI: 10.2174/1574888X16666210804111516	9.83
37.	Choudhary, S., Kamboj, M. L., Ungerfeld, R., & Singh, P. (2022). Calf-cow and bull-cow management in buffaloes: Effects on growth, productive and reproductive performance of mothers and their calves. *Reproduction in Domestic Animals*, *57*(11), 1428-1439. DOI: 10.1111/rda.14219.	8.01
38.	Crotta, M., Prakashbabu, B. C., Holt, H., Swift, B., Pedada, V. C., Shaik, T. B., Kaur, P., Bedi, J. S., Tumati, S. R., & Guitian, J. (2022). Microbiological risk ranking of foodborne pathogens and food products in scarce-data settings. *Food Control*, *141*, 109-152. DOI: 10.1016/j.foodcont.2022.109152.	11.55
39.	Datta, S. N., & Kumar, S. (2022). Standardization of stocking density on genetically improved farmed tilapia (GIFT) *Oreochromis niloticus* in pond cage aquaculture system. *Journal of Environmental Biology*, *43*, 216-222. DOI:10.22438/jeb/43/2/MRN-1547	5.57
40.	Datta, S. N., Singh, A., & Tyagi, A. (2022). Study on biometrics and genetic variability of giant river catfish *Sperata seenghala* from Harike wetland - a Ramsar site. *Journal of Experimental Zoology, India, 25*(1), 1123-1128. DOI: 10.03895.2022.25.1123	5.25
41.	Deshmukh, A. K., Talwar, G., & Chandla, N. K. (2022). Effect of ultrasonication on mechanical properties, biodegradability, and morphological behavior of composite biodegradable cup. *Journal of Food Processing and Preservation*, *46*(7), e16706. DOI: 10.1111/jfpp.16706	8.19
42.	Deshmukh, A., Talwar, G., & Singla, M. (2022). Cold plasma technology–An overview of basics and Principle. *Environment Conservation Journal*, *23*(3), 87-101.	5.66
43.	Deshmukh, B., Verma, A., Gupta, I. D., Kashyap, N., & Mishra, R. (2022). Characterization of coding region of SPAG11B gene in Murrah bulls. *Buffalo Bulletin*, *41* (2), 213-223. DOI: 10.56825/bufbu.2022.4122814.	6.17
44.	Devi, N. U., Singh, S. S., Khosa, J. S., Mohindroo, J., Singh, T., & Verma, P. (2022). Surgical management of umbilical hernia in four foals. *Haryana Veterinarian*, *61*(1), 125-127.	5.58
45.	Dhaliwal, A. D. S., Kasrija, R., Singh, P. & Jadoun, Y. S. (2022). A collating study for Health and management practices followed by stall fed and extensive rearing goat farmers of Punjab. *International Journal of Bio-resource and Stress Management. 13* (6): 605-612.	5.11
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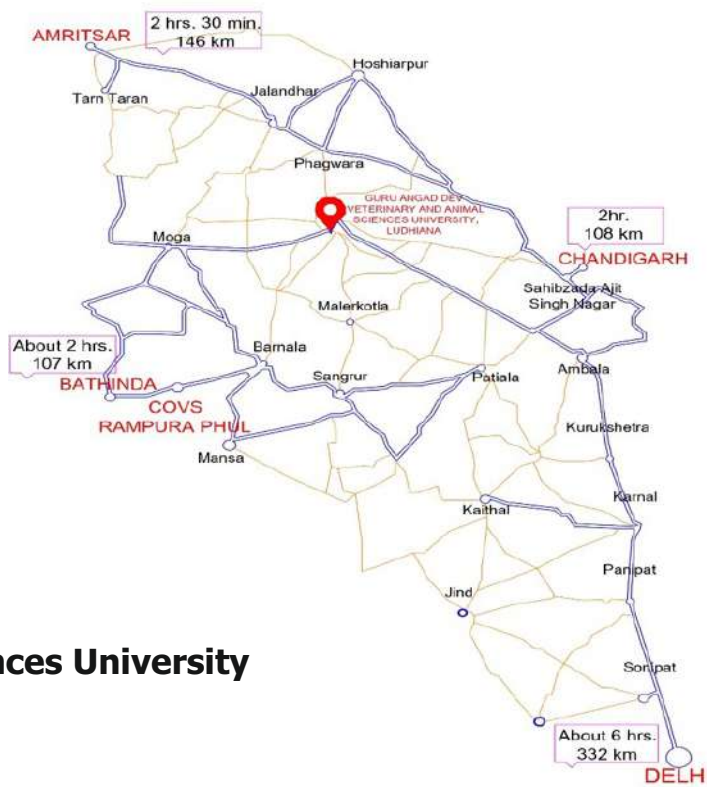

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