

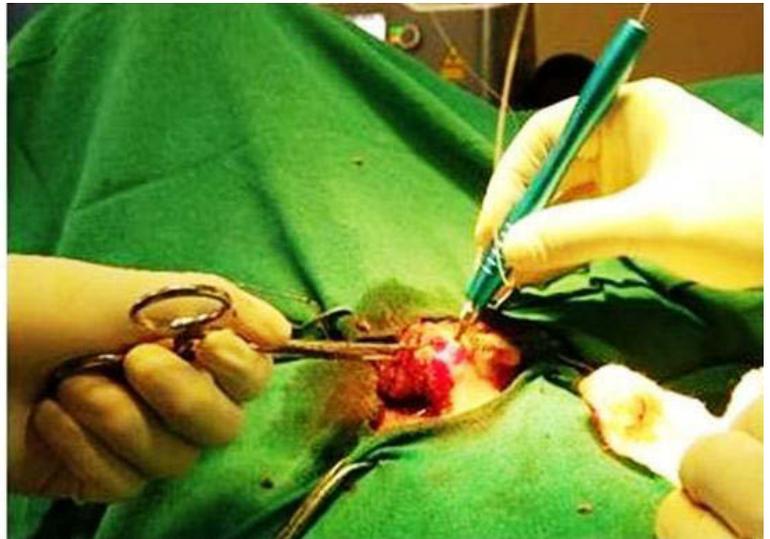
# **GURU ANGAD DEV VETERINARY AND ANIMAL SCIENCES UNIVERSITY**

## **Annual Report 2016-17**

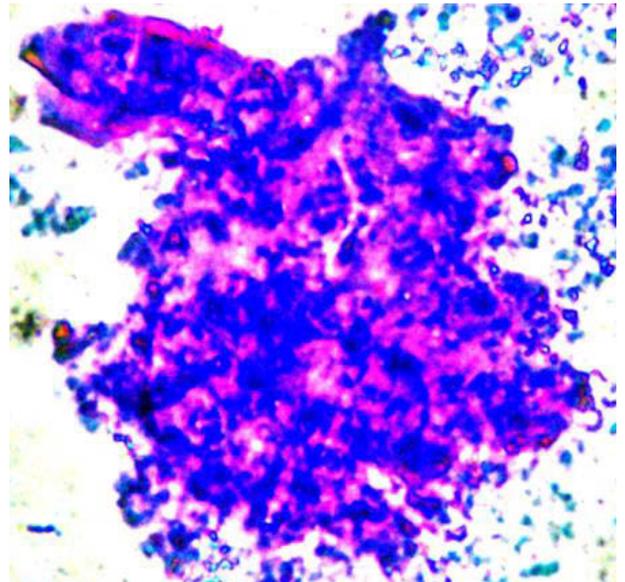
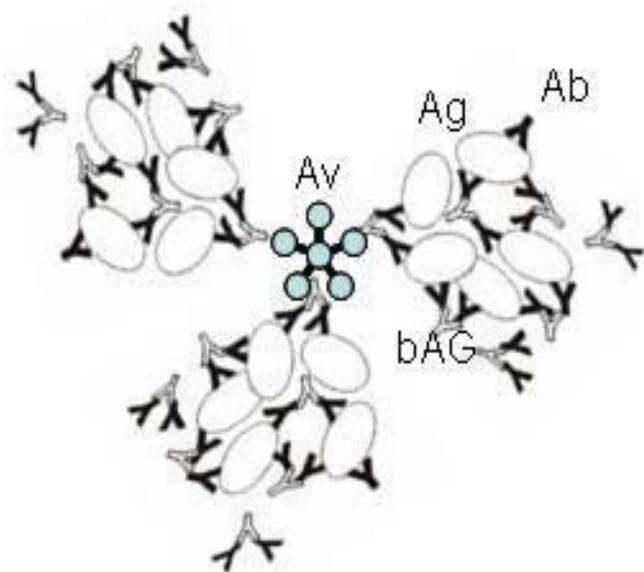




**Ultrasonography of intestinal affection in bovine**



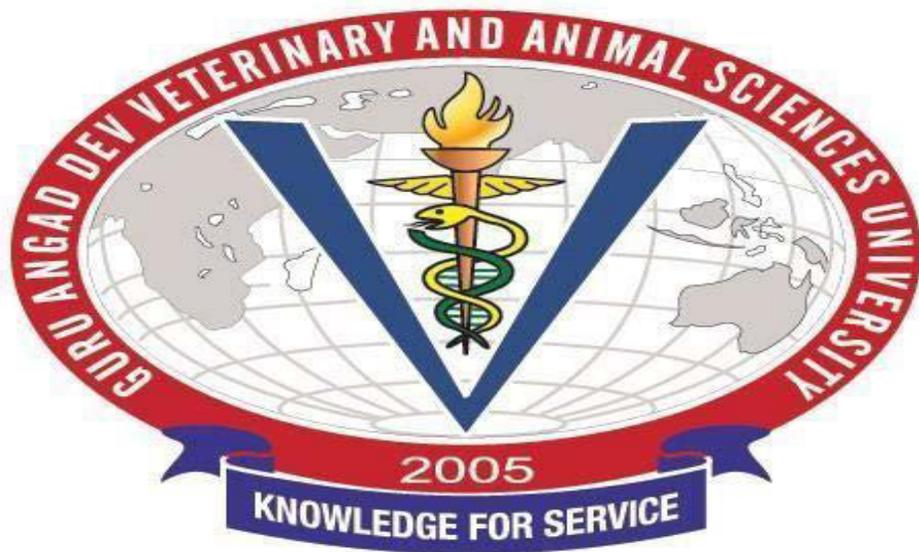
**Laser surgery in a dog**



**Superagglutination test patented by GADVASU in USA, Europe, China & S. Africa**

# Annual Report

2016-17



**GURU ANGAD DEV VETERINARY AND  
ANIMAL SCIENCES UNIVERSITY  
Ludhiana, (Punjab) India**

# Annual Report 2016-17

Guru Angad Dev Veterinary and Animal Sciences University, Ludhhiana

(Official publication of GADVASU)

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## PREFACE



Guru Angad Dev Veterinary and Animal Sciences University (GADVASU) is promoting livestock production and health with a strong base of teaching, research and extension. During the year 2016-17, the university has made significant achievements in all the diverse aspects of veterinary, dairying and fishery sciences with a focus on nutritional safety, food security and socio-economic development of masses. The university has been ranked as number one State Veterinary University (SVU) among all the SVUs in the country by the Indian Council for Agricultural Research (ICAR).

The university has the distinction of having three in discharge of leadership in the areas of Veterinary Gynecology, Veterinary Surgery and Veterinary Pathology. Its highly motivated faculty has bagged a large number of extramural grants from several national and international agencies. It has hosted many international and national training programmes and conferences including those in collaboration with certain reputed Canadian and Australian institutions. It has made original contributions to knowledge in the field of diagnostics, vaccines and therapeutics for livestock diseases.

State of the art facilities for advanced diagnosis and effective treatments are provided to animals at the teaching Veterinary Hospital; The University Animal Farms have an enviable number of elite animals of various livestock species (e.g., Murrah and Nili Ravi buffaloes, Sahiwal cattle and Beetal goats). The university has developed formulations of Area Specific Mineral Mixture, Bypass fat and Uromin licks for the dairy animals and is supplying them to the farmers. Fruits and vegetable based silage supplementations in feed have proved to be useful for methane mitigation. GADVASU has been transferring livestock products processing technologies to the entrepreneurs and farmers through public private partnerships. Shrimp farming in salt affected areas of Punjab promoted by GADVASU has uplifted the socio-economic status of several debt ridden farmers through reclamation of underproductive or zero earning lands.

The students of GADVASU have brought laurels in various activities including Inter University Sports Tournaments, Annual Athletic Meet, cultural activities, youth festivals, NCC and NSS. Several new initiatives and administrative reforms have been implemented. New buildings for the College of Dairy Science, School of Animal Biotechnology and School of Public Health and Zoonoses are near completion while others are underway.

The overall progress of the university had been commendable and the future looks promising with new initiatives, public private partnership and commercialization of know how for which the entire faculty and staff deserve to be congratulated.

A handwritten signature in blue ink, consisting of stylized initials and a long horizontal stroke.

**(A S Nanda)**  
**Vice Chancellor**

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## EXECUTIVE SUMMARY

Guru Angad Dev Veterinary and Animal Sciences University was established on 9<sup>th</sup> Aug, 2005 at Ludhiana and started functioning from 21<sup>st</sup> April, 2006 with only one College of Veterinary Science which was established in 1969. The university has grown remarkably and is already among the top Veterinary Universities in the country. GADVASU has been ranked first among the 14 State Veterinary Universities of India, as per the ICAR ranking 2016-17. It is ranked 9<sup>th</sup> among all the 67 Agricultural Universities and Research Institutes of India. The university has been ranked 81<sup>st</sup> among 3390 Higher Educational Institutions in India and 50<sup>th</sup> among all universities of the country by the National Institutional Ranking Framework (NIRF) in 2017 conducted by the Union Ministry of Human Resources Development, New Delhi. In order to produce highly efficient and skilled human resource for giving boost to activities of livestock and fishery sectors in Punjab, the university has established a College of Fisheries, a College of Dairy Science and Technology, a School of Animal Biotechnology, and a Veterinary Polytechnic. A School of Public Health and Zoonoses has been established to address the problems of zoonoses, food safety and environmental pollutants, through research and collaboration with various agencies. Regional Livestock Research and Training Centres at Kaljharani (Bathinda), Talwara (Hoshiarpur) and Booh (Taran Taran) have been established for catering to the specific needs of the area. Krishi Vigyan Kendras have been established at Taran Taran, Barnala and Mohali districts of Punjab for technology assessment, refinement and demonstration. Khalsa College of Veterinary and Animal Sciences, Amritsar and Baba Hira Dass Ji College of Veterinary Pharmacy, Badal, Distt. Muktsar are affiliated to GADVASU. The University has been recognized by the University Grants Commission (UGC) to receive central assistance under section 12 (B) of UGC Act, 1956. GADVASU got accreditation from UGC and ICAR and has been admitted as a regular member of the Association of Indian Universities (AIU).

### Financial Report

The university allocated 10732.60 lacs (as on 31.03.2017) during 2016-17 under various schemes/projects which included grant of 5940.0 lacs from State Agencies, 1384.81 lacs from ICAR, 1204.56 lacs from RKVY and 2203.23 lacs from other agencies. The total expenditure for the year 2016-17 was 10714.15 lacs which included 6887.49 lacs for State NPV Schemes, 1444.18 lacs for ICAR Schemes/Projects/Development grant, 615.24 lacs for RKVY and 1767.24 lacs for other schemes.

### Faculty profile

Total present faculty strength in the constituent colleges / institutes of the university is 208, out of which 65 are Professors or equivalent, 8 Associate Professors or equivalent and 135 Assistant Professors or equivalent. About 115 faculty members are in the teaching schemes, 55 in the research schemes and 38 in the extension schemes. At university level, 20% of the faculty is female, 83% of the faculty holds doctoral degrees, 29% faculty is trained from foreign institutes and 46% faculty is from states other than Punjab.



## **Students' profile**

The present strength of students in various programmes of the constituent colleges is 1116, out of which 55% are in undergraduate courses, 22% in postgraduate courses, 8% in doctoral program and 15% are in the diploma course. The percentage of male and female students in the university is 67% and 33%, respectively.

## **Teaching**

Admissions in various undergraduate programmes were done on the basis of Common Entrance Test (CET) conducted by the university. The total number of students admitted for the session 2016-17 was 372 which included 99 in B.V.Sc. & A.H., 14 in B.F.Sc., 30 in B. Tech. (Dairy Technology), 125 in M.V.Sc./M. Sc./ M.F.Sc., 23 in Ph.D programme and 81 in Diploma in Veterinary Science and Health Technology. A total of 270 students successfully completed their degrees in different disciplines (83 - B.V.Sc. & A.H., 17 - B.F.Sc., 17 - B.Tech., 70 - M.V.Sc./M.F.Sc./M.Sc./M.Tech., 15 - Ph.D. and 68 - Diploma). After completion of course work in nine semesters, 74 B.V.Sc. and A.H. students were registered for the six months compulsory internship programme. A total of 17 students of final year B. Tech. (Dairy Technology) programme have undergone their in-plant training at various milk plants of Milkfed, Punjab.

Eighty three students of B.V.Sc. & A.H. (2012 batch) participated in the All India Study Tour from December 2016 to January, 2017. The students visited various Veterinary Colleges, National Institutes, Laboratories and places of academic interest at Mumbai, Goa, Bengaluru and Hyderabad. A seven days educational tour of the B.Tech. (Dairy Technology) final year students (Batch 2013) was conducted from 9-15 January, 2017. All India Compulsory Educational Tour of 15 days was conducted for seventeen B.F.Sc. final year students, from 30.12.2016 to 13.01.2017.

During 2016-17, university merit scholarship was given to 82 undergraduate, 61 postgraduate and 19 Ph.D. students. Ten undergraduate students admitted through an all India entrance examination were awarded National Talent Scholarships. Junior Research Fellowship of ICAR was awarded to 7 M.V.Sc students and Senior Research Fellowship to 2 Ph.D. students. Ten students received INSPIRE fellowship. Dr. Balwant Singh Gold Medal has been started from the academic year 2016-17 and the medal for 2017 will be awarded to Miss Gulgul Singh, College of Fisheries on the basis of her all around performance during her Bachelor's degree programme.

## **Advanced trainings imparted**

The Department of Veterinary Surgery and Radiology organized an advanced training course on "Diagnostic imaging and minimally invasive surgical techniques for veterinary patients" and training programmes on "Small animal soft tissue surgery" and "Small animal orthopaedic surgery". The Department of Veterinary Gynaecology & Obstetrics organized Advanced Training Course on "Cutting-edge technologies to enhance fertility in farm animals". The School of Animal Biotechnology organized an International Winter School on "Role of Molecular Biology in Disease Diagnosis and Development of New Generation Vaccines" and two Hands - on Training Programs of 4 and 6 weeks duration. The School of Public Health



and Zoonoses organized a training of farmers regarding “Clean milk production and milk hygiene practices”. The Department of Veterinary Microbiology organized a practical training course in ‘Techniques in Veterinary Microbiology and Molecular Biology’. The Department of Livestock Products Technology organized an International Symposium & VII-IMSACON- 2016 on “New Horizons for Augmenting Meat Production and Processing to Ensure Nutritional Security, Food Safety and Environmental Sustainability” and an International Workshop on Food Quality and Safety. It also organized an Industry - Academia - Farmers Interface and Farmers’ Training Programmes on “Egg Drink Concentrate” and “Egg Paneer” and 8 day Training Course on “Value Addition to Livestock Products and Entrepreneurship Development”. The Department of Animal Nutrition organized Hands - on training on nutritional technologies for dairy farmers. The Directorate of Extension Education organized 8 days Model Training Course on “Extension Strategies for Sustainable Entrepreneurship in Livestock Sector” and a Workshop-cum-Training Course on "Precision Livestock Management for Sustainable Animal Production". Various training programmes for field Veterinary Officers and Livestock Farmers were also organized. RRTC, Kaljharani organized two trainings on goat farming. Workshop on virus - free seedlings in potato was organized by KVK, Handiaya. Artificial insemination technicians’ training and Dairy Farmer / Entrepreneur training were organized by KVK, Barnala.

### **Research**

GADVASU scientists and researchers continued to make rapid strides in the domain of Veterinary and Animal Sciences through cutting edge technologies and innovative approaches. ICAR has sanctioned a Centre for Advanced Faculty Training (CAFT) in Department of Veterinary Pathology in recognition of the highest standards of professional training and competence of faculty. Annual Review Meet of ICAR Network Project on Buffalo Improvement and the Annual Review Meeting of the ICAR Outreach Programme on Methane Emission were organized by GADVASU. The faculty participated in international and national conferences, symposia and workshops and presented research papers. The faculty won several awards and honours and published about 300 research papers.

**Cattle breeding:** Twenty one breeding bulls / male calves and 13132 doses of frozen semen were supplied to gaushalas, farmers and other dairy development agencies of the state.

**FPT program of AICRP on cattle:** The improvement in milk production as well as age at first calving at GADVASU was the highest among all Field Progeny Testing (FPT) centers in the country for crossbred cattle.

**AICRP on buffalo - Murrah:** A bull has been ranked 2<sup>nd</sup> among all the progeny tested bulls of the network project. A total of 18131 semen doses of elite buffalo bulls were supplied to the farmers and other agencies. Twenty three buffalo breeding bulls / bull calves were also supplied to the farmers for breeding purposes. Frozen semen of progeny tested bulls was provided to 28 AI centers.

**Nili Ravi:** The average 305 day milk yield and complete lactation yield of Nili Ravi buffaloes were 2204 kg and 2631 kg, respectively. A Nili Ravi buffalo produced 2981 kg milk in 305 days lactation length with a peak yield of 16.0 kg, comparable to the best yield of any of the buffalo breeds.



**Broiler breeding:** The commercial broiler (IBL-80) developed at GADVASU attains average 6-week body weight of 1600g with a feed efficiency of 2.0 and mortality of less than 5%.

**Embryo transfer:** Five Sahiwal calves were produced through embryo transfer at field level. Three Sahiwal calves were born from embryos recovered from one donor.

**Imaging and surgical interventions:** Intestinal affections and teat affections in bovines and pyometra, UTI, intussusceptions, lymphoma, tumors, ascites due to hepatic diseases, and prostate disease in dogs were diagnosed by ultrasonography. Brisket edema with pericarditis in cattle was diagnosed with the help of echocardiography. A technique for surgical repair of third degree perineal laceration in equine was developed.

**Laser and endoscopic surgical techniques:** Foreign body was recovered from oesophagus in one dog and GDV and esophageal diverticulum were detected by endoscopy. Ethmoid granuloma in the nasal cavity of a horse was observed by Rhinoscopy. Oral and superficial growths were excised in dogs with the help of LASER surgery. No hemorrhage was recorded during excision. Excellent recovery was recorded post-operatively.

**Ophthalmic ultrasound and surgery:** Ultrasonography using ophthalmic probe was used to detect retinal detachment in dogs with cataract. Management of cataract by phacoemulsification and implantation of intraocular lens (IOL) was carried out in dogs with very high success rate. Corneal ulcers in canines were treated successfully using conjunctival grafting and human amniotic membrane with excellent healing postoperatively.

**Endoscopy in URT affections:** Endoscopy was done to diagnose URT affections in horses, especially pharyngeal lymphoid hyperplasia, laryngeal functional disorders and pharyngeal cysts.

**Mitigation of hydrofluorosis:** A positive correlation of water alkalinity and the fluoride content in water was identified. A cost effective modified Nalgonda technique has been developed to defluorinate the drinking water which has reduced the culling of good animals suffering from skeletal fluorosis and improved the production in these animals.

**Mastitis in goats:** The average prevalence of sub-clinical mastitis (SCM) in goats was found to be 21.07% at animal level and 15.22% at quarter level. CNS staphylococci were the chief organisms. Overall, the microbes were the most sensitive (90.43%) to tetracycline and least sensitive (24.40%) for penicillin.

**Canine dermatitis:** Significantly high IgE in serum of dogs was found to be a diagnostic feature in atopic dermatitis. Bacterial isolates cultured from skin scrapings / pus swabs included *Staphylococcus spp.* (71.43%), *Staphylococcus aureus* (19.04%) and *Streptococcus spp.* (9.53%). Cyclosporine showed better efficacy in reducing pruritus score than cetirizine.

**Reproduction in farm animals:** Anti-sperm antibodies (ASA) /cross reacting antibodies in serum of heifers / cows were found to delay the fertility. Decrease in percentage of IgG /IgA - ASA and ASA - positivity in serum of heifers and cows with time was found to be conducive to success in conception. Molecular mimicry was found to exist between cattle bull spermatozoa and certain bacteria (*E coli*, *Bacillus* and *Staphylococcus*).

**Campylobacter in poultry:** Prevalence of *Campylobacter* species in Punjab was 6.23% with *C. jejuni* accounting for majority of the isolates (82.6%) and *C. coli* for remaining isolates

(17.39%). Highest resistance was shown against amikacin (26.08%) followed by tetracycline (17.39%). Erythromycin was found to be the drug of choice for the treatment of campylobacteriosis.

**Pesticide residues:** POPs residues including organochlorine pesticides (HCH, DDT, Chlordane, Endosulfan and Methoxychlor) and PCBs (28, 138, and 180) were detected in fish samples and  $\beta$ -,  $\gamma$ -HCH, p, p' DDD, p, p' DDE, PCBs congeners were found in human breast milk samples. About 29% of human blood samples were found positive for Chlorpyrifos, Malathion, p, p' DDE and Lindane.

**Canine mammary tumors:** A sandwich ELISA was developed for the diagnosis of canine mammary tumors. Mammaglobin was found to be a better biomarker of CMT. HSP90 and mammaglobin-B may serve as independent prognostic factors for disease-free survival ( $p \leq 0.05$ ) and overall survival ( $p \leq 0.05$ ). Markers like PROX-1, LYVE -1, Laminin and VGFR were found to be good markers for diagnosing cancer and its spread and prognosis.

**Marker vaccine and DIVA assays for Hemorrhagic Septicemia:** A new bacteriophage lysate marker vaccine and two DIVA assays (Western blotting and ELISA) have been developed for HS in bovines.

**Therapeutic vaccine and phage therapy for bovine Brucellosis:** A lytic brucellaphage was targeted *in vivo* employing the live attenuated *Brucella abortus* vaccine strain S-19 to kill the virulent *Brucella* residing intracellularly in macrophages / monocytes in the body. A single dose of the phage pulsed vaccine (S-19 organisms bearing the phage) or phage alone could eliminate live *Brucella* in the body within 3 months. Bacteriophage was found to have a promising potential to cure Brucellosis and abolish the carrier state in Brucellosis infected cattle.

A novel biomarker (*Brucella* RNA) was employed for monitoring the efficacy of phage therapy in bovine Brucellosis.

**Bacteriophage in diagnostics:** An ATP bioluminescence assay relying on ATP release by phage lysed bacteria and luminescence by ATP catalyzed luciferin - luciferase reaction has been developed at GADVASU for detection of *Brucella* and *Salmonella* in pure isolates and clinical samples.

**Teratological effects of Arsenic:** Dilated renal pelvis and complete absence of coccygeal vertebrae were the new skeletal anomalies due to arsenic toxicity found in the fetus.

**Rabies in domestic animals:** Only the genotype 1 of Rabies virus was found to be prevalent in the representative domestic and wild animal species studied. There was deviation of isolates of rabies virus of Punjab from the phylogenetic clusters of other isolates of Indian origin. IHC, RIDA, HnRT-PCR and qPCR can be used as diagnostic tools for detecting rabies virus.

**Gastrointestinal helminths in buffaloes:** The prevalence of gastrointestinal helminth parasites in buffaloes from 21 districts representing different agro-climatic zones of Punjab was as follows: Strongyles (27.62%), Amphistomes (16.94%), *Fasciola* spp. (5.23%), *Moniezia* spp. (4.18%), *Trichuris* spp. (2.2%), *Strongyloides* spp. (1.88%) and *Capillaria* spp. (0.10%). Coproculture revealed the presence of larvae of genera *Oesophagostomum*, *Haemonchus*, *Trichostrongylus*, *Cooperia*, *Chabertia* and *Strongyloides*.

**Equine piroplasmiasis in Punjab:** Equine piroplasmiasis and Equine theileriosis were found to

be endemic in Punjab with detection of latent infections of *T. equi* by PCR. Buparvaquone was found to be 100% efficacious in controlling equine piroplasmiasis (*Theileria equi*).

**Gastrointestinal parasites in small ruminants:** The overall prevalence of endoparasitic infections was 83.08% in small ruminants (85.16% and 79.24% in sheep and goats, respectively) from six districts of western zone of Punjab.

**Resistance to anthelmintic in *H. contortus* in sheep:** Resistance to anthelmintic benzimidazole in *H. contortus* in sheep from six districts of western zone of Punjab was detected by allele - specific PCR.

**Vector-borne infections in dogs:** *Babesia gibsoni* was found by PCR to be the most common parasite infecting dogs (15.04%) followed by *Ehrlichia canis*, *Babesia vogeli* and *Hepatozoon canis*.

**Acaricide resistance in *Rhipicephalus (Boophilus) microplus* and *Hyalomma anatolicum*:** Level I resistance against Cypermethrin in Barnala, Bathinda and Muktsar isolates, level I resistance against deltamethrin in Mansa, Moga and Sangrur isolates and level II resistance in Barnala, Fazilka, Ferozepur and Muktsar isolates of *Rhipicephalus (Boophilus) microplus* ticks was recorded. Level II resistance against Amitraz was detected in *Hyalomma anatolicum* ticks collected from district Muktsar, Punjab. Level II resistance against ivermectin was detected in all the three field isolates *Hyalomma anatolicum* ticks from Amritsar, Moga and Muktsar districts of Punjab.

**Acaricidal activity of *Glycyrrhiza glabra* (Mulethi) against ivermectin resistant *Rhipicephalus (Boophilus) microplus*:** Highest acaricidal property was recorded in hexane extract of roots of *Glycyrrhiza glabra* (Mulethi) against ivermectin resistant (level II) *R. (B.) microplus*.

**Acaricidal activity of *Piper longum* L. against Amitraz resistant *Rhipicephalus (Boophilus) microplus*:** Higher acaricidal activity against Amitraz resistant cattle tick, *Rhipicephalus (Boophilus) microplus* was exhibited by the alcoholic extract of *Piper longum* L. It was found that ethanolic extracts of *P. longum* and *P. nigrum* and their combinations can be used effectively for control of *Hyalomma anatolicum* ticks.

**Pathogens in wild ungulates and carnivores:** Endoparasitic infections and *E. coli*, *Salmonella* and *Mycobacterium avium* subsp. paratuberculosis were detected in captive and free range wild animals and domestic livestock at Abohar and in and around Dachigam National Park. Virulence genes and antibiotic resistance genes were detected in the bacteria by PCR. Higher resistance against tetracyclines and beta lactam group of antibiotics was detected.

**Therapeutic potential of an indigenous plant:** The anti-inflammatory activity of *Kiegelia Africana* (Sausage Tree) was found to be comparable with the standard drug Diclofenac and Methyl Salicylate ointment used to treat inflammation.

**Adverse effects of Pesticides:** Flubendiamide caused significant alteration in relative organ weight (heart, liver, kidney, testes and uterus with ovary) and biochemical (AST, ALT, LDH, ALP, GGT, glucose and BUN), hematological (TLC, TEC, PCV, MPV and platelet count), antioxidant (CAT, GPx, GST, LPO, GSH, GR and G6PD) and hormonal (T3) parameters in rats. The pesticides were found to be toxic to reproductive, immune and nervous systems at different



dose levels.

**Effect of *Terminalia arjuna* on buffaloes exposed to environmental pollution:** Treatment with powdered bark of *Terminalia arjuna* modulated the oxidative stress, biochemical response and improved the conception rate in buffaloes environmentally exposed to arsenic or lead contamination.

**Amelioration of effects of heavy metal exposure on mice by herbal antioxidant:** Amla supplementation was found to ameliorate the adverse effects on liver, kidney and ovary caused by heavy metal contamination in mice.

**Effect of *Yea sac*<sup>1026</sup> supplementation on buffalo calves in summer:** Supplementation of *Yea sac*<sup>1026</sup> in buffalo calves resulted in restoration of rumen microbial population and optimization of rumen metabolites concentration in summer.

**Mitigation of methane emission:** Cotton seed oil supplemented at 1% level to the TMR mitigated the methane production significantly. Leaves of safeda, guava and khajur trees supplemented at the rate of 1% each to complete feed were found to have a positive impact on *in-vitro* fermentability and in suppressing methane production.

**Effect of vitamins on *in vitro* digestibility of complete feeds:** A combination of niacin and vitamin E supplementation was found to improve the *in vitro* digestibility of nutrients and utilization of complete feed. Multi and fertility licks increased the milk yield by 2 kg per cow per day in crossbred cows. Multi lick also improved the milk fat and protein content.

**Improvement of fodder quality:** Foliar spray of FeSO<sub>4</sub> enhanced Nitrogen (N), Phosphorus (P), Potash (K) and Iron (Fe) content of herbage in teosinte grown in Iron (Fe) deficient alkaline field.

**Poultry nutrition:** In birds reared in environment controlled broiler house, crude protein in diet can be reduced by 2% in starter and 1% during overall growth period without affecting the growth and carcass parameters by the addition of enzyme protease in diet.

**Extension of storage life of pork by phyto-extracts:** Chevron roll could be successfully stored for 28 days in aerobic packaging and upto 35 days in MAP under refrigeration by incorporation of phyto-extracts of *Aloe vera* and *Cinnamon* bark extract. The ethanolic extract of watermelon rind enhanced storage stability of aerobically packaged pork patties stored at refrigeration temperature.

**Herbal products in aquaculture:** Garlic powder can be used as a feed additive @ 2%, not only for higher fish production, but also for producing fish with better health and flesh quality. *Aloe vera* extract @ 1% (10g kg<sup>-1</sup> feed) was found to enhance fish growth (in terms of body length and body weight).

**Benefits of carrot in fish feed:** Carrot meal incorporation in koi carp diet @ 25 ppm increased the carotenoid content in fish skin and muscle and enhanced fish growth.

**Kit for detection of *Vibrio parahaemolyticus*:** A flow through assay kit for detection of *V. parahaemolyticus* (causative agent of shrimp EMS) based on polyclonal antibodies against toxic PirA protein was developed.

**Vitamin D<sub>2</sub> fortification in food by nanotechnology:** A nanotechnology based technique and water dispersible vitamin D<sub>2</sub> powder have been developed for fortification of food including milk



and milk products.

**Kit for detection of adulteration in milk:** A kit was developed to detect common adulterants in milk like sugar, starch, urea, neutralizers, hydrogen peroxide, glucose, salt, formalin, nitrates (pond water), and ammonium compounds.

### **Extension**

GADVASU is making all out efforts for the development of the livestock sector in the state by strengthening its extension programmes. These efforts have made good impact in improving productivity of dairy, fishery, goatery, piggery and poultry farming. The Directorate of Extension Education coordinated extension activities through its wings like Farm Advisory Service, training and visits to villages. Training courses were organized for the farmers, field veterinarians and scientists from other universities. Faculty published about 128 extension articles in various magazines, journals, newspapers etc. in order to disseminate information to farmers. The faculty members also delivered 36 TV and 55 radio talks on the topics assigned by the directorate. Seven animal welfare camps were organized in rural areas of Punjab for the treatment of sick animals. Pashu Palan Melas of Guru Angad Dev Veterinary & Animal Sciences University were held on 22 & 23 September, 2016 and 24 & 25 March, 2017. The university also participated as knowledge partner in the Kisan Melas organized by Punjab Agricultural University at Ballawal Saunkhadi, Gurdaspur, Bathinda, Rauni, Tarn Taran /Amritsar, Faridkot Regional Research Stations/KVKs for the benefit of livestock farmers. Expert lectures were given by faculty and trainings were organized by KVKs and RRTCs. The University has established various associations of the farmers for different livestock professions and held regular monthly meetings of these associations and organized technical seminars for the transfer of technologies. The University has liaison with Animal Husbandry, Dairy Development and Fisheries departments of Punjab state for undertaking animal welfare activities.

### ***Chief Minister's Award for farmers***

Chief Minister's Awards 2017 have been conferred on three livestock farmers of the state. In the cattle category, Sh. Gurmukh Singh, VPO Kairon, Distt. Tarn Taran, in the buffalo category, S. Rajinder Pal Singh, VPO Dahedu, Distt. Ludhiana and in the goat farming category, Sh. Rahul Kasnia, Vill. Ramsra, Distt. Fazilka were awarded during the Kisan Mela. The awards carried a plaque, a shawl and a citation along with cash.

### **Library and networking**

The GADVASU library is central to the academic and research activities of the University. The various operations and services of the library are fully automated using LSEase Library Management System. The library provides single window access to its various e-resources, services and other important information through its website Cyberary (<http://www.gadvasu.in/>). The website of library is continuously updated to facilitate current information to users. The library is a member of Consortium for e-Resources in Agriculture providing access to about 3900 journals in the broad spectrum of Agricultural Sciences including Veterinary Sciences, Animal Husbandry, Livestock Management & Poultry Sciences, Fisheries and Aquaculture, Dairy Technology, Biotechnology, Animal Nutrition and allied subjects accessible through website of the library. In addition, the website provides access to various



forms / proformas relevant to the fraternity of GADVASU. Web-links have been given to various open access electronic information resources to access the scientific literature. The other Information Technology based services of library include automated circulation, creation of ID cards, database management for books, journals, theses etc.

During the year 2016-17, the university library has strengthened its books collection with addition of nearly 1500 text and reference books. The online-book collection for the academic community of GADVASU was also strengthened with addition of 18 new titles. The library has taken initiative to develop audios and videos of clinical and other practices related to veterinary science and animal husbandry. The university library has also submitted a research proposal entitled, "Impact of digital tools on students' and farmers' learning process" to the Indian Council of Agricultural Research.

In addition to the routine functioning, the library is providing data inputs to the National Institutional Ranking Framework (NIRF), All India Survey on Higher Education (AISHE) and National Information System on Agricultural Education Network in India (NISAGENET). The library is also taking care of compliance to the e-Waste Management & Handling Rules 2011 by the university. The Water-Mist (Fire Extinguisher) to handle heavy fire accident has been installed in the library.

The University Library has established a campus - wide network in GADVASU connecting more than 500 nodes throughout the campus. The library provides various services like internet, e-mail, and access of library through intranet website in GADVASU Campus through a Campus - Wide Area Network. The library hosts Intranet Web Server to provide library services throughout the campus from Cyberary website.

The library provides the email services to the staff on the domain @gadvasu.in. This email service can be accessed worldwide. The Information Technology personnel of library manage and control the server for Apache Web-server, Mail Services, Network Management System, CD Server and Server for Antivirus Software. During the year 2016-17, the library procured i5 and i7 computers with high speed processing and quality display features to provide state of the art information technology infrastructure to students, researchers and faculty.

### **Sports and Co-curricular activities**

Tenth Annual Athletic Meet of the university was organized at GADVASU. Sports contingent of 40 athletes participated in 16<sup>th</sup> All India Inter Agricultural Universities Sports and Games Meet held at Tamilnadu Agricultural University, Coimbatore. GADVASU students also participated in various North Zone Inter-varsity Tournaments. The 7<sup>th</sup> Youth Festival of GADVASU was organized. GADVASU students won prizes at the All India National Youth Festival 2017 held at Shivaji University, Kolhapur (Maharashtra), All India Agricultural University Youth Festival held at Rajasthan University of Veterinary and Animal Sciences Bikaner, and the Inter University North Zone Youth Festival (UNIFESTS) 2017 held at Chhatrapati Sahu Ji Maharaj University, Kanpur, UP.

### **National Cadet Corps**

Three cadets participated in various equestrian activities during Republic Day Camp and Prime Minister Rally and won one Bronze Medal. A girl cadet of 1 Pb R & V SQN NCC won a



Silver Medal in Punjab State Equestrian Championship. Ten cadets appeared for NCC “C” certificate exam while 69 cadets appeared for NCC “B” certificate exam. Annual Training Camp at NCC Academy, Malout was attended by 79 cadets while 15 SD cadets attended Army Attachment Camp held at Remount Veterinary College and Centre, Meerut. NCC week was celebrated in which cadets participated in various activities like painting competition, declamation, awareness rallies against social evils and “Run for fun and good health”. International Day for Girl Child was also celebrated.

### **National Service Scheme**

The NSS Unit organized a 7-Day NSS Special Winter Camp with the theme ‘Mat ko banao bahumat’ to educate voters. Another seven-day camp was organized at KCVAS. Poster making, essay writing, quiz competitions and an Awareness Rally within the campus were organized. NSS volunteers became a part of a 65 km long human chain that registered a record in India Book of Records for being the Longest Human Chain for Voters’ Awareness. A two day Yoga Fest was organized at TVCC Campus of KCVAS. Two lectures were organized on Prevention of Drug Addiction and Female Foeticide where in 100 NSS volunteers participated. NSS volunteers planted more than 100 saplings in the Administrative Block during a Tree Plantation Drive. International Yoga Day was observed wherein volunteers were guided about different Yoga postures and their benefits in routine life. Four cleanliness drives under Shramadaan (Swatchh Bharat Abhiyaan) were performed and works like cleaning of labs, classrooms, painting of pavements were carried out. Various important days were observed such as National Youth Day, World Health Day, Anti-Terrorism Day, World No - Tobacco Day, World Red Cross Day, World Environment Day, Sadbhawana Divas, Teachers’ Day, International Literacy Day, International Peace Day, NSS Day, Social Justice Day, National Blood Donation Day, National Integration Day, World AIDS Day, World Human Rights Day, Road Safety Week, Van Mahotsav Week, and Qaumi Ekta Week. The volunteers also provided their services in creating awareness on various social issues in rural areas as well as in urban slum areas. NSS volunteers also took part in various activities of social welfare and got associated in problems related to environment and the society in the city / state.

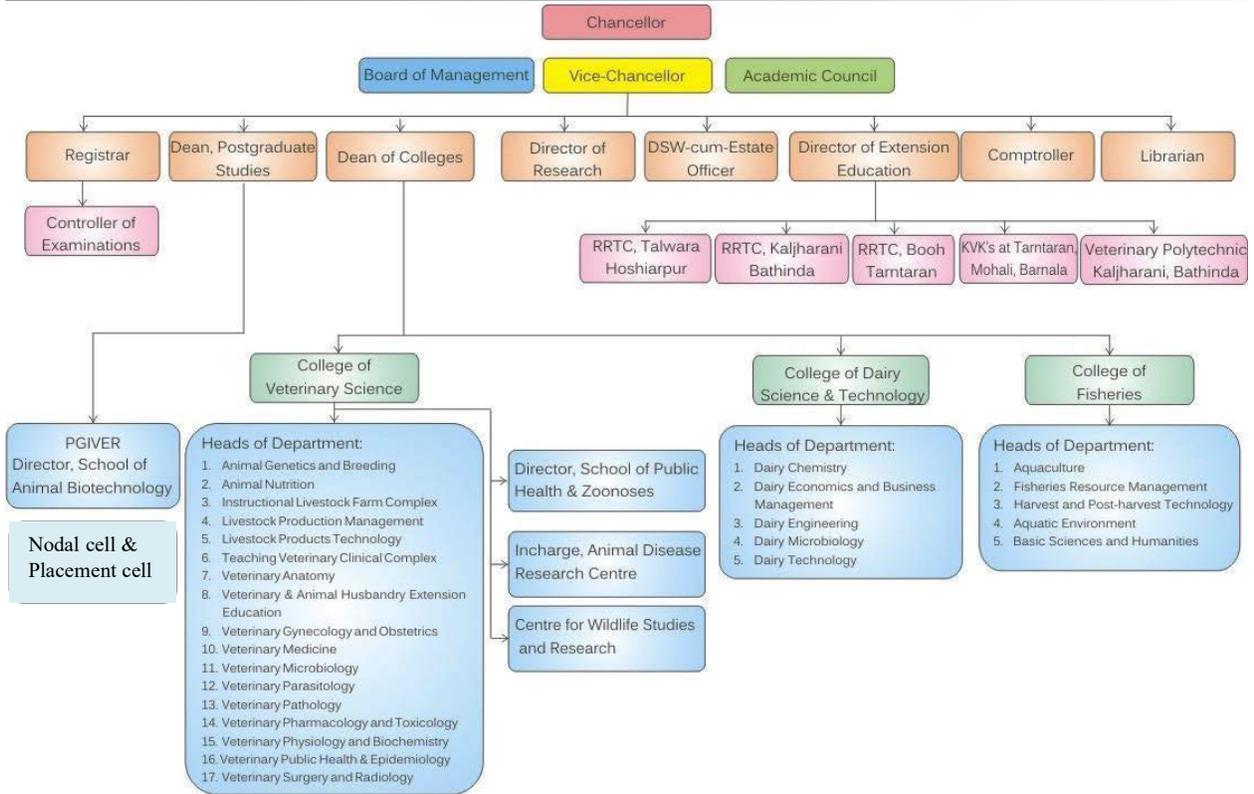


## **ABOUT THE UNIVERSITY**

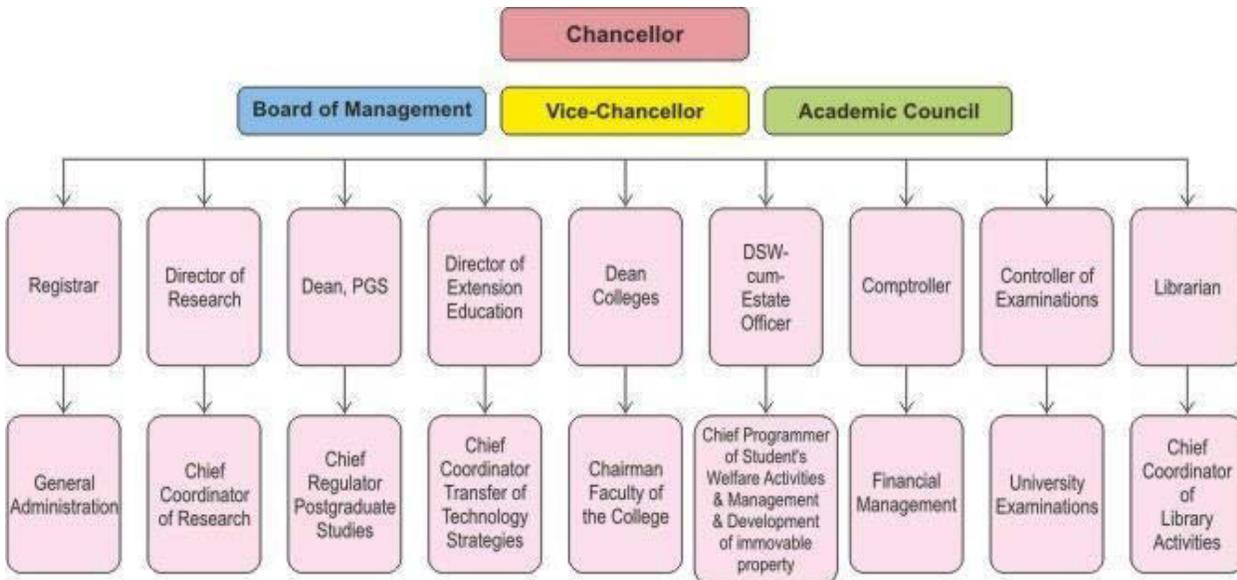
Guru Angad Dev Veterinary and Animal Sciences University started functioning on 21<sup>st</sup> April, 2006 at Ludhiana, as per the Punjab Act No. 16 of 2005 to serve the society by promoting livestock production, health and prevention of diseases through integrated teaching, research and extension programmes. The University was established with the following goals and objectives:

- To provide adequate supply of trained Veterinary professionals including Master's and Doctorate level specialists capable of handling livestock health and production aspects according to the needs of the state government and allied agencies.
- To undertake research work in selected areas and wherever applicable following multi-disciplinary approach.
- To provide opportunities for continuing professional education in Veterinary Science.
- To provide consultancy and specialist services to livestock owners, government, semi-government and allied agencies.
- To run "Referral" hospital for specialized treatment of the livestock patients and to provide clinical training to the students.
- To provide technical expert opinion to different government and other agencies.
- To foster faculty development by providing them opportunities to participate in appropriate training programmes, conferences, workshops, seminars, symposia etc. and avail opportunities in exchange programmes.
- To encourage cooperation and collaboration with other departments, colleges, universities and industries, both national and international.

# ORGANIZATIONAL SETUP



## Functional Chart





The functioning of the university is governed by the following bodies focused at 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 which controls the finances and assets of the university, appointments of all officers and teachers and provides 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 institution, education and examination. Committee on Students' Welfare regulates various students' activities. Research Advisory Committee regulates the allocation of funds for research, conditions for accepting grants and other matters regarding research programmes of the university. Extension Education Advisory Committee coordinates university extension programmes with the state and the center and devises ways and means to implement university extension education programmes. Resident Instruction Committee makes recommendations to the Academic Council concerning the new curricula and arrangement, alteration and abolition of existing curricula. Postgraduate Committee examines the courses and curricula for postgraduate students recommended by the Board of Studies before submission to Academic Council. The Board of Studies of a college proposes to the Academic Council through 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

#### Honorary Chairman

- His Excellency Shri V. P. Singh Badnore, Chancellor and Governor of Punjab, Chandigarh.

#### Working Chairman

- Dr. A. S. Nanda, Vice-Chancellor, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana.

#### Members

##### *Ex-officio Members*

- Shri Karan Avtar Singh, IAS, Chief Secretary, Govt. of Punjab, Chandigarh.
- Shri M.S. Sandhu, IAS, Additional Chief Secretary, Department of Animal Husbandry, Fisheries & Dairy Development, Punjab, Chandigarh.
- Shri Satish Chandra, IAS, Additional Chief Secretary, Development, Department of Agriculture, Punjab, Chandigarh.
- Shri Anirudh Tewari, IAS, Principal Secretary, Department of Finance, Chandigarh.
- Dr. Harjinderjeet Singh Sandha, Director of Animal Husbandry, Punjab, Chandigarh.
- Sh. Inderjit Singh, Director, Dairy Development, Punjab, Chandigarh.
- Dr. Madan Mohan, Director and Warden of Fisheries, Punjab, Chandigarh.
- Dr. B.N. Tripathi, Director, National Research Centre for Equines, Hisar.
- Dr. Simrat Sagar Singh, Dean, Postgraduate Studies, GADVASU, Ludhiana.

##### *Non Official Members*

- Dr. P. K. Uppal, Advisor to the Govt. of Punjab, DAHDF, Chandigarh.
- Dr. R. K. Singh, Director & Vice Chancellor, Indian Veterinary Research Institute, Izatnagar.
- Shri Sukh Harpreet Singh Rode s/o Shri Randhir Singh Rode, VPO Rode, Teh. Bagha Purana, Distt. Moga.
- Shri Sapinder Singh s/o Shri Baldev Singh, Vil. Hakima, Distt. Sangrur.
- Shri Ajit Singh s/o Shri Khushal Singh, Metro Milk Products Pvt. Ltd., Batala, Gurdaspur.
- Smt. Navpreet Kaur w/o Shri Harsharan Singh, Vil. Manawala, Amritsar.

##### *Special Invitee*

- Dr. B.S. Dhillon, Vice-Chancellor, Punjab Agricultural University, Ludhiana.
- Dr C K Singh, President, GADVASU Teachers' Association, Ludhiana.

##### *Secretary*

- Dr. Sushil Prabhakar, Registrar, GADVASU, Ludhiana.

### Academic Council

#### Chairman

**Dr. A. S. Nanda**, Vice-Chancellor, GADVASU, Ludhiana.

#### Members

- Dr. J. P. S. Gill, Director of Research
- Dr. Simrat Sagar Singh, Dean Postgraduate Studies
- Dr. P. S. Brar, Dean, College of Veterinary Science



- Dr. Asha Dhawan, Dean, College of Fisheries
- Dr. Anil Kumar Puniya, Dean, College of Dairy Science and Technology
- Dr. H. K. Verma, Director of Extension Education
- Dr. C. K. Singh, Head, Department of Veterinary Pathology
- Dr. V. K. Dumka, Head, Department of Veterinary Pharmacology and Toxicology
- Dr. Opinder Singh, Head, Department of Veterinary Anatomy
- Dr. T S Rai, Head, Department of Veterinary Microbiology
- Dr. Meera D Ansal, Head, Department of Aquaculture

#### **Special Invitees**

- Dr. S. Rampal, Director, Student Welfare-cum-Estate Officer
- Dr. N. S. Sharma, Controller of Examinations
- Dr. Ramneek, Director, School of Animal Biotechnology (Additional charge)
- President, GADVASU Teacher's Association

#### **Secretary**

Dr. Sushil Prabhakar, Registrar, GADVASU, Ludhiana.

#### **Officers of the University**

Vice-Chancellor

Dr. Amarjit Singh Nanda

Registrar

Dr. Sushil Prabhakar

Director of Research

Dr. J. P. S. Gill

Dean, Postgraduate Studies

Dr. Simrat Sagar Singh

Director of Extension Education

Dr. H. K. Verma

Director Students' Welfare-cum-Estate Officer

Dr. Satyavan Rampal

Dean, College of Veterinary Science

Dr. P. S. Brar

Dean, College of Fisheries

Dr. Asha Dhawan

Dean, College of Dairy Science and Technology

Dr. Anil Kumar Puniya

Librarian

Dr. R. S. Brar\*

Controller of Examinations

Dr. N. S. Sharma

Comptroller

Dr. P. S. Dhaliwal\*

*\*Additional charge*

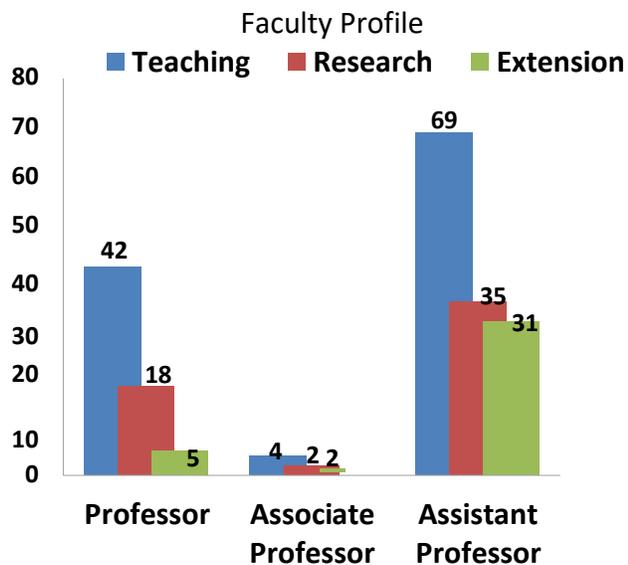


## FACULTY PROFILE

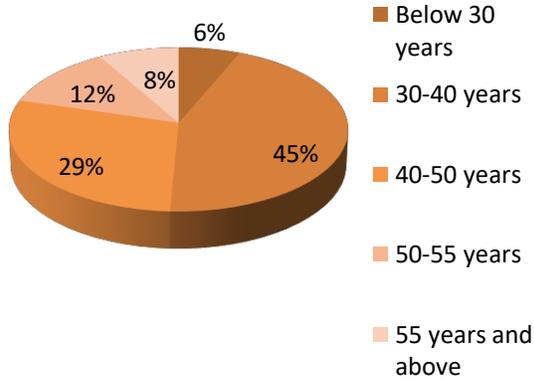
Presently, the total faculty strength in the constituent colleges / institutes of the university is 208, out of which 65 are Professors or equivalent, 8 Associate Professors or equivalent and 135 Assistant Professors or equivalent. About 115 faculty members are in the teaching schemes, 55 in the research schemes and 38 in the extension schemes. At university level, 20% of the faculty is female, 83% of the faculty holds doctoral degree, 29% faculty is trained from foreign institutes and 54% faculty is from Punjab.

### Faculty strength

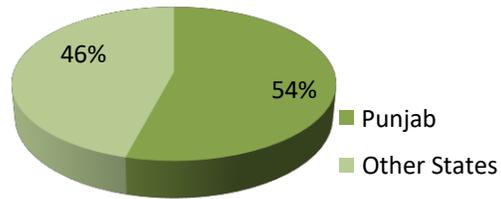
Institution	Professors	Associate Professors	Assistant Professors	Total
College of Veterinary Science	56	5	64	125
College of Dairy Science & Technology	1	0	14	15
College of Fisheries	2	0	14	16
School of Animal Biotechnology	2	0	7	9
Directorate of Livestock Farms	1	1	9	11
Veterinary Polytechnic, Krishi Vigyan Kendra's and Others	3	2	27	32
<b>Total</b>	<b>65</b>	<b>8</b>	<b>135</b>	<b>208</b>



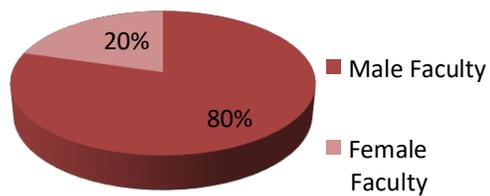
### Age-wise distribution of the Faculty



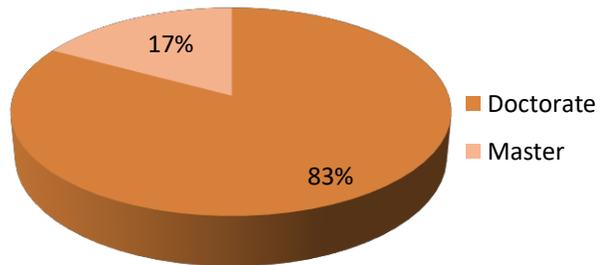
### Domicile based distribution of Faculty



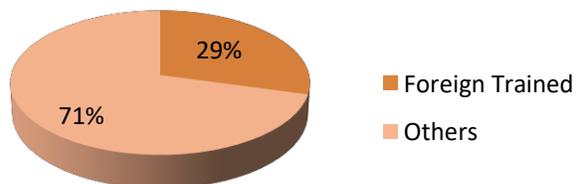
### Gender-wise distribution of the Faculty



## Faculty with Doctorate and Master's Degrees



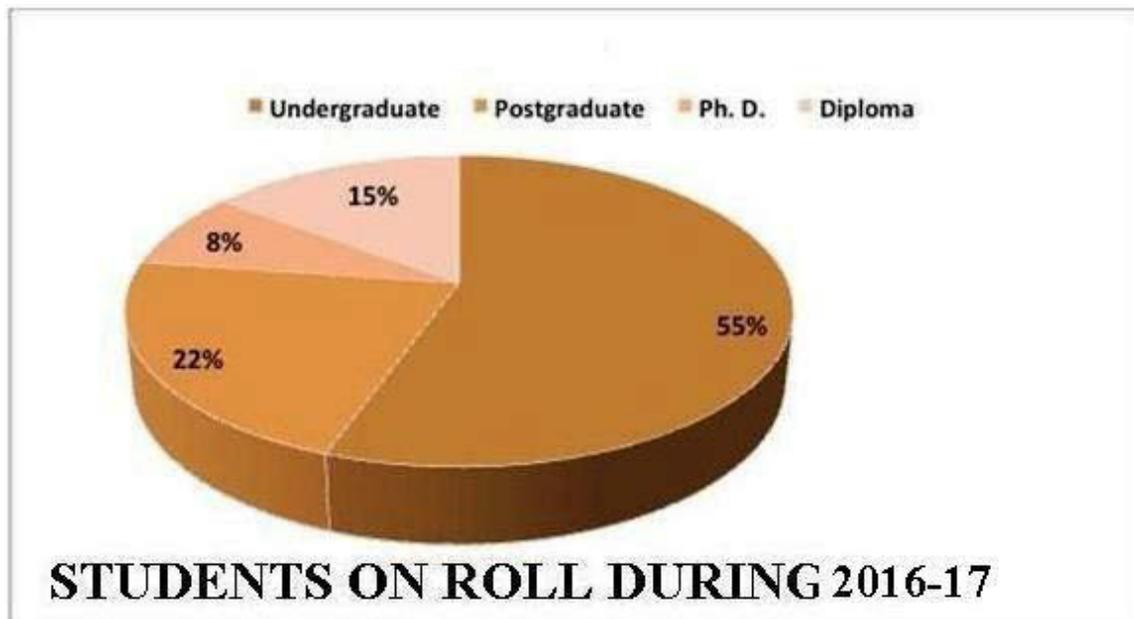
## Training based breakup of Faculty



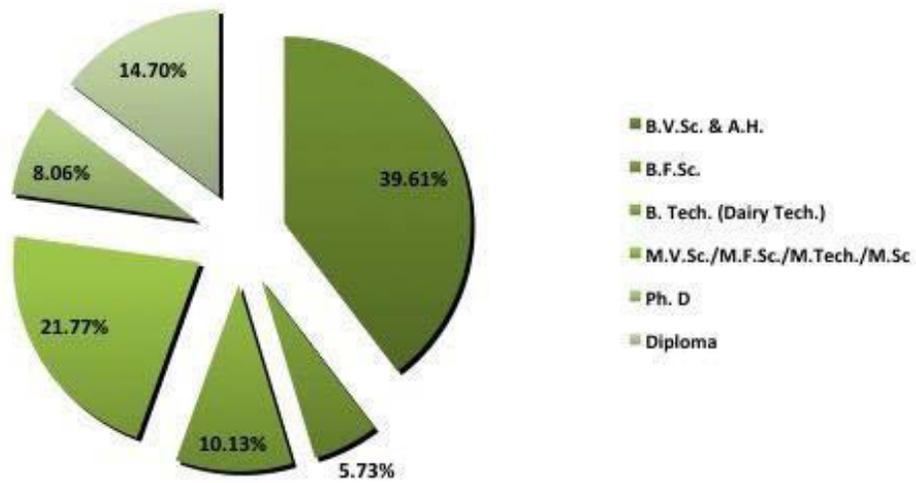
### STUDENTS' PROFILE

Students enrolled in various programmes and their genderwise distribution in courses

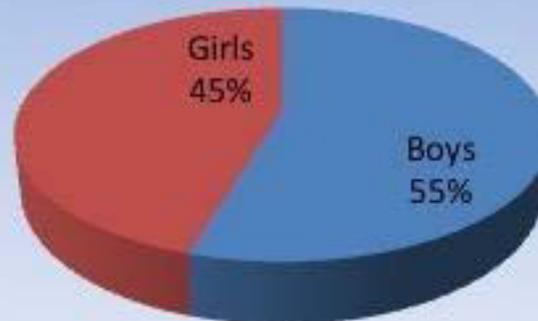
Programmes	Boys	Girls	Total
B.V.Sc. & A.H.	282	160	442
B.F.Sc.	39	25	64
B. Tech. (Dairy Tech.)	91	22	113
MV.Sc./M.F.Sc./M.Tech./M.Sc	133	110	243
Ph. D	45	45	90
PGDIF	0	0	0
Diploma	162	2	164
<b>Total</b>	<b>752</b>	<b>364</b>	<b>1116</b>



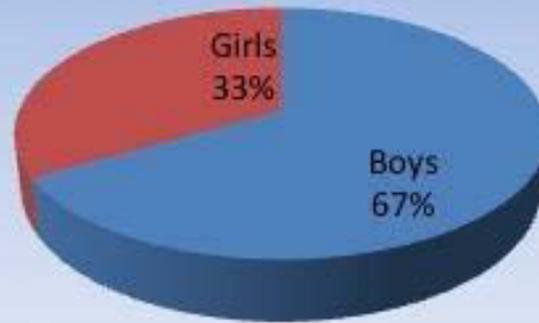
### Distribution (%) of students in different programmes



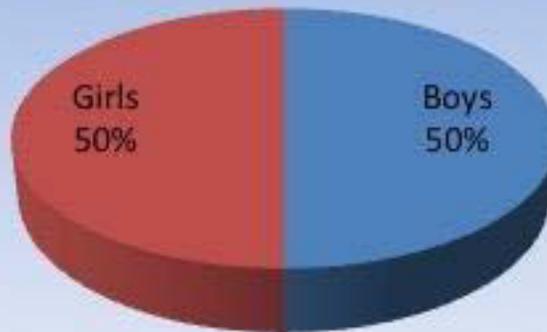
### Postgraduate Programmes



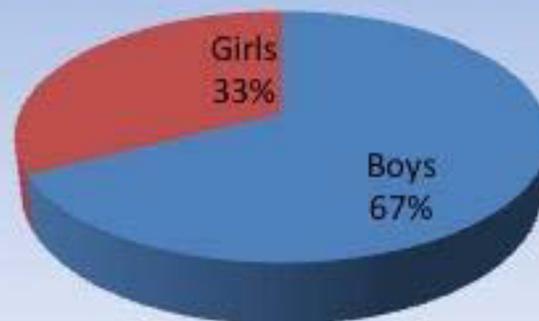
### Undergraduate Programmes



### Ph. D. Programme



### Student Profile



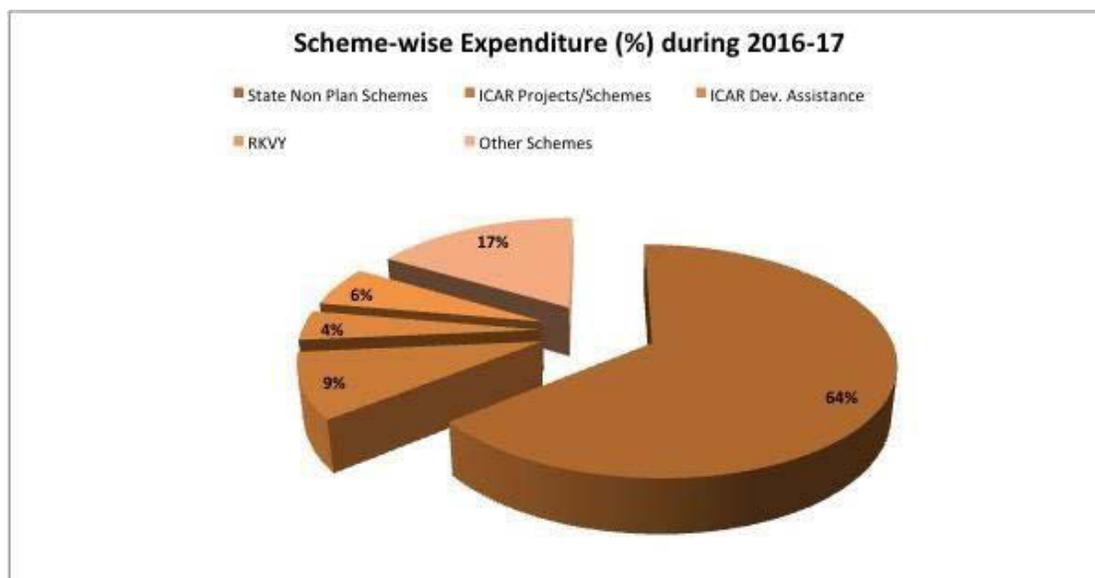
## FINANCIAL REPORT

Financial statement indicating budget allocated and amount spent (Rs. in lacs) under various schemes/projects during financial year 2016-17

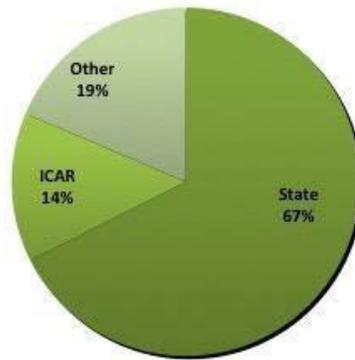
Schemes	Budget Allocated for 2016-2017*	Expenditure*				
		Salary	Wages	TA	Contingencies & Others	Total
State Non Plan Schemes	5940.00	5947.05	508.42	10.10	421.92	<b>6887.49</b>
ICAR Projects/Schemes	933.93	346.23	45.58	14.06	587.84	<b>993.71</b>
ICAR Dev. Assistance	450.88	0.00	0.00	6.99	443.48	<b>450.47</b>
RKVY	1204.56	0.00	0.00	0.00	615.24	<b>615.24</b>
Other Schemes	2203.23	0.00	106.00	20.92	1640.32	<b>1767.24</b>
<b>Total</b>	<b>10732.60</b>	<b>6293.28</b>	<b>660.00</b>	<b>52.07</b>	<b>3708.80</b>	<b>10714.15</b>

\*Figures shown are as on 31-03-2017

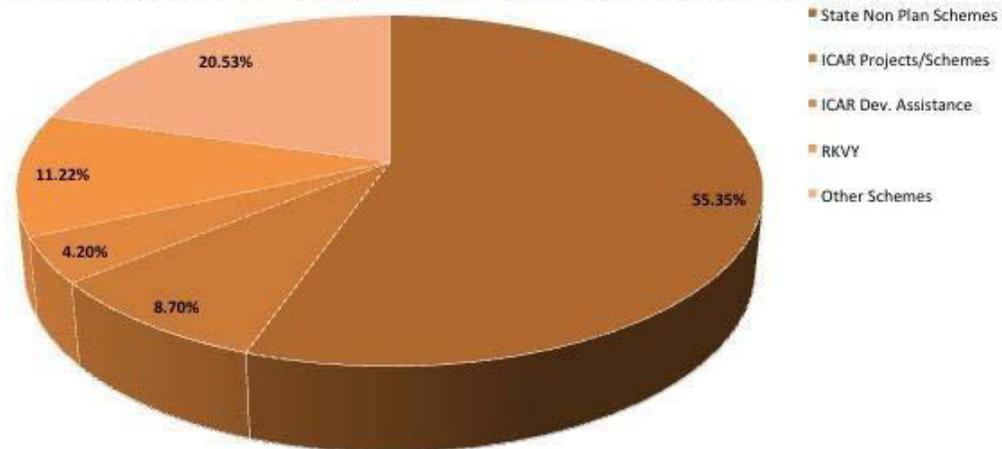
### Grants received from State, central and other agencies (Rs in Lakh)



Contribution (%) from different funding agencies during 2016-17



Per cent budget allocated under various schemes/projects during 2016-17





## ACADEMIC UNITS

There are three constituent colleges, viz. College of Veterinary Science, College of Dairy Science & Technology, College of Fisheries, which are imparting undergraduate and postgraduate teaching in various disciplines. Besides, the university has established a School of Animal Biotechnology and a School of Public Health & Zoonoses to generate scientific expertise and address various health and environment related issues. The Khalsa College of Veterinary and Animal Sciences, Amritsar and Baba Hira Dass Ji College of Veterinary Pharmacy, Badal, Distt. Muktsar are affiliated to GADVASU. Three Regional Livestock Research & Training Centres at Kaljharani (Bathinda), Talwara (Hoshiarpur) and Booh (Taran Taran), and three Krishi Vigyan Kendras at Booh (Taran Taran), Barnala and Mohali have been established.

### Entrance tests conducted by GADVASU for admission to its various programs in 2016-17

Test	Date of test	Number of applications received	Number of candidates appeared in the test
Common Entrance Test (CET-2016) for admission to undergraduate programs of the university i.e B.V.Sc. & A.H./ B.F.Sc./ B. Tech. (Dairy Technology)	16.06.2016	2794	Total 2685 (Male candidates- 1535; Female candidates- 1150)
Common Entrance Test for admission to Diploma in Veterinary Science & Animal Health Technology program	21.08.2016	808	Total 745 Male candidates- 730; Female candidates 15

### Admissions in undergraduate and postgraduate programmes in academic session 2016-17

Program	General / Reserve Categories	VCI/ICAR/ JNU/State Govt. Nominations	NRI Seats/ Foreign Nationals	Total
B.V.Sc. & A.H.	66+11(self financed)	2	20	99
B.F.Sc.	14	0	0	14
B. Tech. (Dairy Technology)	29	1	0	30
M.V.Sc./M.Sc.(ABT)/ M.F.Sc. / M. Tech. (Dairy Technology)	75	46	4	125
Ph.D.	18	5	0	23
Diploma in Veterinary Science & Animal Health Technology	81	-	-	81
<b>Grand Total</b>				<b>372</b>



**Theses / Dissertations completed during 2016-17**

<b>Year</b>	<b>Name of the student</b>	<b>Major Advisor</b>	<b>Title of the thesis / dissertation</b>
2016	Akhilesh Kumar Verma	Dr. M. K. Chatli	Extraction of bioactive peptides from porcine blood and liver and their effects on quality of functional pork loaves
2016	Devendra Kumar	Dr. M. K. Chatli	Production of bioactive peptides from camel milk and their effect on the quality of functional goat meat patties
2016	Abdur Rezzaque Choudhury	Dr. Opinder Singh	Histomorphochemical and histochemical studies on liver of sheep during prenatal development.
2016	Rayees Ahmad Rather	Dr. N. S. Saini	Clinical studies on the diagnosis and surgical management of corneal ulceration and cataract in dogs
2016	Bhaskar Vemu	Dr. V. K. Dumka	Evaluation of flubendiamide toxicity through one generation extended reproductive study in rats
2016	Pankaj Goswami	Dr. H. S. Banga	Pathoepidemiology of important common respiratory pathogens of bovine in Punjab
2016	Rajesh Kasrija	Dr. H. K. Verma	Effectiveness of instructional material designed on the basis of felt needs of the dairy framers of Punjab regarding common reproductive conditions
2016	Omer Khalil Baba	Dr. N. K Sood	Studies on diagnostic and prognostic markers in the serum and tissues of dogs affected with canine mammary tumour
2016	Ajaz Ahmad Zargar	Dr. C. K. Singh	Epidemiological studies of rabies in animals: patho-molecular approaches
2016	Ab. Qayoom Mir	Dr. Kirti Dua	Molecular epidemiology and diagnosis of bacterial and parasitic pathogens from faeces of wild ungulates and carnivores
2016	Riyaz Ajmed Bhat	Dr. P S Dhaliwal	Diagnostic and therapeutic studies on hemolytic anaemia in dogs
2016	Abhishek Gupta	Dr. S S Rath	Epidemiology of gastro-intestinal helminths in dairy animals with special reference to immunodiagnosis of bovine fasciolosis in Punjab
2016	Anupama Sharma	Dr. S P S Gill	Study on genotoxicity induced by lindane and deltamethrin in nice model and its public health significance
2016	Shaswati	Dr. T. S. Rai	Detection of Brucella and mycobacterium



	Subhdarshini Pany		infections with special emphasis on brucellosis
2017	Kalambhe Deepali Gopal	Dr. J P S Gill	Seroprevalence and molecular detection of zoonotic <i>toxoplasma gondii</i> in sheep and goats of north India
2017	Reeti Tewari	Dr. R S Aulakh	Quality assessment of surface and ground wated in Punjab
2017	Mandeep Singla	Dr. A. L Saini	Management manipulations for sustainability of beetal goats under stall-fed production system
2017	Subrat Kumar Dash	Dr. Shashi Nayyar	Effect of Terminalia arjuna on antioxidant status, metabolic profile and reproductive performance of buffaloes exposed to environment arsenic and lead pollution
2017	Pallvi	Dr. Dr. R S Aulakkh	Multi-residue detection of antibiotics in milk and role of dairy farm managerial practices in occurrence of residues
2016	Mamta Pandey	Dr. Ramneek	Evaluation of mammaglobin and matrix metalloprpteinase-3 (MMP-3) as diagnostic markers of canine mammary tumors
2016	Geetika Verma	Dr. R S Sethi	Expression of toll like receptors (TLR_4 and TLR_9) and inflammatory mediators (IL-1 $\beta$ and TNF- $\alpha$ ) vis-à-vis DNA fragmentation following ethion exposure
2016	Sandeep Kaur	Dr. C S Mukhopadhyay	Expression of toll like receptors (TLR-4 and TLR-9) and inflammatory mediators (IL-1 $\beta$ and TNF- $\alpha$ ) vis-a- vis DNA fragmentation following indoxacarb exposure
2016	Ashfauq Farooq Aga	Dr. Asha Dhawan	Efficacy of formulated diets and feeding strategies in the brood stock management of Inidan major carp Laboe rohita (Ham.)
2016	Anju Mohan	Dr. H M Saxena	Application of brucellaphage in therapy of brucellosis and as an adjunct to <i>brucella abortus</i> vaccine in cattle and buffaloes
2016	Amandeep	Dr. Randhir Singh	Molecular characterization of antibiotic resistant staphylococcus aureus of milk and milk products origin
2016	Paramjeet Ahir	Dr. Gursimran Filia	Molecular detection of mycobacterium bovis in milk of cattle and buffaloes suspected for bovine tuberculosis
2016	Gursher Singh Sidhu	Dr. Deepti Narang	Diagnosis of bovine tuberculosis in cattle and buffaloes with special reference to ESAT-6



			and CFP-10 antigens
2016	Subhra De	Dr. M P Gupta	Haemato-biochemical and therapeutic studies on ancylostomosis in dogs
2016	Pooja Devi	Dr. Digvijay Singh	Viability and expression pattern of cryopreserved mesenchymal stem cells derived from buffalo bone marrow
2016	Jasleen Kaur	Dr. Arun Anand	Clinical studies on the management of dental and mandibular affections in dogs
2016	Satinder Pal Singh Saini	Dr. S S Singh	Studies on the biological osteosynthesis of multifragmental fractures of long bones in canine using intramedullary interlocking nailing
2016	Nisha Sharma	Dr. Raman Narang	Studies on persistency of milk yield in crossbred cattle of different levels of exotic inheritance
2016	Ekta Singh	Dr. Paramjeet Kaur	Prevalence of gastrointestinal parasitism of small ruminants with special emphasis on molecular detection of benzimidazole resistance to <i>Haemonchus contortus</i> in sheep.
2016	Kaushlendra Singh	Dr. Harkirat Singh	A study on molecular epidemiology and risk factors of canine hepatozoonosis."
2016	Kumbagiri Subbaiah	Dr. J S Lamba	Nutritional evaluation of duckweed as alternate protein source in goats
2016	Palvi Thakur	Dr. B S Sandhu	Comparative studies on quantitative detection of rabies antibodies by ELISA and counter immuno electrophoresis
2016	Ankit Narang	Dr. Tarunbir Singh	Surgical management of long bone diaphyseal fractures by intramedullary interlocking nailing technique in bovine
2016	Priya Shukla	Dr. T. S. Rai	Studies on bacterial and mycotic skin affections of domestic animals with special reference to molecular methods in dermatophytosis
2016	Ankit Kumar Ahuja	Dr. R. S. Cheema	Investigation on developing cross reacting/anti sperm antibodies as a cause of infertility or subfertility in cross bred cows
2016	Arpan Sharma	Dr. Sandeep Kaswan	Effect of body condition score on performance of beetal goats.
2016	Suresh Kumar	Dr. Ravi Kant	Evaluation of broilers performace under coloured light emitting diodes.
2016	Omer Salih Elnoor	Dr. J S Hundal	Assessment of veterinary students' information literacy competencies and attitude towards e-



			learning.
2016	Sarmistha Kar	Dr. Randhir Singh	Molecular epidemiology of <i>Salmonella</i> species in poultry and human.
2016	Navjot Kaur	Dr. J S Bhatti	Evaluation of specialized training courses for farmers being organized by Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana.
2016	Pragya Yadav	Dr. Parminder Singh	Evaluation of ensiled sugar beet pulp ( <i>Beta vulgaris</i> ) as alternate roughage for dairy cows.
2016	Jyoti	Dr. R. S. Grewal	A study on the residual feed intake and performance of lactating crossbred cows fed silage based total mixed ration.
2016	Chaudhari Viraben Babulal	Dr. Ashwani Kumar Sharma	Diagnostic and therapeutic studies on cystic echinococcosis in cattle and buffaloes.
2016	Manoja V	Dr. S P S Saini	Development of an <i>in vitro</i> tool using S9 liver fraction from sheep and goat for the prediction of <i>in vivo</i> drug metabolism and time-dependent kinetics of lincomycin.
2016	Balaji C	Dr. S. K. Mahajan	Clinical studies on diagnosis and surgical management of corneal ulcers in dogs.
2016	Balreet Singh	Dr. Ashwani Kumar	Clinical study on localization and surgical management of gastro-intestinal obstruction in bovine.
2016	Manjeet Rathour	Dr. O P Malav	Efficacy of phyto-extracts as preservative for the storage stability of chevon rolls.
2016	Mehak Jandyal	Dr. Nitin Mehta	Efficacy of phyto-extracts as preservative for the storage stability of chevon rolls.
2016	Nawesha Kumari	Dr. Neelam Bansal	Histomorphological and histochemical studies on ovarian rete system of buffaloes ( <i>Bubalus Bubalis</i> ).
2016	Pooja Dogra	Dr. G S Dhaliwal	Comparative efficacy of norgestomet based estrus induction protocols in beetal goat.
2016	Debajit Debbarma	Dr. Varinder Uppal	Histomorphological and histochemical studies on regional variation in skin architecture of buffalo.
2016	Shweta Raghav	Dr. Opinder Singh	Histomorphological and histochemical studies on prenatal development of goat large intestine.
2016	Rajat	Dr. S P S Ghuman	Hypertonic saline and colloidal fluid therapy in dystocia affected buffalo.
2016	Maninder Jeet	Dr. Ajeet Kumar	Evaluation of fertility associated metabolites in



	Singh Shatab		breeding buffalo bulls and their male calves using nuclear magnetic resonance.
2016	Mohinderpal Singh	Dr. S S Dhindsa	A study on use of absorbable oxidized regenerated cellulose adhesion barrier during cesarean section in the buffalo.
2016	Derhasar Brahma	Dr. Deepti Narang	Studies on the molecular and immunological approaches in differentiation of pathogenic mycobacterial species and non-tuberculous mycobacterial species.
2016	Hitesh Raje	Dr. Kirti Dua	Study on water quality at zoo and possible risk to zoo animal health.
2016	Khushmeet Kaur	Dr. B. K. Bansal	Assessment of intramammary infections and their control in periparturient dairy cows.
2016	Deepika Sharma	Dr. Kuldeep Gupta	Studies on reticuloendotheliosis and marker's disease in poultry.
2016	Dinesh Kumar	Dr. A P S Sethi	Nutrient requirement of meat type birds reared in environment controlled broiler house.
2016	Manmeet Kaur	Dr. Amit Sharma	Performance of broiler chicks under different stocking densities in environment controlled vis-à-vis open-sided house.
2016	Dinesh Kumar	Dr. Nitin Mehta	Development of bioactive emulsion as preservative for the storage quality of chevon nuggets and balls.
2016	Sanghvi Vaibhavi Dharmendra	Dr. Sikh Tejinder Singh	Clinico-biochemical studies on failure of passive transfer of immunity in bovine calves.
2016	Thorat Sneha Ravindra	Dr. A P S Brar	Studies on important angiogenic markers of canine mammary tumour.
2016	Shalini Thakur	Dr. J S Bedi	Rapid diagnosis and treatment follow up of human brucellosis by sybr green based quantitative real-time polymerase chain reaction.
2016	Vishal Proch	Dr. B B Singh	Prediction of bovine brucellosis from occupationally exposed human brucellosis cases in Ludhiana, Punjab.
2016	Neharika Saxena	Dr. B B Singh	Epidemiological studies of caprine and ovine brucellosis and exploratory investigations for identification of a possible biomarker for brucellosis.
2016	Gurleen Kour	Dr. Mudit Chandra	Studies on antibiotic resistance genes among bacterial isolates causing mastitis in dairy animals.
2016	Vinny Dodiya	Dr. P S Brar	Studies on follicular dynamics and hormonal



			interventions to enhance fertility in Sahiwal cattle.
2016	Aarti Hansda	Dr. C S Randhawa	A diagnostic and therapeutic study on chronic diarrhoea with special reference to salmonellosis in crossbred cattle.
2016	Rakesh Kumar	Dr. Dhiraj K Gupta	Studies on prevalence and diagnosis of mastitis in dairy goats.
2016	Varun Puri	Dr. S. K. Uppal	Echocardiography in healthy and pericarditis affected cattle and buffaloes.
2016	Shameena K S	Dr. Navdeep Singh	A clinical study on the management of developmental orthopedic diseases in dogs.
2017	Rohini Bhardwaj	Dr. Yashpal	Effect of coarsely ground maize on the performance of sexed broiler birds.
2017	Gurwinder Singh	Dr. Sushma Chhabra	Trace mineral status and its relationship to clinic-haematological observations in goats of Punjab.
2017	Rasmeeek Kaur Brar	Dr. P S Dhaliwal	Clinico-Pathological and therapeutic studies on canine dermatitis with special reference to atopy.
2017	Poonam Bawa	Dr. J S Bedi	Persistent organic pollutants residues in the breast milk of mothers in Punjab and their health risk assessment in infants.
2017	Kirandeep Kaur	Dr. P. N. Dwivedi	Sero-prevalence and molecular detection of peste des petits ruminants virus (PPRV) in goats.
2017	Pruthviraj T N	Dr. Randhir Singh	Molecular epidemiology of <i>campylobacter</i> species from poultry and humans.
2017	Satnam Singh Mann	Dr. Navdeep Singh	Long term follow up of surgically treated gastro-intestinal affections in bovine with special reference to economics.
2017	Rubal	Dr. S P S Saini	Clinical efficacy of piperacillin alone and in combination with tazobactam, in the treatment of acute diffuse peritonitis in buffaloes.
2017	Simerjot Singh	Dr. Rajdeep Kaur	Disposition of cefquinome alone and in combination with tazobactam in cattle suffering from pericarditis.
2017	Shalinta Meenu Ekka	Dr. J P S Gill	Studies on genotypic diversity of <i>brucella</i> species in livestock and humans.
2017	Rajdeep Brar	Dr. Swarn Singh Randhawa	Endoscopic evaluation of upper respiratory tract in horses.
2016	Harpreet Kaur	Dr. Dipak Deka	Cloning, expression and characterization of



			bovine herpesvirus-1 (BHV-1) glycoprotein E (gE) as a potential diagnostic antigen.
2016	Chirag Uppal	Dr. R S Sethi	Studies on the dynamics of neutrophil during mastitis and metritis in buffalo.
2017	Sadhika Chauhan	Dr. Neeraj Kumar Singh	Cloning, sequencing and expression of pre-membrane gene of Japanese encephalitis virus.
2016	Farwah Muzaffar	Dr. Meera D Ansal	Effect of garlic ( <i>Allium sativum L.</i> ) supplemented diets on survival, growth, health and flesh quality of common carp, <i>Cyprinus carpio L.</i>
2016	Shubhkaramjeet Kaur	Dr. Vaneet Inder Kaur	Effect of dietary supplementation of carotenoids and vitamin C on survival, growth, pigmentation and antioxidant responses in freshwater ornamental fish koi carp, <i>Cyprinus carpio</i> (Linnaeus).
2016	Navjot Kaur	Dr. Prabhjeet Singh	Study of different fish biomarkers to assess the impact of pollution in river Sutlej.
2016	Sarbjeet Kaur	Dr. Prabhjeet Singh	Ecochemical assessment of water, sediment and selected fishes of river Sutlej.
2016	Jagdeep Kaur	Dr. Ajeet Singh	Study on methionine modulated bioavailability of inorganic zinc in common carp ( <i>Cyprinus carpio L.</i> ) fed with diets containing tricalcium phosphate.
2016	Injeela Khan	Dr. Asha Dhawan	Effect of Aloe vera supplemented diets on survival, growth, health and flesh quality of common carp, <i>Cyprinus carpio L.</i>
2016	Rajender Kumar	Dr. S Shiva Kumar	Studies on development of paneer nuggets and evaluation of its storage stability.
2016	Wathatkar Mithilesh Mahadev	Dr. S Shiva Kumar	Development and quality evaluation of apicy paneer using oleoresins.
2016	Ravneet Singh Brar	Dr. Inderpreet Kaur	Sustainability of small and medium sized dairy farmers amidst the existing milk supply chain in Punjab state.

### College of Veterinary Science

The College of Veterinary Science was set up in 1969 as a constituent college of Punjab Agricultural University, Ludhiana. The college was transferred to Guru Angad Dev Veterinary and Animal Sciences University in 2006. The college was created to be a centre of regional, national and international excellence in teaching, research and learning in animal health and production. It carries out teaching, research and extension education programmes pertaining to



livestock production and health and has been instrumental in ushering in an era of ‘White Revolution’ in the state.

The college has highly competent and experienced faculty members who have made significant contributions in research on animal health and production and won various national and international awards. The college is recognized by the Veterinary Council of India and is accredited with the Indian Council of Agricultural Research (ICAR) for UG and PG programs. The Minimum Standards of Veterinary Education for Degree Course (B.V.Sc. & A.H.) Regulations, 1993 of Veterinary Council of India (VCI), subsequently revised in 2008 and 2016, have been implemented in the college. External examination system for B.V.Sc. & A.H. programme was introduced from the year 1998 onwards. The college has three ICAR Centres of Advance Faculty Training (CAFT) in the Departments of Veterinary Surgery & Radiology and Veterinary Gynaecology and Obstetrics. A new CAFT has been sanctioned to the Department of Veterinary Pathology.

The College of Veterinary Science has 17 departments having excellent laboratory facilities and adequate infrastructure for undergraduate and postgraduate teaching and research, and a well-equipped teaching Veterinary hospital to cater to the needs of large and small animal health care. In addition, the college also has an elite dairy herd and a poultry farm for teaching and research.

The programme leading to the award of B.V.Sc. & A.H. degree is designed to equip graduates with the knowledge and skills essential for a Veterinary career. The College of Veterinary Science has introduced 5 ½ years BVSc&AH program from 2016-17 as per the VCI norms of MSVE. The programme is divided into three phases. The pre-clinical phase, undertaken in years one and two, provides education in basic sciences such as anatomy, physiology and biochemistry, as well as in animal husbandry through intramural learning. The para-clinical phase, undertaken in years three and four, includes bridging subjects between the pre-clinical and clinical phases, such as Pathology, Microbiology, Parasitology and Pharmacology. The clinical phase (Surgery, Medicine and Gynaecology) starts in year four and culminates in the fifth year. At the end of the course work (9 semesters), the students undergo a compulsory rotational internship programme of six calendar months on training in diagnostic laboratories, clinical practice and animal production technology. The programme aims to enrich the knowledge of the students to be professionally competent and prepared to face the professional challenges. The successful completion of B.V.Sc. & A.H. programme entitles the graduates to seek mandatory registration with the Punjab State Veterinary Council / Veterinary Council of India as Registered Veterinary Practitioner.

**Student intake capacity**

<b>Programme</b>	<b>Available seats</b>
B.V.Sc. & A.H. (5 years)	<b>60</b> -for residents of Punjab State and Union Territory of Chandigarh <b>9</b> -Nominees of the VCI <b>12</b> -NRI candidates <b>9</b> -Self financed seats
M.V.Sc. (2 years)	<b>50</b> -for residents of Punjab State and Union Territory of Chandigarh <b>42</b> -Nominees of the ICAR <b>10</b> -NRI candidates Self financed seats (two in each discipline)
Ph.D. (3 years)	<b>35</b> -for residents of Punjab State and Union Territory of Chandigarh <b>05</b> - NRI candidates Self financed seats (two in each discipline)

**College of Dairy Science and Technology**

The College of Dairy Science and Technology was established in the year 2008 at Ludhiana as one of the constituent colleges of the Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (Punjab). The major objective of the college is to produce trained human resource through its undergraduate and post graduate programmes to meet the technical manpower requirements of dairy and food processing industries, government departments and R&D organizations. 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 of Dairy Science and Technology. Presently, the college is offering a 4-year programme in B. Tech. (Dairy Technology) and a 2-year programme in M. Tech. (Dairy Technology / Dairy Engineering / Dairy Microbiology) along with M. Sc. (Dairy Economics and Business Management), which are unique job oriented courses for the overall development of students as highly professional dairy specialists through value based education, research and training in dairy science and technology.

The four year B. Tech. (Dairy Technology) programme is a unique job oriented course for the overall professional development of dairy specialists to meet the requirements of industry, research and development. The programme follows the course curriculum as recommended by the 5<sup>th</sup> Deans' Committee constituted by the Indian Council of Agricultural Research, New Delhi. The programme has been structured into eight semesters. The first six semesters include the courses (theory and practicals) on Dairy Technology, Dairy Engineering, Dairy Chemistry, Dairy Microbiology and Dairy Economics & Business Management. Seventh and eighth semesters include in-plant training practicals on different aspects of Dairy Technology. M.Tech. and M.Sc. programmes in the College of Dairy Science and Technology have been started to strengthen the research programmes of the college. Under both undergraduate and postgraduate programmes, the students are exposed to every aspect of equipment designing, technology of product making and quality assurance.



### Capacity of student intake

Programme	Available seats
B.Tech. (Dairy Technology) (4 years)	25-for residents of Punjab State and Union Territory of Chandigarh 4-Nominees of the ICAR 3-NRI candidates 2-Nominees from other states not having College of Dairy Science and Technology
M.Tech. (Dairy Technology, Dairy Engineering and Dairy Microbiology) M.Sc. (Dairy Economics) (2 years)	5-for residents of Punjab State and Union Territory of Chandigarh 5-Nominees of the ICAR

### College of Fisheries

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 has competent and experienced faculty and is well equipped with both laboratory and farm facilities including instructional farm for experiential learning, trainings and demonstrations, to carry out teaching, research and extension activities efficiently. The college offers the following programmes of study:

Degree programme	Discipline	Intake capacity
B.F.Sc.	Fisheries	18*+3**
M.F.Sc.	Aquaculture	6+2**
M.F.Sc.	Fisheries Resource Management	2+1**
Ph.D.	Aquaculture	2 +1**
Diploma in Inland Fisheries	Inland Fisheries	5***
<b>New Introductions</b>		
M.F.Sc. (Approved for initiation from academic year 2017-18)	Aquatic Environment Management	2 +1**
Ph.D. Initiated in academic year 2016-17	Fisheries Resource Management	2 +1**

\*for residents of Punjab and Union Territory of Chandigarh; \*\*ICAR Nominees

\*\*\*For in-service candidates of State Fisheries Department

Over a short span of 8 years, since its establishment in 2008, the College of Fisheries, GADVASU 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 5<sup>th</sup> Deans' Committee of the 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, marketing and trading, economics and statistical methods and extension education. During the 7<sup>th</sup> semester the students undergo on-campus experiential learning programme and take up in-plant training during the 8<sup>th</sup> semester, which includes practical training at aqua-farms, hatcheries, feed industry, fish markets and processing/value addition units. The curriculum of M.F.Sc and Ph.D. in Aquaculture is also based on ICAR regulations covering both theory and research in the field of advanced aquaculture technologies and fisheries resource management. New M.F.Sc. degree programme in 'Aquatic Environment Management' has been approved for initiation from academic year 2017-18, while Ph.D. in Fisheries Resource Management was initiated during the academic year 2016-17. One year Diploma in Inland Fisheries is offered to the sponsored in-service candidates of the State Fisheries Department. The College of Fisheries has four departments namely Aquaculture, Fisheries Resource Management, Aquatic Environment, Harvest and Post-harvest Technology.

### **Postgraduate Institute of Veterinary Education and Research**

Postgraduate Institute of Veterinary Education and Research (PGIVER) was established in 2007 to give impetus to specialized and need-based research and imparting training to graduates of various disciplines. The basic objectives are to develop and strengthen postgraduate education, research and training programs. The priority areas are molecular biology, biotechnology, diagnostics, bioinformatics, communication technology including computer education and business management. The other objectives of PGIVER include strengthening of embryo transfer technology for better productivity in relation to milk, meat and disease resistance, development of molecular techniques for production of better diagnostics, genetically defined marker vaccines and transgenic organisms for producing animal products of superior quality and identification of physiological, biochemical, molecular and cytogenetic markers for early selection of animals and poultry for increased production and quality products.

The objectives of PGIVER include the following:

- To develop and strengthen post graduate education, research and training programs.
- To strengthen embryo transfer technology for better productivity.
- To develop molecular techniques for diagnostics, production of genetically defined marker vaccines, and identification of physiological, biochemical, molecular and cytogenetic markers for early selection of animals and poultry birds in order to produce the quality products and increase the productivity.
- To have super specialty teaching/referral hospital for equine, companion and wild animals.
- To establish a centralized laboratory of international standards to deal with emerging diseases of livestock and poultry.

### **School of Animal Biotechnology**

The School of Animal Biotechnology was established in February, 2008 under the aegis of



PGIVER. In view of the progress made by the department, and the opportunities available in biotechnology, the university established the School of Animal Biotechnology in September 2010 by upgrading the department with the mandate to integrate and strengthen research in various facets of molecular biology with the aim of improving livestock productivity and health, and to produce professionally trained manpower.

The broad mandates of the School of Animal Biotechnology include:

- To generate scientific expertise and human resource in various facets of animal biotechnology
- To develop specialized and state of the art facilities for research in cutting edge fields of biotechnology
- To undertake research in different areas of molecular biology and biotechnology for improving animal health and productivity.

Presently the school is offering the following programs of study:

- M.V.Sc./ M.Sc. (Animal Biotechnology)
- Ph.D. (Animal Biotechnology)

The university academic council has approved an undergraduate programme in Biotechnology (B. Tech.) from 2017-18. 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.

**Capacity of student intake**

Programme	Available seats
M.V.Sc. (2 years)	2-for residents of Punjab State and Union Territory of Chandigarh 1-Nominee of the ICAR 8-Nominees of JNU
M.Sc. (2 years)	4-for residents of Punjab State and Union Territory of Chandigarh
Ph.D. (3 years)	4-for residents of Punjab State and Union Territory of Chandigarh 2-for candidates having scholarships/fellowships from national funding agencies

**Veterinary Polytechnic, Kaljharani (Bathinda)**

With an aim to produce trained supporting man power capable of handling livestock health, production and milk procurement, GADVASU has established a Veterinary Polytechnic at Kaljharani, District Bathinda in 2010 for imparting Diploma in Veterinary Science & Animal Health Technology. The diploma has been designed for generating trained manpower to support and complement Veterinary practitioners in a better way, in order to provide better care and guided treatment to domesticated animals within Veterinary hospitals, Veterinary colleges, research institutes etc.

**Capacity of student intake**

Programme	Available seats
Diploma in Veterinary Science & Animal Health Technology (2 years)	70-for residents of Punjab State and Union Territory of Chandigarh 2-For residents of Kaljharani, Bathinda



## **Placement Cell**

The Placement Cell of the university acts as a unit for liaison between 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 the interests and talents of the student to choose the area of work. The main objectives of the Placement Cell include:

- To create a database of the alumni who have achieved a landmark in the society,
- To create a database of probable recruiters including industries and different organizations,
- To act as a liaison unit for plugging the gap between industry and fresh professionals to speed up the process of recruitment,
- To organize informative seminars to make the students aware about the opportunities abroad and for their preparation for the qualifying examinations,

The Placement Cell of the university is putting efforts for the on-campus and off-campus placement of the university students. Milkfed, Punjab conducted online campus placement and recruited twenty six (26) students of Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana as 'Management Trainees' against the posts of Milk Procurement Assistant. Two (2) diploma students were engaged by PFA, Chandigarh as Veterinary Pharmacists. Two (2) Veterinary graduates were engaged as Route Officers by Nestle, India. Milkfed, Punjab has also recruited sixteen (16) Veterinary graduates and ten (10) Dairy Technologists of the university as Management Trainees against the posts of Deputy Manager. The Placement Cell organized a lecture on "Fulbright-Nehru and Fulbright Fellowship Opportunities to the U.S." on Feb. 21, 2017. Ms Pratibha Nair, Programme Coordinator, United States-India Educational Foundation (USIEF), the Fulbright Commission in India, New Delhi discussed about various Fulbright programmes, eligibility criteria, application procedure, tips on writing a strong application, review process and selection criteria. About 100 postgraduate and doctoral students and faculty members participated in the seminar.

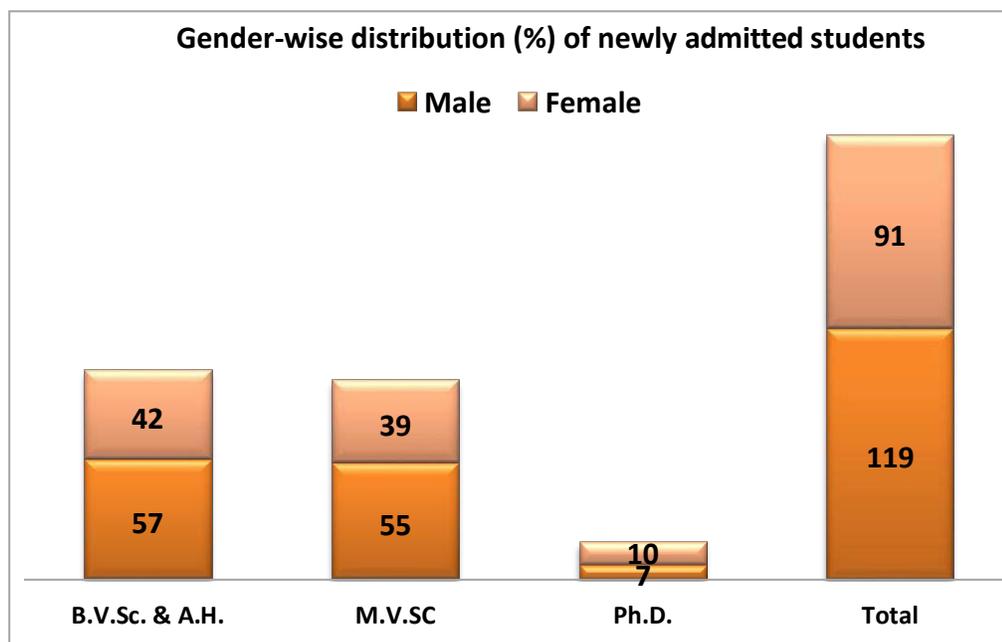
## **Nodal Cell, ICAR**

The university has established a Nodal Cell to coordinate various activities of the Education Division of the ICAR and the university under various schemes. The nodal cell functions as a Single Window System and provides all requisite information to the Agricultural Education Division. The Dean, Postgraduate Studies, Dr. Simrat Sagar Singh has been designated as the Nodal Officer and Dr. Amarjit Singh, Professor of Veterinary Pathology as the Incharge, Nodal Cell. The Monitoring and Review Team of Education Division of Indian Council of Agricultural Research (ICAR) visited Guru Angad Dev Veterinary and Animal Sciences University (GADVASU), Ludhiana on December 14, 2016 to review the ICAR Development grant. The committee appreciated the efforts made by the university to utilize the funds provided by the Education Division of ICAR for development of infrastructure, and undergraduate and postgraduate teaching facilities.

## TEACHING

### College of Veterinary Science

The total number of students admitted in the College of Veterinary Science for the session 2016-17 was 210 which included 99 in B.V.Sc. and A.H., 94 in M.V.Sc. and 17 in Ph.D. program. Among 199 students admitted, 119 were male and 91 were female. The gender-wise distribution of male and female students admitted in different programmes of College of Veterinary Science is shown below:



During 2016-17, a total of 150 students successfully completed their degrees, of which 83, 57 and 10 students completed B.V.Sc. & A.H., M.V.Sc. and Ph.D. programmes in different disciplines, respectively.

### Scholarships / Fellowships

The university awards merit scholarships to students for academic excellence. During 2016-17, university merit scholarship was given to 50 BVSc&AH, 50 M.V.Sc. and 18 Ph. D. students. Ten undergraduate students admitted through an all India entrance examination were awarded National Talent Scholarship. Junior Research Fellowship of ICAR was awarded to 7 M.V.Sc students and Senior Research Fellowship to 2 Ph.D. scholars. Ten students received INSPIRE fellowship.

### Courses taught

The undergraduate students of the college were offered courses as per the course curriculum of Veterinary Council of India. The 1<sup>st</sup> professional B.V.Sc. & A.H. students were offered courses as per Veterinary Council of India – Minimum Standards of Veterinary Education Degree Course (B.V.Sc & A.H.) Regulations, 2016 whereas 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> professional B.V.Sc. & A.H. students were offered courses as per Veterinary Council of India – Minimum Standards of Veterinary Education Degree Course (B.V.Sc & A.H.) Regulations, 2008. The 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year students were offered 43 courses in the Semester I and 40



courses in Semester II whereas first year students were offered four courses according to the new VCI guidelines. The postgraduate students were offered courses in their respective major, minor and supporting fields as proposed by the advisory committee of the student and duly approved by the Dean, Postgraduate Studies.

**Internship program**

After completion of course work in nine semesters, 83 B.V.Sc. and A.H. students of 2012 Batch were registered to the six months compulsory internship programme. The students underwent training program in 6 departments (Veterinary Medicine, Epidemiology and Preventive Medicine, Veterinary Surgery and Radiology, Veterinary Gynaecology and Obstetrics, Livestock Production Management and Teaching Veterinary Clinical Complex) for a period of 6 months.

**All India Study Tour**

Eighty four students of B.V.Sc. & A.H. (2012 batch) participated in the All India Study Tour from December 2016 to January, 2017. The students visited various Veterinary Colleges, National Institutes, and places of academic interest at Mumbai, Goa, Bengaluru and Hyderabad.

**Teaching Veterinary Clinical Complex**

**Clinical cases registered in the hospital from Jan 1 to Dec 31, 2016**

	Medicine	Surgery	Gyanecology	Total
<b>Small animals</b>	14739	5022	474	20235
<b>Large animals</b>	4761	2172	915	7848
<b>Total</b>	<b>19500</b>	<b>7194</b>	<b>1389</b>	<b>28083</b>

**Number of laboratory samples tested from Jan 1 to Dec 31, 2016**

Pathology			Parasitology			Biochemistry	Total
blood	cytology	urine	blood	fecal	skin		
7172	758	338	3088	737	323	1690	<b>14106</b>

**National Cadet Corps**

Three cadets of 1 Punjab R&V Sqn NCC participated in various equestrian activities during Republic Day Camp and Prime Minister Rally and won one Bronze Medal. A girl cadet of 1 Pb R & V SQN NCC won a Silver Medal in Punjab State Equestrian Championship. Ten cadets appeared for NCC “C” certificate exam and 69 cadets appeared for NCC “B” certificate exam. Annual Training Camp at NCC Academy, Malout was attended by 79 cadets while 15 SD cadets attended Army Attachment Camp at Remount Veterinary College and Centre, Meerut. NCC week was celebrated in which cadets participated in various activities like Painting competition, Declamation, awareness rallies against social evils and Run for Fun and Good Health. International Day for Girl Child was celebrated and girls were made aware about their rights and against the social evils in the society.

**College of Fisheries**

**Courses offered to UG/PG students**

The college offered 56 UG (BFSc), 19 PG (MFSc) 12 doctoral (PhD) and 2 diploma (PGDIF) courses.

**Gender representation in admissions**

Programme	Current strength of students		Students enrolled during 2016-17	
	Boys	Girls	Boys	Girls
B.F.Sc	35	24	13	08
M.F.Sc (Aquaculture)	06	07	05	03
M.F.Sc (Fisheries Resource Management)	01	04	--	03
PGDIF	--	--	--	--
Ph.D. (Aquaculture)	02	02	--	--
Ph.D. (Fisheries Resource Management)	--	02	--	03
<b>Total</b>	<b>44</b>	<b>39</b>	<b>18</b>	<b>17</b>

**Scholarships / Fellowships to students**

Degree	Scholarship / Fellowship	No. of students
B.F.Sc.	University Merit Scholarship	14
	National Talent Scholarship	--
	Mata Inder Kaur Award	03
	Dr. G.S. Khush Scholarship	03
M.F.Sc.	GADVASU Merit Fellowship	07
Ph.D.	GADVASU Fellowship	01

**Theses / Dissertations completed during 2016-17**

Year	Name of the student	Title of thesis / dissertation
<b>M. F. Sc.</b>		
2016	Farwah Muzaffar	Effect of garlic ( <i>Allium sativum L.</i> ) supplemented diets on survival, growth, health and flesh quality of common carp, <i>Cyprinus carpio L.</i>
2016	Injeela Khan	Effect of <i>Aloe vera</i> supplemented diets on survival, growth, health and flesh quality of common carp, <i>Cyprinus carpio L.</i>
2016	Jagdeep Kaur	Study on methionine modulated bioavailability of inorganic zinc in common carp ( <i>Cyprinus carpio L.</i> ) fed with diets containing tricalcium phosphate
2016	Shubhkaramjeet Kaur	Effect of dietary supplementation of carotenoids and vitamin C on survival, growth, pigmentation and antioxidant responses in freshwater ornamental fish koi carp, <i>Cyprinus carpio</i> (Linnaeus)
2016	Navjot Kaur	Study of different fish biomarkers to assess the impact of pollution in river Sutlej
2016	Sarbjeet Kaur	Ecochemical assessment of water, sediment and selected fishes of River Sutlej
2017	Harmanpreet Kaur	Studies on water quality, fish diversity and flesh quality of commercially important finfishes of Harike Wetland, Punjab
<b>Ph. D.</b>		
2016	Asfauq Farooq Aga	Efficacy of formulated diets and feeding strategies in brood stock management of Indian Major Carp <i>Labeo rohita</i> (Ham.)

**College of Dairy Science and Technology**

During the session 2016-17, the total admissions made in various programs were 39, which included 30 in B.Tech. (Dairy Technology) and 9 in M.Tech. (Dairy Technology). Out of these, 33 were male and 6 were female students.

**Courses Taught**

The undergraduate students were offered courses as per the recommendations of 5<sup>th</sup> Deans' Committee constituted by ICAR, New Delhi. The B. Tech. students were offered 26 courses. The college offered 14 PG courses to the students during 2016-17.

**In – plant training**

- Total 17 students of final year B.Tech. (Dairy Technology) programme are undergoing their in-plant training at various milk plants of Milkfed, Punjab.
- M. Tech. (Dairy Technology) student Rajinder Kumar achieved I rank in 21<sup>st</sup> ICAR SRF (PGS) examination 2016.



- Three final B. Tech. (Dairy Technology) students got placed in Milkfed for the posts of Deputy Manager.
- One final year B. Tech. (Dairy Technology) student Tarunvir Singh Sandhu got admission in ABM programme at MANAGE, Hyderabad.
- M. Tech. (Dairy Technology) student Mr Gurbrinder Singh participated in AIU North Zone Students' Research Convention 2017 - "Anveshan" during January 20-21, 2017 at Chitkara University, Rajpura (Punjab).

### All India Study Tour

At the end of the course curriculum, students are required to go to a mandatory educational tour to various dairy plants across the country to get valuable knowledge and exposure of dairy sector across the states. The objective is to provide education with quality and excellence to our students promptly and exclusively. Educational tour of the B.Tech. (Dairy Technology) final year students (Batch 2013) was conducted from 9-15 January, 2017. The students visited various dairy plants viz. Mother Dairy, Delhi, AMUL, Anand, Vidya Dairy Plant, Anand, AMULFED, Gandhinagar and Saras dairy, Jaipur during the tour.

### Scholarships / Fellowships

University Merit Scholarship was awarded to 17 students. Four students received S. Gurdev Singh Khush Scholarship.

### List of students who obtained M. Tech. degrees

Sr. No	Name	Month & year of completion	Major subject and title of thesis
1	Rajender Kumar	July, 2016	DAIRY TECHNOLOGY: "Studies on development of paneer nuggets and evaluation of its storage stability"
2	Watharkar Mithilesh Mahadev	July, 2016	DAIRY TECHNOLOGY: "Development and quality evaluation of spicy paneer using oleoresins"
3	Ravneet Singh Brar	September, 2016	DAIRY ECONOMICS: "Sustainability of small and medium sized dairy farmers amidst the existing milk supply chain in Punjab state"

### School of Animal Biotechnology

The Department of Animal Biotechnology, established in February, 2008 was upgraded and renamed as School of Animal Biotechnology and entrusted with the broad mandates to undertake teaching and training in various facets of animal biotechnology, to generate scientific expertise and human resource and to develop specialized and state of the art facilities for research in cutting edge fields of biotechnology.

**Academics and Teaching:**

Total number of students admitted for the session 2016-17 was 12 which included 09 in M.V.Sc. / M.Sc. and 3 in Ph.D. programs. Among these, 10 were girls. During this year 05 students successfully completed their PG program. A total of 24 courses were offered during the year which included one for UG, 12 for Master's and 11 for PhD students. Three students were awarded DBT Merit Scholarship on the basis of All India Entrance Test. During 2016-17, one student got ICAR JRF and four postgraduate students received University Merit Scholarship.

**Theses / Dissertations completed during 2016-17****M.Sc. (Animal Biotechnology)**

S. No.	Name	Month & year of completion	Major subject and title of thesis
1.	Harpreet Kaur	April, 2016	Animal Biotechnology: "Cloning, expression and characterization of bovine herpesvirus-1 (BHV-1) glycoprotein E (gE) as a potential diagnostic antigen"
2.	Chirag Uppal	December, 2016	Animal Biotechnology: "Studies on the dynamics of neutrophils during mastitis and metritis in buffalo"
3.	Sadhika Chauhan	December, 2016	Animal Biotechnology: "Cloning, sequencing and expression of pre-membrane gene of Japanese Encephalitis Virus"

**Ph.D. (Animal Biotechnology)**

Sr. No.	Name	Month & year of completion	Major subject and title of thesis
1	Mamta Pandey	April, 2016	Evaluation of mammaglobin and matrix metalloproteinase-3 (MMP-3) as diagnostic markers of canine mammary tumors
2	Geetika Verma	May, 2016	Expression of toll like receptors (TLR_4 and TLR_9) and inflammatory mediators (IL-1 $\beta$ and TNF- $\alpha$ ) vis-a-vis DNA fragmentation following ethion exposure
3	Sandeep Kaur	May, 2016	Expression of toll like receptors (TLR_4 and TLR_9) and inflammatory mediators (IL-1 $\beta$ and TNF- $\alpha$ ) vis-a-vis DNA fragmentation following indoxacarb exposure

**Veterinary Polytechnic Kaljharani, Bathinda:**

The Veterinary Polytechnic at Kaljharani, District Bathinda imparts Diploma in Veterinary Science and Animal Health Technology. During the year, 19 courses were offered to diploma students. Post Matric Scholarship of Punjab State Govt. for SC/BC/OBC and Minority students was given to eligible students.



**Oath Taking Ceremony of graduating Veterinary students**



**Lt: Ambulatory service of GADVASU; Rt: Veterinary students taking care of a sick bird**



**Recently passed out young Veterinarians of 2011 batch**



**Ultrasonography of a buffalo at TVCC**



**Operation of an animal at TVCC**



**Training of a GADVASU clinician abroad**



**Annual Prize Distribution Function at College of Fisheries**



**All India Educational Tours of B. F. Sc. Students**

**RESEARCH**

Undertaking need based research on different aspects related to production and health of various livestock species, poultry and fisheries forms an integral part of the mandate of the university. During the year 2016-17, a total of 109 new project proposals were submitted to various funding agencies, viz. Indian Council of Agricultural Research, Department of Biotechnology, Department of Science and Technology including SERB, Indian Council of Medical Research, UGC and others. During the year 2016-17, a total of 178 research schemes were operational.

Funding agency	Number of schemes
ICAR Schemes	33
UGC	15
DBT/DST and others	29
Miscellaneous Schemes	14
RKVY Schemes	43
Punjab Government	44
<b>Total</b>	<b>178</b>

**Research proposals submitted during the year 2016-17**

Title of the Project	Funding agency
Endothelial to mesenchymal transition in pulmonary fibrosis	SERB
Epidemiology of diarrhoeal infections of protozoan origin with special reference to distribution of potentially zoonotic <i>Giardia duodenalis</i> genotypes among animals and humans in one health perspective	ICMR
Establishment of Pig Breeding Farm for augmenting scientific pig production in Punjab	Rashtrya KrishiVikasYojana (RKVY)
Potential of new varieties of maize crop as silage	Limagrains, Bisco Bio Science Pvt Limited, Secunderabad, Telangana
Impact of limonin on the performance of commercial broilers	Punjab Agro Juices Ltd, Chandigarh
Amelioration of aflatoxicosis in poultry with limonin	Punjab Agro Juices Ltd, Chandigarh
A study on factors affecting the chemical parameters of milk fat/ghee in Punjab with special reference to Reichert Meissl (RM) and Polenske value (PV)	Milkfed, Punjab
Impact of digital tools on students' and farmers' learning process	ICAR
Establishment of water quality testing laboratory and integrated fish farming demonstration units at Krishi Vigyan Kendra (KVK), Barnala	NFDB, Hyderabad
Establishment, genetic improvement and conservation of Nili Ravi buffalo herd	ICAR
Propagation of elite Sahiwal cows through embryo transfer technology for sustainable milk production in Punjab state	RKVY
A novel approach to predict superovulatory response of indigenous	DBT



Sahiwal cattle and their conservation and propagation through improved embryo transfer technology	
Optimization of ovum pick up and <i>in vitro</i> embryo production (OPU-IVP) techniques for multiplication of superior Sahiwal cattle	DBT
Establishment of integrated farming system demonstration units in the KVK for creating awareness among farmers of S.A.S. Nagar (Mohali)	National Rainfed Area Authority of India
Impact of early detection and treatment of moderately lame cattle on disease progression and milk production	DST
Experiential learning for hands on training- regarding neutering and spaying in dogs	ICAR
Development of arthroscopy for the diagnosis and management of intra-articular lesions in bovines and equines	DST
Antibiotic resistance: Animal-human interface	ICAR
Evaluation of anticancerous and cytoprotective potential of indigenous plants <i>Dalbergia sissoo</i> , <i>Calotropis gigantea</i> , <i>Calandula officinalis</i> and <i>Murraya koenigii</i> against experimentally-induced genotoxicity in mice	Ministry of AYUSH
Cytotoxic and genotoxic potential of pesticides and its amelioration with conventional and indigenous means <i>in vitro</i>	SERB
Exploring the darker side of mobile phones in the possible transmission of bacterial infections to humans	ICAR
Epidemiology of antimicrobial resistance in selected bacterial genera of canines	DBT
Leptospirosis in Northern India: A study of burden determinants, perceptions and control policies in a changing ecology	GCRF, MRC, London
Cellular antioxidant status as related to heavy metal exposure in buffaloes	MOE, GOI
Modelling exposure to milk borne hazards in the Punjabi dairy chains to inform food safety policy	GCRF, London
A novel phage lysate vaccine for Brucellosis in goats	GALVMed
To identify the cause of vaccination failure of CPV in Punjab and to develop a real time PCR to differentiate all the prevalent types of CPV	DBT
Development of a diagnostic assay for antigenic typing of Canine Parvovirus and to develop virus-like-particles as a vaccine against the prevalent antigenic type	DBT
Studies on the prevalence of New Castle Disease in Punjab and development of a new DNA vaccine against Newcastle Disease	RKVY
Epidemiology of antimicrobial resistance in selected bacterial genera of canines	DBT
NAE on antimicrobial resistance: Animal - human interface	ICAR
Diagnosis of important diseases affecting central nervous system of bovines using conventional and advanced diagnostic techniques	RKVY
Evaluation of a Bovine Adenovirus field isolate for its suitability as a vaccine / gene delivery vector	RKVY
Diagnostic and prognostic evaluation of canine mammary tumour as a model for human breast cancer	DBT
Development and evaluation of therapeutic xenogenic DNA vaccines based on canine homologous marker sequences against mammary tumors in mice models	DBT
Diagnostic and prognostic evaluation of canine mammary tumour as a model for human breast cancer	DBT
Studies on development of recombinant proteins based ELISA for	DBT



diagnosis of canine leptospirosis	
Omic studies to predict the pulmonary damage following co-exposure to poultry barn and endotoxin	ICMR
Using omic studies to predict the pulmonary damage in growing children following combined insecticide - endotoxin exposure	ICMR-BBF (Indo-German)
Studies on the molecular epidemiology of Porcine Parvovirus (PPV) and Porcine Type 2 Circovirus (PCV-2) - the major causative agents of reproductive problems in pigs	ICAR
Molecular characterization of Canine Distemper Virus field isolates for selection of suitable vaccine candidate and establishment of a CDV rescue system from full length cDNA clone	DBT
Multiplex-Polymerase Chain Reaction based detection of tick borne canine haematozoan diseases	DBT
Epidemiology of gastrointestinal parasitism with special reference to poultry coccidiosis and its management	RKVY
Epidemiological studies on canine gastrointestinal parasitic infections and their zoonotic potential	DBT
Epidemiology of zoonotic diarrhoeal infections of protozoan origin with emphasis on distribution of <i>Giardia duodenalis</i> genotypes among animals and humans in one health perspective	ICMR
Utilization of plant based natural resources for animal productivity : Biochemical and physiological concepts for undergraduate Veterinarians	Agricultural Education Division, ICAR
Identification of gaps in veterinary education in veterinary universities of Punjab and Haryana and making suggestions for improvement	Agricultural Education Division, ICAR
Acute Phase Proteins as biomarkers for clinical monitoring in animal herd health	DST, SERB, Govt. of India
Impact of heavy metal exposure in buffaloes: Assessment of biomarkers, cellular adaptation for environmental contaminants and amelioration	Ministry of Environment, Forest & Climate Change, Government of India
Conservation and improvement of Kajali sheep for mutton production under stall fed conditions	ICAR
Experiential learning in scientific intensive pig production	ICAR
Establishment of instructional layer farm to develop entrepreneurship skills in graduating students	ICAR
Establishment of Beetal Goat Breeding Farm for enhancing scientific goat production in Punjab	RKVY
Expression of biomarkers of morphological disruption in placenta of ruminants in relation to abortions associated with environmental pollutants	DBT
Bioactive biodegradable composite films for the extension of shelf life of livestock products (Revised proposal submission)	DST, GOI
Identification and characterization of genes responsible for subestrus / anestrus in water buffalo ( <i>Bubalus bubalis</i> )	DBT
Metagenomic analysis of genital tract of healthy and diseased animals to understand the microbes assisting in normal reproduction and also in infertility	DBT
Ultrasound radiation and immunocontraception: Non-invasive methods for sterilization in stray dogs	BARC, BRNS, Mumbai
Fertility evaluation of cross-bred bulls on the basis of fertility associated sperm proteins	ICAR, NASF, New Delhi



Immunocontraception in female dogs: Active immunization against PH-20 and LDHC <sub>4</sub>	Department of Biotechnology, Min of Science and Tech. GOI
Improving postpartum uterine health through intrauterine proteolytic enzyme therapy in dairy animals	ICAR
Development of ICT tools and assessment of its impact on teaching and learning of veterinary students	ICAR
Reducing age at puberty in male calves	RKVY,
Biomarker-based fertility prediction in buffalo males during calthood stage	Department of Science and Technology
Effects of herbal fertility enhancer “SireKing powder” on endocrine status, antioxidant activity, libido, semen quality and fertility of cattle and buffalo bulls	Indian Herbs Specialties Pvt. Ltd, Sharanpur, UP
Antibiotic resistance: Animal-human interface	Niche Area of Excellence, ICAR
Assessment of current practices, related risks and policy development for carcass disposal ecosystem in Punjab, India	RKVY
Towards climate resilient milk production system in Punjab	NABARD
Estimating requirement of postgraduate specialists in Veterinary Sciences for field and academic institutions in the country	ICAR
To study effect of herbal formulations during transition period on oxidative status in dairy animals	Indian Herbs
Centre of Excellence in Canine Healthcare (CECH) at GADVASU, Ludhiana	DBT
Epidemiological studies on fading puppy syndrome	DBT
Epidemiology, risk factors, diagnostic biomarkers and management of obesity in canines	DBT
Epidemiology, diagnosis and therapeutic management of cardiac disorders in canines	DBT
Prevalence, diagnosis and management of endocrine disorders of dogs and role of pesticides, insecticides as endocrine disruptors	DBT
Characterization and antimicrobial resistance in <i>Salmonella</i> , <i>Staphylococcus aureus</i> and <i>Escherichia coli</i> of food and animal origin	WHO
Study on udder health and lameness in Sahiwal cows	RKVY
Assessment of drinking water quality in the Indian zoo, related wildlife health impacts and its public health implications	ICAR
Improving livestock health in the fluorotic areas of Punjab by adopting mitigation strategies	ICAR
Improving livestock health in the flourotic areas of Punjab by adopting mitigation strategies	RKVY
Impact analysis and adoption of techniques learnt through experiential programs in the field of Veterinary Science	ICAR
Diagnosis and therapeutic management of urinary tract disorders in cattle and buffaloes	RKVY
Development of ultra-sonication based homogenizer for small scale dairy farmers	RKVY
Development of paper based microfluidic device for selected adulterants in milk	RKVY
Empowering rural women through dissemination of knowledge at their door step for their self reliance in dairy business	NABARD
Development of pasteurizer based on thermal fluid heating system (alternative technology) for dairy plants	DST



Aptamer-conjugated nanoparticles based colorimetric assay for melamine detection in milk and milk products	BIOCARE, DBT
Establishment of Energy Conservation, Monitoring and Training Unit in College of Dairy Science and Technology	Punjab Energy Development Agency
Development of mechanisms for value addition to milk at cottage level	ICAR
Value addition to milk at farm level using waste heat from engine	RKVY
Capacity building programme in ornamental fisheries for livelihood generation and socio-economic uplifting of rural population in Punjab	ICAR
Adaption, assessment and farmers' perception on aquaculture technologies in selected districts of Punjab	ICAR- Extramural
Skill upgradation of stake holders on fish harvesting, ice preservation techniques and its transportation in Punjab	ICAR- Extramural
Adaptation strategies for inland fisheries and fishermen community for climate resilience and livelihood security in Punjab, India	Adaptation Fund Washington, D.C., U.S.A through NABARD
Value-chain development for commercialization of <i>Pangasius</i> culture in Punjab	National Fisheries Development Board (NFDB), Hyderabad
Development of monoclonal antibody based flow through assay for detection of antibiotic residues in fish and fishery products	Scheme for Young Scientists and Technologists, DST
Molecular insights through cloning and characterization of selected steroidogenic and reproductive transcripts in <i>Pangasius pangasius</i> (Hamilton, 1822) and their responses to environmental attributes	Department of Science and Technology
Environmental impacts of EDCs in Sutlej River — A case study	Ministry of Environment, Forestry and Climate Change
Land surface dynamics and anthropogenic challenges faced by the Harike-Wetland, Punjab: Remote sensing based analysis spanning to a decade	ICAR- Extramural
Utilization of carp and catfish processing waste to develop high value collagen and gelatin proteins	DST (SERB)
Development of cost effective fish feed from water hyacinth ( <i>Eichhornia crassipes</i> ) by microbial intervention strategies	DBT
Comparative growth and reproductive potential of Amur strain of common carp for rearing under climatic conditions of Punjab for enhancing aquaculture productivity	ICAR
Performance of Amur carp under agro-climatic conditions of Punjab for enhancing aquaculture productivity	RKVY
Experiential Learning Program in Ornamental Fisheries to develop fishery graduates as prospective entrepreneurs	ICAR
Developing culture and breeding technology for indigenous ornamental fishes and aquatic plants in Punjab	RKVY
Optimizing culture and breeding technology for air breathing, high value fish, striped murrel, <i>Channa striatus</i> (Bloch)	RKVY
Evaluation of fish genetic diversity of Punjab using molecular techniques	RKVY
Human capital requirement and importance of vocational education in fisheries sector of selected northern states of India	ICAR
Understanding molecular pathways through isolation and characterization of steroidogenesis and reproductive transcripts of <i>P. pangasius</i>	ICAR
<i>De novo</i> transcriptome assembly and expression analysis for	ICAR



identification of defense genes and gene-associated markers in <i>Channa striatus</i>	
Experiential Learning Programme in Post-Harvest Technologies for self-employment ready fishery graduates	ICAR
Skill upgradation of stake holders on fish harvesting, ice preservation techniques and its transportation in Punjab	ICAR
Integrated approaches for livestock development in Kandi area of Hoshiarpur district	NABARD

**Research schemes operational during 2016-17**

Name of the scheme	Funding agency
<b>ICAR</b>	
Project Directorate on Animal Disease Monitoring and Surveillance	ICAR
Outreach/ Network Programme on “Estimation of methane emission under different feeding systems and development of mitigation strategies”	ICAR
Organisation of CFLD	ICAR
Development of integrated farming System	ICAR
Establishment of a new KVK at village Majra, SAS Nagar (Mohali)	ICAR
Experiential Learning through provision of Veterinary Clinical Services to livestock farmers, pet owners and NGOs	ICAR
Experiential Learning - Setting up of facilities for hands on training, Advanced Disease Diagnostic Unit	ICAR
Network program on Diagnostic imaging and management of surgical affections in animals	ICAR
Network Project on Buffalo Improvement	ICAR
Project Directorate on Cattle Field Progeny Testing	ICAR
AICRP on Cattle-Sahiwal (Data Recording Unit)	ICAR
All India Coord. Res. Project on Poultry Improvement	ICAR
All India Network Program on Haemorrhagic Septicemia	ICAR
Exploring the gaps in Veterinary Education in India to match the graduate skills with stakeholder’s level	ICAR
Integrated approaches for livestock development: Farmer’s context	ICAR
Nutritional and physiological approaches for enhancing reproductive performance in cattle and buffalo	ICAR
Establishment of a new KVK at Panchayat, Booh, Tarn Taran	ICAR
Veterinary education for sustainable growth, entrepreneurial skill and self reliance	ICAR
AICRP on Goat Improvement “Conservation and improvement of Beetal goats	ICAR
Identification of species on morphological and molecular characterization of skin and hair	ICAR
Designing a digital model to promote cooperative learning for producing high quality dairy professionals	ICAR
Nanoencapsulation of resveratrol and its stability, antioxidant activity and bioavailability in selective traditional dairy products for health benefits	ICAR



Comparative economic valuation and empirical assessment of salient characteristics of Indigenous cattle vis-à-vis cross bred cattle in the state of Punjab – a prelude to economic incentives	ICAR
Strengthening and development of higher agricultural education in India	ICAR
Extension tools for strengthening technical support to fish farmers	ICAR
Estimating requirement of post graduate specialists in Veterinary Sciences for field and academic institutions in the country	ICAR
Centre of Advanced Faculty Training (CAFT) in Veterinary Gynaecology & Reproduction	ICAR
Outreach Programme on Zoonotic Disease. ICAR Network project	ICAR
Outreach programme on Monitoring of drug residues and environmental pollutants	ICAR
“Farmer’s First” Project on Integrated Approaches for Livestock Development: Farmer’s context	ICAR
Data Recording unit for Sahiwal Cattle	ICAR
<b>UGC</b>	
Color Doppler studies on major blood vessels in dairy animals.	UGC
Ameliorative measures for enrofloxacin-induced testicular toxicity in rats	UGC
Development of a single multiplex PCR for identification of mastitis causing microorganisms along with the antibiotic resistant genes against commonly used antibiotics in dairy animals.	UGC
Development of biochemical assay as diagnostic tool for synthetic pyrethroid resistance in cattle tick <i>Hyalomma anatolicum anatolicum</i>	UGC
Development of control strategies based on molecular epidemiology and drug efficacy for equine piroplasmiasis in Punjab	UGC
Clinical application of bone marrow derived mesenchymal stem cells from buffalo for allogenic and xenogenic cutaneous regeneration of chronic wounds	UGC
Development of extended storage life functional meat products by incorporating bioactive phytoextracts	UGC
Standardisation of breeding and rearing technology of high value vulnerable catfish <i>Pangasius pangasius</i> under agro-climatic conditions of Punjab	UGC
Polymorphism screening and association studies of CXCR genes with udder health and milk production in buffalo breeds of Northern India	UGC
Studies on cloning and expression of heat shock proteins (Hsps) of <i>Brucella</i> spp. and their immunological characterization in experimental animals	UGC
Development of user-friendly diagnostic kit for Marek's disease	UGC
Persistent organic pollutants in fish, fish pond sediments and water: Health risk assessment through dietary exposure	UGC
Molecular epidemiological characterization and diagnostics of human Brucellosis, a major zoonotic disease	UGC
Development of functional fermented dairy products with zinc	UGC



fortified milk	
Molecular epidemiology and diagnostics of pig transmitted (Zoonoses) human parasitic diseases	UGC
<b>DBT</b>	
Evaluation of diagnostic assays for quicker diagnosis of Mycobacterial infections in cattle and buffaloes	DBT
DBT Network Project on Brucellosis	DBT
Combined use of novel diagnostic tools and strategic vaccination to control bovine Brucellosis in endemic areas	DBT-BBSRC, UK
Development of virus-like particles (VLP) of Japanese encephalitis virus as a potential vaccine candidate	DBT
Development of sub-viral particles of IBD virus as a potential vaccine and diagnostic candidate	DBT
Xanthosine treatment: A novel strategy to increase milk production and mammary stem cells	DBT
To design novel vaccines adjuvants against New Castle Disease in indigenous chicken	DBT
HRD Program for MVSc/MSc courses in Animal Biotechnology	DBT
Development and evaluation of sero-diagnostic assay for timely diagnosis and prognosis of mammary tumors	DBT
Aetio-pathology and molecular epidemiology of bacterial and viral diseases associated with the respiratory problems of Yak in the north eastern regions of India.	DBT
<b>DST</b>	
Fund for Improvement of S&T infrastructure (FIST)	DST
Molecular mapping and octopamine receptor gene polymorphism based detection of amitraz resistance in cattle tick, <i>Rhipicephalus (Boophilus) microplus</i>	DST, WOS-A scheme
An assessment of the role of mitochondria in bovine mastitis	DST
Rapid and confirmatory detection of important animal meat based food borne pathogens and its associated toxicants by immuno-histopathological and molecular techniques: A step towards one health concept	MOFPI, DST
Studies on Epithelial Mesenchymal Transition (EMT) in acute and chronic lung injury	DST
Comprehending the role of mucosal associated immunity during host pathogen interaction following <i>Avibacter paragallinarum</i> infection in poultry (Chicken and Japanese quail) for developing a futuristic mucosal vaccine	DST
Studies on fibronectin binding outer membrane proteins of <i>Pasteurella multocida</i> : role in extracellular matrix adhesion and pathogenesis in <i>Bubalus bubalis</i>	DST
Community awareness project for prevention and control of zoonoses	DST
Study of microbial diversity and potential human pathogens in freshwater aquaculture environment"	DST
Development of farmer level monoclonal antibody based flow through immunoassay for detection of <i>Vibrio parahaemolyticus</i> – the causative agent of shrimp EMS	DST
Value addition of whey and pearl millet in the development of functional gluten free foods	DST



Isolation and characterization of dairy flora of Punjab region as probiotic with bio-therapeutic potential and development of preservation technology for ready to use cultures	MOFPI, DST
Surveillance of anti microbial resistance in microflora of milk and dairy cattle from organized and unorganized dairy sector of Punjab region	DST
Encapsulation of natural bioactive compounds and micronutrients for the enhancement of nutritive, preservative and processing functionality of meat products	MOFPI, DST
<b>ICMR</b>	
Molecular epidemiology of Trichinellosis and Toxoplasmosis in India: addressing neglected zoonotic diseases in a one health context	ICMR
Molecular epidemiology of <i>Listeria</i> spp. in relation to its ecology and trace back using genome based typing methods	ICMR
<b>Miscellaneous Govt. Agencies</b>	
Establishment of Instructional Poultry Processing Unit and Poultry Products Manufacturing Unit	MOFPI
Toward climate resilient livestock production system	MOE, GOI, NAFCC
Development of subviral particle of Japanese Encephalitis Virus (JEV) as a candidate vaccine against JEV	DAE
NFDB assistance under the activity of human resource development: 1. Integrated fish farming 2. Ornamental fish breeding, culture, trade and aquarium services	NFDB, Hyderabad
Skill development trainings (artificial insemination technician training, dairy farmer/entrepreneur training)	ASCI
Open Nucleus Breeding System to improve Sahiwal cattle and Nili Ravi buffaloes in the state of Punjab	GOI
Towards Climate Resilient Livestock Production System in Punjab: Climate resilient sheds at community and institutional sheds	GOI under NAFCC
Towards Climate Resilient Livestock Production System in Punjab: Weather linked insurance package	GOI under NAFCC
Towards climate resilient milk production system in Punjab	NABARD
Towards climate resilient livestock production system in Punjab: Monitoring of data and disease forecasting activity	NABARD
Towards climate resilient livestock production system in Punjab	NABARD
<b>RKVY</b>	
Special Component GADVASU, LDH	RKVY
Diagnosis and surgical management of bone, joint and tendon affections in large animals	RKVY
Nitrite toxicity, an emerging problem in Punjab: Impact on animal health and production	RKVY
Evaluation of the therapeutic potential of some indigenous plants of Punjab	RKVY
Evaluation of antibacterial efficacy of commonly used antibacterials	RKVY
Therapeutic vaccine and phage therapy in bovine Brucellosis	RKVY
Bioassay based detection of Ivermectin resistance status in cattle tick <i>Rhipicephalus (Boophilus) microplus</i> from Punjab	RKVY
Epidemiology of gastrointestinal parasitic infections in relation to	RKVY



anthelmintic resistance in sheep and goats in Punjab State	
Studies on production disorders vis a vis neutrophil dynamics in buffalo	RKVY
Studies on viral diseases associated with porcine reproductive problems vis-à-vis development of suitable field based diagnostics	RKVY
Dairy calf health: Risk factors, assessment, resulting outcomes and strategies for improvement	RKVY
Research infrastructure and assets, Component -5: Strengthening of the physical facilities of IVF/ETT Lab with construction of shed for animals.	RKVY
Standardization of culture, breeding and processing technologies for Pangasius species in Punjab	RKVY
Ecological survey of salt affected areas of South West districts for developing inland saline water aquaculture in Punjab	RKVY
Processing of meat and egg into newer value added products for popularization and better marketing	RKVY
Processing of meat industry byproducts into novel pet foods for economic and environment sustainability	RKVY
Development of designer meat and egg products for health benefits and marketing	RKVY
Development and dissemination of processing technologies of value added meat products for enhanced economic benefits	RKVY
Studies on the nutritional requirements of male buffalo calves for meat production	RKVY
Processing of slaughter house byproducts for the development and storage stability of pet foods.	RKVY
Establishment of elite milch flock of Beetal goats through feeding interventions under stall-fed conditions	RKVY
Animation and sketch based teaching aids for Veterinary Anatomy	RKVY
Environmental pollutants and zoonotic pathogens in Punjab and their impact on animal and human health	RKVY
Assessment of quality of drinking water in Punjab for health hazards and evaluation of efficacy of water purification techniques for mitigation of water pollutants	RKVY
Studies on current scenario of antibiotic residues in food of animal origin in Punjab and prevention of antibiotic residue risks	RKVY
Creation of database on major prevalent food borne pathogens and public awareness on hygienic food practices in the state of Punjab	RKVY
Molecular epidemiological studies on viral food borne pathogens: An emerging public health hazard	RKVY
Endocrine disruptor chemicals in water and their remediation with emphasis on nanotechnology	RKVY
Serological and molecular studies on infectious diseases of small ruminants in Punjab	RKVY
Diagnosis and management of reticulo-omasal and abomasal disorders in cattle and buffaloes	RKVY
Epidemiology and therapeutic studies on iodine deficiency in dairy animals in sub mountainous regions of Punjab	RKVY



Characterization of respiratory diseases, improving diagnosis and therapy in dairy cattle and buffaloes	RKVY
Development of biodegradable packaging for enhancing shelf life of khooya based milk sweets	RKVY
Economic evaluation of milk processing in a dairy plant	RKVY
Cost evaluation and benefit assessment of fish farming in selected districts of Punjab	RKVY
Seroprevalence and to validate a new ELISA for the detection of <i>Toxoplasma gondii</i> infection in naturally infected multiple animal species including sheep, goat and pigs	RKVY and Centre for Food Borne & Animal Parasitology, CFIA, Saskatoon, Canada
Impact of linseed and canola oil on the conjugated linoleic and linolenic acid content in eggs and meat	RKVY, Collaborator with Department of AN
Molecular epidemiological studies on field isolates of Marek's disease virus and protective efficacy of commercially available vaccines against Marek's disease using single vaccination and revaccination protocols	RKVY
Establishment of State of the Art Institute for Sahiwal Cattle at RRTC, Kaljharani (Bathinda)	RKVY
<b>Punjab Government</b>	
Strengthening of diagnostic facilities and experimentation	Punjab Government
College of Veterinary Science	Punjab Government
Pesticide-induced adverse effects: Implications on livestock production	Punjab Government
Toxicity studies on insecticides in Livestock	Punjab Government
Research facilities for dairy cattle and buffalo breeding	Punjab Government
Recovery, cryopreservation and embryo transfer in buffaloes and crossbred cattle	Punjab Government
Additional facilities for the modernization of dairy operations	Punjab Government
Advanced Research Centre for Buffalo Reproduction	Punjab Government
Rearing of buffalo male calves for meat	Punjab Government
General Dairy Farm	Punjab Government
Processing and distribution of milk, Revolving Fund Scheme	Punjab Government
Establishment of Regional Research Centre for Nili Ravi Buffalo	Punjab Government
Improvement of dairy animals through embryo transfer technology at the institutional farm and field conditions	Punjab Government
Genetic improvement of dairy cattle through embryo transfer in Punjab under NPCBB	Punjab Government
Germplasm Multiplication of egg type poultry stocks	Punjab Government
Physical facilities to breed quails for meat and eggs	Punjab Government
Introduction and breeding of Naked Neck Rhode Island Red and other miscellaneous stocks of poultry	Punjab Government
Establishment of Small Animal Colony at GADVASU	Punjab Government
Creation of facilities for rearing of meat animals	Punjab Government
Resource mobilization from poultry farm	Punjab Government
Anatomical, histological, histochemical, electron microscopic studies as related to hormonal and biochemical profile in female reproductive organs in buffalo	Punjab Government
Studies on the utilization and popularization of processed meat products prepared from buffaloes and other species	Punjab Government
Strengthening of department of Livestock Products Technology	Punjab Government



Establishment of College of Fisheries at Ludhiana	Punjab Government
Establishment of Fisheries Unit	Punjab Government
Strengthening of fisheries research in GADVASU	Punjab Government
Fisheries research scheme”	Punjab Government
Sustainable aquaculture technology for salt-affected/water logged areas of Punjab	Punjab Government
Production of table sized fish and fish seed (Revolving Fund)	Punjab Government
Regional Livestock Poultry Research and Training Centre for Kandi area	Punjab Government
Control of mastitis in Punjab State- A pilot project	Punjab Government
Internal diseases of dairy animals- their clinico-pathological diagnostic and therapeutic aspects	Punjab Government
Nutritional deficiency diseases of dairy animals- Their clinico-pathological diagnostic and therapeutic aspects	Punjab Government
Epidemiology, diagnosis and management of gastrointestinal disorders in dairy animals in Punjab	Punjab Government
Studies on metabolic profile, risk factors and treatment of production diseases in dairy animals in Punjab	Punjab Government
Status on nutritional profiles and food safety aspects of meat and poultry products available in Punjab and improvement in their quality	Punjab Government
Development and sale of value added meat products for income generation	Punjab Government
Reproductive disorders in dairy animals	Punjab Government
Reproductive biology, ecology and management of birds and mammals	Punjab Government
Augmenting fertility in dairy cattle through ARTs	Punjab Government
Establishment of Research-cum-Diagnostic Laboratory for Rabies	Punjab Government
Open Nuclear Breeding Scheme for Sahiwal Cattle	Punjab Government
Establishment of Regional Research and Training Centre for Sahiwal Cattle	Punjab Government
Establishment of Veterinary Polytechnic, Kaljharani	Punjab Government
<b>Others</b>	
Potential of new variety of maize crop as silage.	Limagrains, Bisco Bio Science Pvt Limited, Secunderabad, Telangana
A study on factors affecting the chemical parameters of milk fat/ghee in Punjab with special reference to Reichert Meissl (RM) and Polenske (PV) value	The Punjab State Cooperative Milk Producers’ Federation Limited
Addressing Bovine Tuberculosis at the human-animal interface and Veterinary antibiotic use in small holder peri-urban dairy farms in India to ensure safe and sustainable milk production or the PERIMILK Study	Public Health Foundation of India
Collaborative Research and Training Experience ( <i>CREATE</i> ): Integrated training program in infectious disease, food safety and public policy ( <i>Collaborative project with University of Saskatchewan and Free University, Berlin</i> )	Natural Sciences and Engineering Research Council of Canada (NSERC)
Prevalence of <i>Mycobacterium bovis</i> using comparative intradermal tuberculin test on cattle in small holder peri- urban dairy farms in India	Public Health Foundation of India
To study effect of herbal formulations during transition period on oxidative status in dairy animals	Indian Herbs



One health reinvented: Can we predict Brucellosis prevalence in bovines from that in humans?	The University of Sydney, Australia
Capacity building in disease prioritization and risk analysis	Australia-India Council
Aflatoxin contaminated maize value chain and implications on poultry sector in Punjab	IFPRI
Impact of supplementing limonin on the performance of broilers	The Punjab Agro Juice Limited, Chandigarh

### Research highlights

GADVASU scientists continued to make rapid strides in the domain of Veterinary and Animal Sciences through cutting edge technologies and innovative approaches to address the problems of livestock and enhance their productivity to boost income of the farmers.

### Livestock Farms and Animal Genetics and Breeding

**Cattle Breeding:** The average 305-day milk yield and peak yield were recorded at 4674 kg and 24.8 kg, respectively. The average 305 day milk yield of the elite herd being used for the production of future crossbred bulls was 6032 kg with the peak yield of 34.9 kg. Maximum 305 day milk yield and peak yield were found to be 8854 kg and 53.6 kg, respectively in the herd. The average age at first calving in crossbred cattle was achieved in 28.8 months. Twenty one breeding bulls / male calves and 13132 doses of frozen semen were supplied to gaushalas, farmers and other dairy development agencies of the state.

**AICRP on cattle - The FPT Project:** A total of 112 villages have been covered under the All India Coordinated Research Project (AICRP) field progeny testing (FPT) program of crossbred cattle by 30 artificial insemination centers in Ludhiana district of Punjab. The average first lactation 305 days milk yields of the crossbred progenies in the adopted villages increased to 3737 kg in 2016 by supplying high quality semen of test bulls (about 25% improvement). The age at first calving of the crossbred animals in the area reduced from 1191days to 833 days (30% improvement). The supply of high pedigreed male calves, semen of high genetic potential test bulls and progeny tested bulls to the farmers has helped in improving their economic level. The improvement in both milk production as well as age at first calving at GADVASU was the highest among all FPT centers in the country for crossbred cattle.

**Embryo transfer:** Seven recipients were transferred embryos of Sahiwal cattle recovered from two donors, out of which four got pregnant and delivered five Sahiwal calves (one cow delivered twins) at field level. Ten recipients were transferred embryos recovered from one donor in three trials. Three ETT Sahiwal calves were born, two male and one female, while one recipient was pregnant at the time of reporting.

### Buffalo Breeding:

**Murrah:** Under the AICRP on Buffalo breeding at the University Dairy Farm, the average 305-day milk yield of the herd was 2640 kg with a lactation milk yield of 2959 kg. The 305-day milk yield, complete lactation milk yield and peak yield in the herd were 3332 kg, 3846 kg and 20.7 kg, respectively. The maximum 305 day milk yield and peak yield of the herd were recorded as 4636 kg and 26.1 kg, respectively.

Bull No. M 2133 of Set no. 10 under Network Project on Buffalo Improvement (Main Unit) has



been ranked 2<sup>nd</sup> among all the progeny tested bulls of the set in the Network Project. A total of 18131 semen doses were supplied to the farmers and other dairy development agencies for improvement of buffalo population in the state. Twenty three buffalo breeding bulls / bull calves were also made available to the farmers for breeding purposes. Frozen semen of test bulls was provided to 28 AI centers adopted under the FPT Project of Network Project on Buffalo Improvement (Murrah).

**Nili Ravi:** Nili Ravi animals were procured from their native breeding tracts and are being maintained at GADVASU Dairy Research Farm, Ludhiana. The present herd strength of Nili Ravi buffaloes is 124 with 76 breedable buffaloes. The average 305 day milk yield and complete lactation yield were 2204 kg and 2631 kg, respectively. One of the Nili Ravi buffaloes produced 2981 kg milk in 305 days lactation period with a peak yield of 16.0 kg, which is comparable to the best yield of any of the buffalo breeds. Five breeding bulls / bull calves were supplied to progressive dairy farmers.

**Breeding soundness evaluation for buffalo bulls:** A positive correlation between scrotal circumference and fertility was observed ( $P < 0.05$ ) in buffalo bulls. Scrotal fat was negatively correlated with head and tail abnormalities ( $P < 0.05$ ). Rump fat showed negative correlation with HOST positive and live sperms ( $P < 0.05$ ).

#### **Poultry farming:**

**Layer breeding:** About 20,000 day-old chicks have been supplied to the farmers, government agencies of Punjab and other states like Gujarat, Haryana and Rajasthan. Out of these, 11000 chicks have been supplied under national livestock mission in Punjab. About 15,000 fertile eggs have been supplied to the vaccine institute of Punjab state during 2016-17. Indigenous poultry breeds Kadaknath and Aseel are maintained as a part of the crossbreeding program to enhance immunity and hardiness of commercial birds and desi egg production.

**Broiler Breeding:** The commercial broiler (IBL-80) developed at the University has the potential to attain average 6-week body weight of 1600g with a feed efficiency of 2.0 and mortality of less than five percent. Egg production up to 52 weeks of age was significantly improved. The University hatchery has supplied around 60,000 commercial chicks in the current financial year.

**Quail breeding:** Average five week body weight of the commercial crosses is about 192 g. A strain of quails with white plumage has been developed under the name "**Punjab White Quail**". The average egg weight is about 13g and these eggs are being used for preparation of pickles.

#### **Veterinary Surgery and Radiology:**

**Ultrasonography:** Intestinal affections dilated intestinal loops with peritonitis and various teat affections in bovines were diagnosed by ultrasonography. Ultrasonography was applied in early diagnosis of disease conditions in dogs like pyometra, UTI, intussusceptions, lymphoma, tumors, ascites due to hepatic diseases, prostate disease.

**Application of Echocardiography in bovines and equines:** Echocardiography was applied in disease diagnosis in bovines and equines. A cow with brisket edema having pericarditis was diagnosed with the help of echocardiography. Intramural growths and vulvular defects could be diagnosed via echocardiography.



**Conservation of Nili Ravi buffalo at GADVASU**



**Murrah buffalo maintained at AICRP on buffalo at GADVASU**



**Cattle cross breeding project at GADVASU**



**Punjab White quail developed at GADVASU**



PB1 Male



PB1 Female



PB2 Male



PB2 Female

**Broiler breeding at GADVASU**



**Radiographic comparison of standing and recumbent reticulography in bovines:** Study was conducted on healthy bovines and those suffering from traumatic reticulitis. Ultrasonographic findings correlated well with the radiographic findings.

**Establishing diagnostic and surgical protocols in colic and reproductive affections in horses:** Diagnosis and surgical management of equine colic was carried out. Third degree perineal laceration in mares was repaired by two stage repair method. Cases with pelvic flexure impaction and caecal impaction were diagnosed based on per rectum examination and ultrasonography. An inside - out technique for surgical repair of third degree perineal laceration was developed.

**Application of laser and endoscopic surgical techniques in veterinary patients:** Endoscopic procedure was done in eight clinical cases in dogs. Foreign body was recovered from oesophagus in one dog. One dog had GDV while two other dogs had esophageal diverticulum in PRAA. Rhinoscopy was performed in horse and dog. Ethmoid granuloma was seen in the nasal cavity of the horse. Otoscopy was also performed in dogs. LASER surgery was done in dogs. Oral and superficial growths were excised with the help of LASER surgery. No hemorrhage was recorded during excision. Excellent recovery was recorded post-operatively.

**Surgical management of dental and mandibular affections in dogs:** Dogs affected with periodontal diseases were treated with dental scaling and polishing and those with mandibular fracture were successfully treated with dental wiring and acrylic application.

**Ophthalmic ultrasound in normal and diseased bovines:** Ophthalmic ultrasound was standardized in bovines and canines. Ultrasonography helped to detect retinal detachment in dogs with cataract.

**Phaco-emulsification and intra ocular lens implantation in dogs:** Management of cataract by phacoemulsification and subsequent implantation of foldable square edge acrylic intraocular lens (IOL) was carried out in dogs. IOL implantation is now done routinely in GADVASU Veterinary Hospital.

**Diagnosis and surgical management of obstructive urolithiasis in bovines:** Ultrasonography of the urinary tract was applied successfully for diagnosing obstructive urolithiasis, localisation of the urethral calculi and diagnosing urinary bladder rupture.

**Diagnosis and surgical management of corneal ulcer in canines:** Corneal ulcers were diagnosed and treated successfully using pedicle and bridged conjunctival grafting and human amniotic membrane with excellent healing postoperatively.

### **Veterinary Medicine**

**Upper respiratory tract (URT) affections in horses:** Endoscopy was found to be a very good diagnostic technique to evaluate URT affections in horses, especially pharyngeal lymphoid hyperplasia, laryngeal functioning disorders, pharyngeal cysts etc. that escape diagnosis by radiography.

**Status and mitigation strategies for hydrofluorosis in Punjab:** Excess of fluoride intake causes dental fluorosis, skeletal fluorosis and nonskeletal fluorosis in the dairy animals. In the fluoride - endemic areas of Punjab, the fluoride content in the drinking water of livestock was found to be more than 6 times the permissible limit of 1.5 ppm in some areas. There was a



Rhinoscopy in dog with normal nasal passage Rhinoscopy in horse with ethmoid hematoma



Endoscopy in dog with normal gastric mucosa Otoscopy in dog with growth in ear canal

### Endoscopy in Veterinary patients

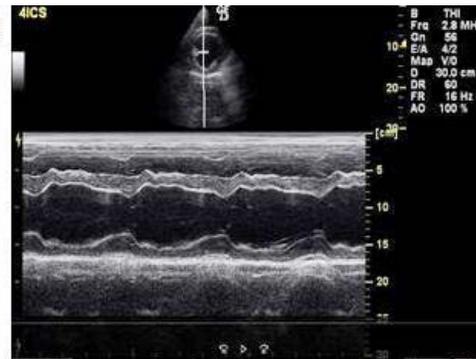
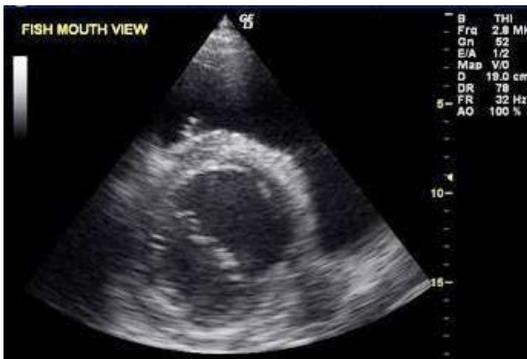
### Echocardiography in pericarditis in cattle



Echocardiogram of a pericarditis affected cattle showing fibrinous pericardial effusions



Echocardiogram of a pericarditis affected cattle showing suppurative pericardial effusions



positive correlation of water alkalinity and the fluoride content in water. High intake of fluoride increases the urinary and milk fluoride concentration which may be used as a diagnostic indicator for detection of animals suffering from fluorosis. A cost effective modified Nalgonda technique has been developed to defluoridate the drinking water.

**Mastitis, periparturient period and dry cow therapy:** Measurement of Hp and MAA was found to be a useful tool in diagnosing mastitis and assessing milk quality, and the MAA appeared to perform better than Hp. *S. aureus* appeared to have some degree of persistence in the dry and post-calving period. Application of dry cow therapy with Spectramast DC (125 mg ceftiofur hydrochloride sterile suspension) appeared to result in appreciable improvement in the udder health of cows.

**Epidemiological study on goat mastitis:** The average prevalence of sub-clinical mastitis (SCM) in goats was found to be 21.07% at animal level and 15.22% at quarter level. CNS staphylococci were the chief organisms. Overall, tetracycline (90.43%) was the most sensitive and penicillin (24.40%) least sensitive drug. At cut-off value of 700 and 750  $\times 10^3$  cells/ml, SCC had comparatively high sensitivity, specificity, positive predictive value, and negative predictive value. So, it was considered as the most suitable cutoff value to differentiate infected udder halves from non-infected ones. For NAGase, the cutoff value was found to be 25 nMoles/ml/min.

**Lower respiratory tract affections in cattle:** Out of twenty four animals sensitive to single intra-dermal tuberculin test and/or gamma interferon assay, Zeihl-Neelson stained smears of transtracheal wash were positive in 4 animals and 6 cattle were found to be culture positive for *Mycobacterium bovis*. PCR assay for *Mycobacterium* was positive in 4 tracheal wash samples and 1 milk sample whereas all blood samples were negative.

**Canine dermatitis:** Skin infections were found to be most common in dogs of upto 3 years of age of toy breeds, Labrador and German Shepherd breeds. Atopic dermatitis was the most common form of skin affection followed by fungal, bacterial and parasitic infections. Significantly high IgE in serum of dogs was a diagnostic feature in atopic dermatitis. Bacterial isolates cultured from skin scrapings / pus swabs included *Staphylococcus spp.* (71.43%), *Staphylococcus aureus* (19.04%) and *Streptococcus spp.* (9.53%). Cyclosporine showed better efficacy in reducing pruritus score than cetirizine.

**Trace mineral status in goats of Punjab:** Maximum Cu deficiency was found to be in the sub-mountainous zone and Zn deficiency in the central zone of Punjab. Feeding mineral mixture was found to improve plasma trace mineral status alongwith increase in milk yield.

**Chronic diarrhoea in crossbred cattle:** Salmonellosis was found to be the cause of chronic diarrhoea in 9.3% of crossbred cows. Infections of *E.coli*, Klebsiella and Pseudomonas in bile have been detected in 50% of the affected animals. Treatment with enrofloxacin was found to be effective in treating 80% of the cows manifesting chronic idiopathic diarrhoea.

**Echinococcosis in cattle:** Thirty one clinical cases of hydatid cyst were diagnosed on the basis of ultrasonography, radiography and molecular characterization. Praziquantel and oxfenbendazole were found to be effective in treatment of cystic echinococcosis.

**Veterinary Gynecology and Obstetrics**

Status and mitigation strategies for hydrofluorosis in Punjab



Hydrofluorosis in animals in Punjab

<p>Nasal polyps in a mare</p>	<p>Lymphoid hyperplasia in a horse</p>	<p>Guttural pouch empyema in a horse</p>

Some disease conditions encountered in horses

<p>Cyst aspirate revealing <i>Echinococcus granulosus</i></p>	<p>Cystic lung disease</p>

Echinococcosis in cattle



**Some skin affections in dogs**

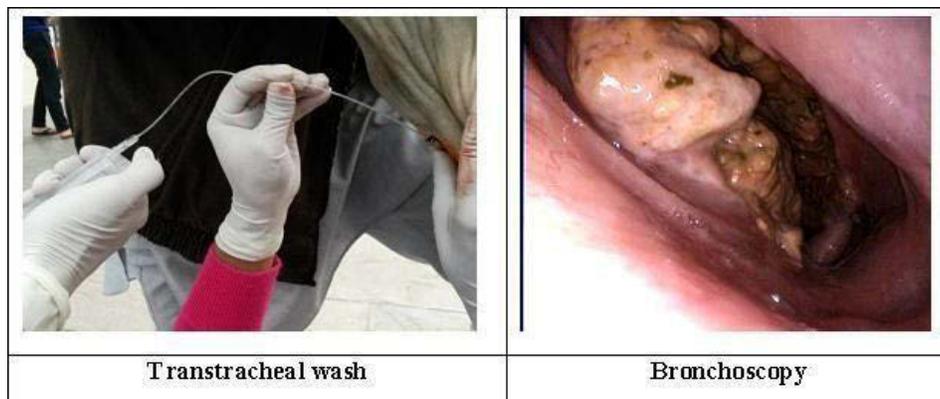


Pre and post treatment effect of Amitraz in a dog suffering from demodicosis



Pre and post treatment effect of Amitraz in a dog suffering from demodicosis

**Treatment of demodicosis in dogs**



**Clinical procedures for some respiratory diseases**

**Reproduction in farm animals:** ASA /cross reacting antibodies in serum of heifers/ cows were found to delay the fertility. Decrease in percentage of IgG /IgA- ASA and ASA- positivity in serum of heifers and cows with time was found to be conducive to success in conception. Molecular mimicry was found to exist between cattle bull spermatozoa and certain bacteria (*E. coli*, *Bacillus* and *Staphylococcus*). Exogenous melatonin reduced oxidative stress in buffaloes.

#### **School of Public Health and Zoonoses:**

**Salmonella in poultry farms:** Prevalence of *Salmonella* in poultry fecal samples in Punjab was found to be low (1%). Highest resistance of *Salmonella* was shown to erythromycin (66.66%) followed by amikacin (50%) gentamicin (33.33%) and co-trimoxazole (16.66%).

**Campylobacter species in poultry farms:** Fecal samples based prevalence of *Campylobacter* species in Punjab was 6.23% with *C. jejuni* accounting for majority of the isolates (82.6%) and *C. coli* for remaining isolates (17.39%). Highest resistance was shown against amikacin (26.08%) followed by tetracycline (17.39%). Twenty-two isolates were sensitive to erythromycin (95.66%) and hence it can be considered as the drug of choice for the treatment campylobacteriosis in the studied area.

**Seroprevalence of Brucellosis in humans:** About 4500 human serum samples from high risk population were tested for *Brucella* agglutinins and 16.7% were found positive. Higher prevalence was found in veterinarians, Veterinary Pharmacists and dairy farmers.

**Pesticide residues:** Wide range of POPs residues including organochlorine pesticides (HCH, DDT, chlordane, endosulfan and methoxychlor) and PCBs (28, 138, and 180) were detected in fish samples collected from three zones of Punjab. Analysis of human breast milk samples (n=150) for POP residues revealed the presence of  $\beta$ -,  $\gamma$ -HCH, p,p' DDD, p,p' DDE, PCBs congeners. About 29% of human blood samples were found positive for pesticide residues with chlorpyrifos as the leading pesticide. Other pesticide residues found were malathion, p,p' DDE and lindane.

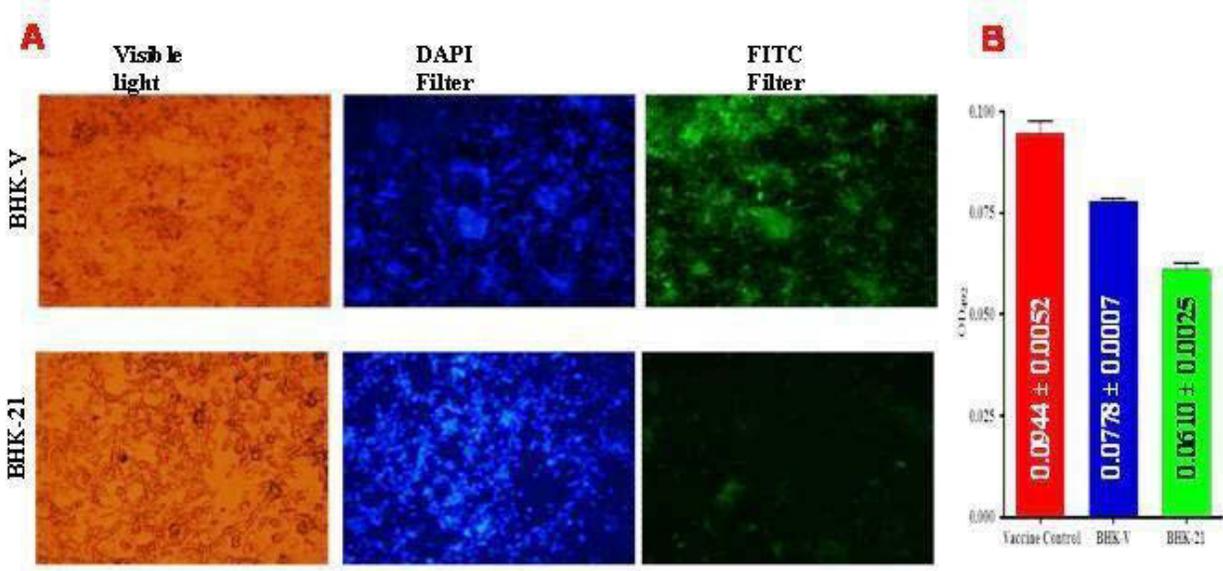
**Prevalence of porcine cysticercosis:** Out of total 179 pig carcasses examined at different slaughter shops in Punjab, 5 were found positive by PCR for the presence of *C. cellulosae* showing overall prevalence of 2.79 per cent.

#### **School of Animal Biotechnology**

**Expression of TLR-9 and IL-1 $\beta$  following exposure to Imidacloprid:** Imidacloprid is a new class of insecticide and primarily used for crop protection and flea control. Imidacloprid exposure resulted in significant decrease in serum concentration of IL-1 $\beta$  protein levels and increase in serum TLR-9 levels in mice. Imidacloprid alone or in combination with LPS was found to alter the expression of TLR-9 and IL-1 $\beta$  in peripheral blood without effecting their pulmonary expression suggesting its immunomodulatory potential.

**Development and evaluation of a sero-diagnostic assay for canine mammary tumors:** Polyclonal IgG from hyperimmune sera were purified by ion exchange chromatography and used to standardize sandwich ELISA for the diagnosis of canine mammary tumors (CMT). The sensitivities of rMammaglobin, rErbB2 and rHsp90 based sELISAs were found to be 90%, 90% and 95%, respectively, while the specificities were found to be 95%, 80% and 90%, respectively in diagnosing CMT. Overall, mammaglobin was found to be a better biomarker of CMT.

**Development of a stable cell line expressing VLP of Japanese Encephalitis Virus at SBT**



**Confirmation of BHK-V cells by (A) Immunostaining (B) ELISA of cell supernatant**



**Cysticercus in meat detected at the School of Public Health & Zoonoses**

Serum concentrations of HSP90 and mammaglobin-B were found to be correlated with aggressive malignant phenotype of canine mammary tumors. The disease-free and overall survival of the mammary tumor subjects was correlated with their serum concentrations of HSP90 and mammaglobin-B ( $p \leq 0.05$ ) but not with their serum *ErbB* concentration indicating that HSP90 and mammaglobin-B may serve as independent prognostic factors for disease-free survival ( $p \leq 0.05$ ) and overall survival ( $p \leq 0.05$ ).

**Development of a stable cell line expressing VLP of JEV:** A stable cell line expressing the virus like particles of Japanese Encephalitis Virus was developed.

### Veterinary Microbiology

**Seroprevalence of Brucellosis in livestock:** The prevalence of brucellosis by RBPT was 13.17 % (cattle 11.38 %, buffaloes 18.68 % and dogs 52.83%). The prevalence by I-ELISA and PCR was 12.62 % and 21.36 %, respectively. Out of 131 samples, six samples including foetal stomach content ( $n=04$ ), vaginal discharge ( $n=01$ ) and placenta ( $n=1$ ) from cows were positive for *Brucella* spp. by isolation. All the isolates were confirmed by Real time PCR as *Brucella* spp. and by Bruce Ladder PCR as *Brucella abortus*.

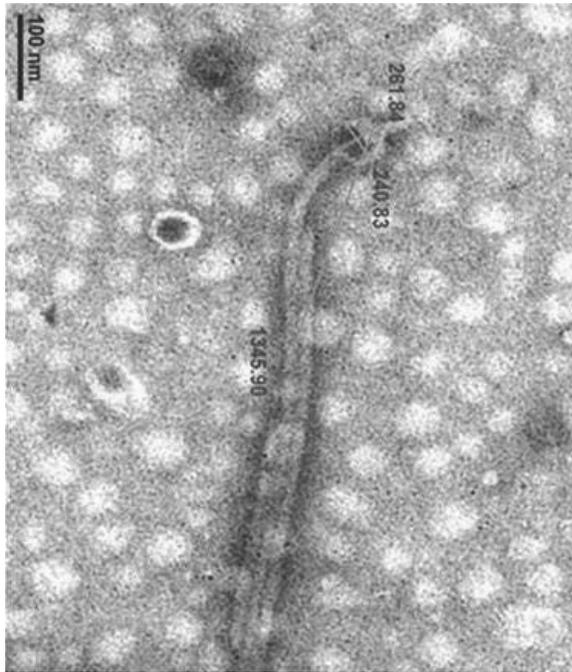
**Combined use of novel diagnostic tools and strategic vaccination to control bovine brucellosis in endemic areas:** Dairy farms from 40 villages in Ludhiana were sampled and fieldwork has been completed in 34 villages in the general population study. Seroprevalence estimates based on 450 samples tested by RBPT, 56 (12.4%) were positive and 150 out of 880 (17.0%) milk samples tested by indirect milk ELISA were positive. A total of 413 serum samples were collected from farm workers and the seroprevalence was estimated to be 6.3% based on past exposure (IgG antibodies). A total of 810 human serum samples were collected from 27 villages. Out of 810 samples, 15 (1.85%) were found to be positive by RBPT and 25 (4.14%) out of 603 samples, were IgG positive.

**Evaluation of diagnostic assays for Mycobacterial infections in cattle and buffaloes:** An in-house designed Multiplex PCR targeting three Mycobacterial species *M. bovis*, MAP and *M. smegmatis* was tested on faecal, blood, lymphnode aspirate and tissue samples for the differentiation of the pathogenic mycobacterial species from the Non-tuberculous Mycobacteria.

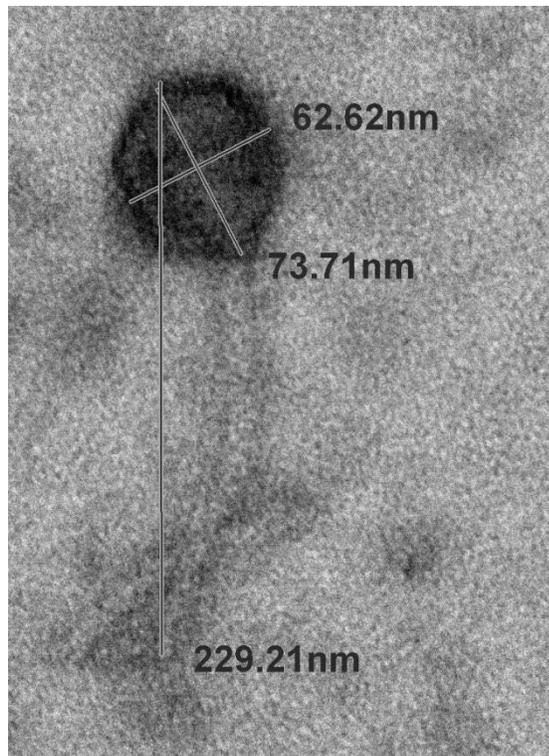
**Development of a new marker vaccine and DIVA assays for Hemorrhagic Septicemia:** A new bacteriophage lysate marker vaccine (containing an induced iron uptake receptor) and two companion DIVA assays (Western blotting and ELISA) have been developed for HS in bovines. Animals in phage lysate vaccine (PLV) group showed higher antibody titers in comparison to conventional alum precipitated HS vaccine (CAPV) group at all stages post-vaccination. The peak titer induced by the PLV group was  $2.34 \pm 0.21$  at 90 days post vaccination (dpv) as revealed by ELISA. In the CAPV group the peak antibody titer ( $2.13 \pm 0.07$ ) was observed at 60 dpv by MAT. The sera of marker vaccinated cattle revealed the presence of antibody to the 137KDa IROMP by western blotting and ELISA which was absent in the sera of CAPV group. The new marker vaccine with improved antigenicity and companion DIVA assays developed at GADVASU would help in effective prevention, control and eradication of this important disease.

**Therapeutic vaccine and phage therapy for bovine Brucellosis:** A broad acting lytic brucellaphage isolated at GADVASU was targeted *in vivo* employing the live attenuated

**Bacteriophages isolated in the Microbiology Department of GADVASU**



**A bacteriophage lytic to *Pasteurella multocida***



**A bacteriophage lytic to *Brucella abortus***

*Brucella abortus* vaccine strain S-19 to kill the virulent *Brucella* residing intracellularly in macrophages / monocytes in the body. A single dose of the phage pulsed vaccine (S-19 organisms bearing the phage) or phage alone could eliminate live *Brucella* in the body within 3 months as evident from non – detectable RNA characteristic of *Brucella abortus* in plasma by RT-PCR.

**Biomarker for Brucellosis:** A novel biomarker (*Brucella* RNA) was employed for the first time for monitoring the efficacy of phage therapy in bovine Brucellosis. Bacteriophage was found to have a promising potential to cure Brucellosis and abolish the carrier state in Brucellosis infected cattle.

**Application of bacteriophage in diagnosis of diseases:** Bacteriophages lyse bacteria specifically and can be employed in field based diagnostics for bacterial diseases. Genus specific lytic bacteriophages against *Brucella* and *Salmonella* were isolated and an ATP bioluminescence assay relying on ATP release by phage lysed bacteria and luminescence by ATP catalyzed luciferin - luciferase reaction has been developed at GADVASU for detection of *Brucella* and *Salmonella* in pure isolates and clinical samples. There was 90% increase in luminescence after incubation of *Brucella* with the brucellaphage. Samples from brucellosis affected animals showed a significantly ( $p < 0.05$ ) high luminescence in case of uterine secretions incubated for 5 hours with the brucellaphage ( $20873.75 \pm 2728.80$  RLU) than the uterine secretions left alone ( $2375.75 \pm 806.16$  RLU). Nine isolates of *Salmonella* showed a highly significant ( $p < 0.001$ ) increase in luminescence ( $31395.56 \pm 4713.77$  RLU) after incubation with salmonellaphage than the bacteria alone ( $2245.56 \pm 230.99$  RLU). The results were confirmed by biochemical tests and PCR. Thus, ATP mediated bioluminescence assay employing a lytic bacteriophage is a simple yet sensitive assay with great accuracy and is suitable for penside diagnostic application.

**Peste des petits ruminants (PPR):** PPR is an acute highly contagious disease of sheep and goats causing high morbidity and mortality. Detection of PPR virus (PPRV) in nasal and ocular swabs of goats from Punjab region was carried out and the virus was isolated at GADVASU. Seroprevalence of PPR virus in Punjab was also studied by competitive ELISA. One hundred samples (50 ocular and 50 nasal swabs) collected randomly from goats were subjected to sandwich ELISA and RT-PCR for detection of PPRV and virus isolation in B95a and vero cell lines. PPRV was found to be present in the goat population in the region and RT-PCR was more sensitive than S-ELISA for the detection of PPRV. Also PPRV could be successfully isolated in B95a and Vero cell lines. Seroprevalence of PPR virus was found to be 20%.

### **Veterinary Pathology**

**Teratological changes due to Arsenic and Cadmium:** Oxidative stress and apoptosis were found to play a major role in arsenic toxicity. Arsenic causes more reproductive toxicity in males as compared to females. It crosses the placental barrier and causes gross, visceral and skeletal malformations in fetus. Dilated renal pelvis is a new visceral anomaly found in the fetus. Complete absence of coccygeal vertebrae was a new skeletal anomaly found in the fetus.

**Studies on Rabies in domestic animals:** There was prevalence of only the genotype 1 of Rabies virus in the representative domestic and wild species studied. There was deviation of isolates of Punjab from the phylogenetic clusters of other isolates of rabies viruses of Indian origin. HnRT-

PCR facilitates prompt and easier epidemiological study of rabies compared to RFLP and sequencing. Rabies Immunogen Detection Assay (RIDA) was found to be more effective than IHC for detection of Rabies. IHC, RIDA, HnRT-PCR and qPCR can be used as supplementary diagnostic tools for detecting rabies viruses. The highest sensitivity for ante-mortem detection of Rabies with TaqMan PCR from skin and urine were found to be 95.83% and 78.94%, respectively.

**Studies on poultry diseases:** Polyclonal Antibody against *Avibacter paragallinarum* was raised in rabbit. Chronic Respiratory Disease, Newcastle disease and Marek's Disease were diagnosed based on immunological markers.

**Studies on Reticuloendotheliosis and Marek's Disease in poultry:** A study conducted on 1619 birds' revealed tumours in visceral organs of 103 birds on necropsy with a prevalence of 6.36%. 29/34 (85.3%) cases were positive for MD, 28/34 (82.3%) for RE, and 28/34 (82.3%) cases were positive for both MD and RE by immunohistochemistry. Conventional PCR detected 29/34 (85.3%) cases of MD, 15 (44.12%) cases of REV, and 15 (44.12%) cases of both MD and REV. By multiplex PCR, 24 (70.59%) cases were positive for MDV, 15 (44.12%) for REV, 15 (44.12%) for both MDV and REV, and two (5.88%) cases for MDV, REV and ALV also. Thus, immunohistochemistry and PCR are recommended for differential diagnosis of mixed avian oncogenic virus infections under field conditions.

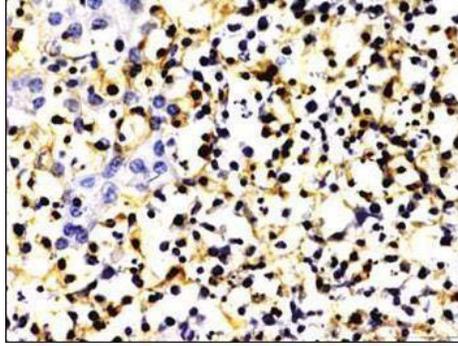
**Diagnosis of diseases of large animals:** Rota virus was more prevalent and *E.coli*, *C. perfringens* and Salmonella were the major bacterial pathogens in livestock. Brucellosis, Listeriosis, IBR, Vibriosis and *Trichomonas fetus* infections were diagnosed using immunological markers.

**Cytokine expression and molecular studies in bovine lymphadenopathies:** There was down regulation of both  $T_H1$  and  $T_H2$  cytokines in bovine lymphoma cases. In Johne's disease, there was expression of both  $T_H1$  and  $T_H2$  cytokines with an up regulation of IL-10. Whereas, in tuberculosis cases, there was an increase in the level of IFN- $\gamma$  and in cases of Theileriosis, there was up regulation of  $T_H2$  cytokines.

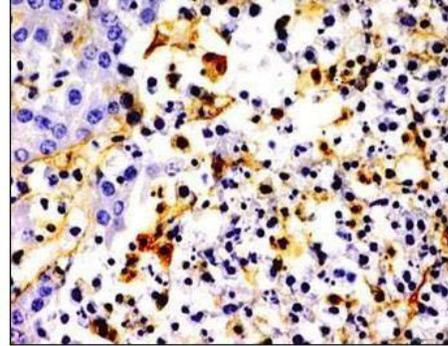
**Diagnosis of Mammary Tumours:** Markers like PROX-1, LYVE -1, Laminin and VGFR were found to be good markers for diagnosing cancer and its spread and prognosis.

### Veterinary Parasitology

**Risk factors associated with prevalence of gastrointestinal helminths in buffaloes in Punjab:** A total of 956 faecal samples were collected from buffaloes representing 21 districts of different agro-climatic zones of the Punjab state of India for detection of various gastrointestinal helminth (GIH) parasites. Coprological examination of the samples revealed an overall prevalence of 43.20% for GIH. The prevalence of parasites (%) in the descending order was: strongyles (27.62%), amphistomes (16.94%), *Fasciola* spp. (5.23%), *Moniezia* spp. (4.18%), *Trichuris* spp. (2.2%), *Strongyloides* spp. (1.88%) and *Capillaria* spp. (0.10%). The prevalence of GIH in buffalo population was associated with various factors viz. districts, agro-climatic zones and seasons. The maximum prevalence of GIH infection was recorded in monsoon season (47.84%) and lowest in winters (39.76%). Agro-climatic zone-wise prevalence of GIH was the highest in undulating plain zone receiving maximum annual rainfall (62.88%) and lowest in

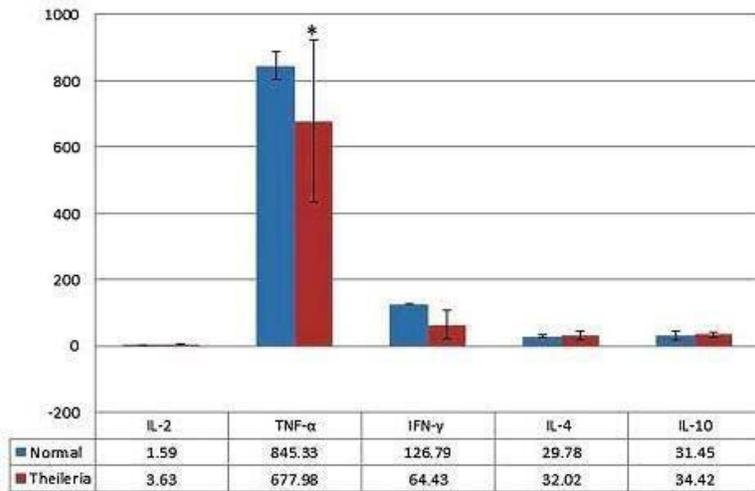


Liver showing positive cytoplasmic as well as nuclear immunoreactivity for MDV antigen. Vectastain ABC staining, counter-stained By Gill's haematoxylin x 100 X



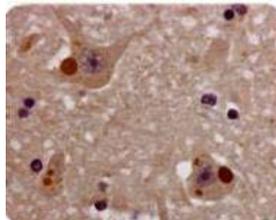
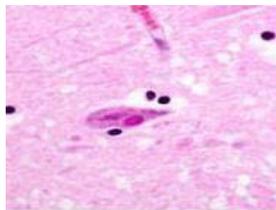
Liver showing positive reactivity for REV antigen. Vectastain ABC staining, counterstained by Gill's haematoxylin x 100X

### Immunohistochemistry in Marek's disease in Reticuloendotheliosis in poultry



Correlation of Th1 and Th2 cytokines showing bovine Th2 increase in lymph nodes from cases of bovine theileriosis

### Cytokine expression in bovine lymphadenopathy



Immunohistochemical detection of Rabies viral antigen

western plain zone with minimum annual rainfall (33.33%) and the differences were highly significant ( $P < 0.01$ ). Coproculture revealed the presence of larvae of genera *Oesophagostomum*, *Haemonchus*, *Trichostrongylus*, *Cooperia*, *Chabertia* and *Strongyloides* in decreasing order of their prevalence.

**Control strategies for equine piroplasmosis in Punjab:** Endemicity of equine piroplasmosis was confirmed by PCR in 11.64% cases while 3.66% equid samples were positive by blood smear examination. Spatial distribution of *T. equi* infection increased from north-east to south-west region of Punjab. Prevalence of *T. equi* by nPCR was resiliently correlated with temperature and evapo-transpiration but inversely correlated with precipitation and cloud cover. Western Plain Zone of Punjab state was found to be more prone to *T. equi* infection suggesting that the control programmes should start from these areas. Equine theileriosis was found to be endemic in Punjab with latent infection of *T. equi* detectable by PCR. Buparvaquone was found to be 100% efficacious in eliminating the natural infections of equine piroplasmosis (*Theileria equi*) from the equines as compared to diminazene aceturate (20%). Butalex was found to be efficacious in clearing *T. equi* from host body while Berenil proved to have low efficacy. This investigation of molecular epidemiology of *T. equi* in different agro-climatic zones of Punjab in relation to associated risk factors will be helpful for epidemiologists as well as clinicians for the management of disease.

**Epidemiology of gastrointestinal parasites in small ruminants in western zone of Punjab:**

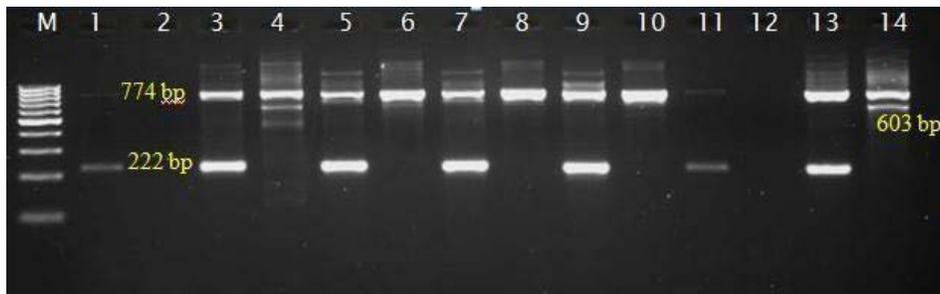
A total of 603 faecal (391 sheep and 212 goats) samples from six districts of western zone were examined out of which 501 were found positive for endoparasitic infection with an overall prevalence of 83.08% (85.16% and 79.24% in sheep and goats, respectively). The district wise prevalence was significantly ( $P < 0.05$ ) highest in Sangrur (88.78%) and lowest in Bathinda (68.08%). Species wise ovines, sex wise females, age wise adults (> 6 month) and season wise monsoon were found to be the most susceptible risk factors responsible for the parasitic infection in the area.

**Resistance to anthelmintic benzimidazole in *H. contortus* in sheep:** Allele specific PCR employed on 138 larvae of *H. contortus* from six districts of western zone of Punjab showed 50% (69) homozygous resistant (rr), 3.62% (5) homozygous susceptible (SS) and 46.37% (64) heterozygous susceptible (rS) to benzimidazole. The study showed an overall allele frequency for resistant and susceptible population to be 0.72 and 0.28, respectively.

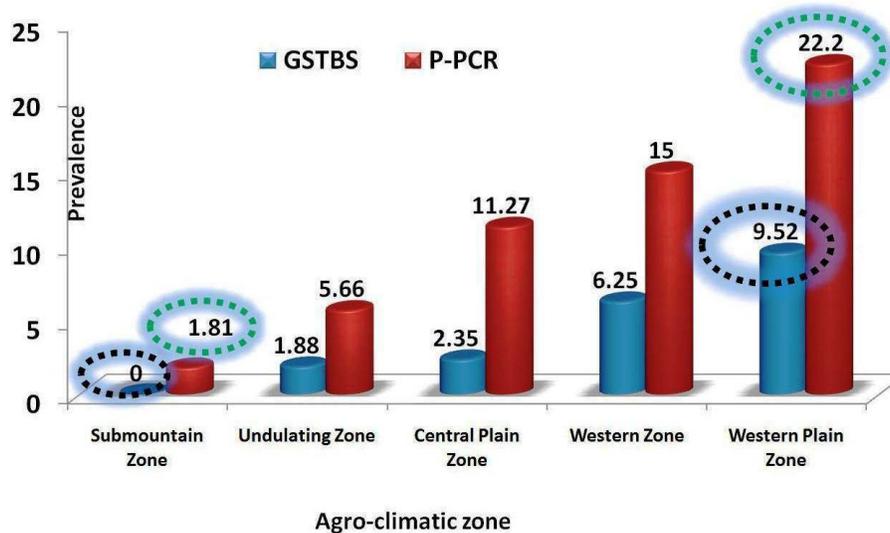
**Vector-borne infections in dogs:** A study was conducted for critical evaluation and phylogenetic analysis of vector-borne haematozoon infections of dogs in Punjab, India to reveal their ancestral background. On blood smear examination, haemopathogens were observed in 124 out of 778 (15.95%, 95% CI: 13.53-18.68) blood smears. Polymerase chain reaction (PCR) was used on blood smear positive cases to validate the results. Out of 778 blood samples, *Babesia gibsoni* was the most common parasite infecting dogs (15.04%, 95% CI: 12.7-17.72), followed by *Ehrlichia canis* (0.39%, 95% CI: 0.0-1.13), while infection of *Babesia vogeli* and *Hepatozoon canis* was of the same level (0.26%, 95% CI: 0.0-0.9).

Prevalence of infection was non-significantly higher in 1-2 years age group (19.88%, 95% CI: 14.45-26.71) and chances of infection were found to be highest in pre-monsoon i.e. summer

## Allele specific PCR for detection of anthelmintic resistance in *H. contortus* from sheep



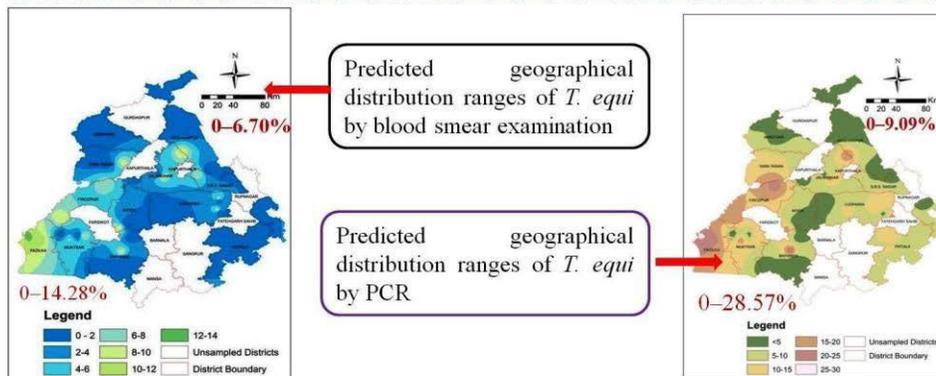
## Prevalence of *Theileria equi* in agroclimatic zones of Punjab



## Spatial distribution of *T. equi* in agroclimatic zones of Punjab

Total number of animals sampled in village was linked with digital village boundary in Geographic Information System (GIS) and the centroid of each village was generated in ArcGIS 10.2.

The spatial distribution of *T. equi* determined both by blood film and by PCR ranged from 0-15% and 0-30% respectively



Increasing trend from north-east (0-6.70% by blood film and 0-9.09% by PCR) to south-west (0-14.28% by blood film and 0-28.57% by PCR) was observed.

(18.26%, 95% CI: 14.49-22.76) season. Phylogenetic analysis revealed ancestral relationship of Ludhiana isolates of *B. vogeli*, *B. gibsoni*, *H. canis*, and *E. canis* with the isolates of Philippines, Mongolia and Tunisia. Vector borne haemopathogens of dogs were found to be endemic in Punjab. As compared to other haemopathogens, *B. gibsoni* was more prevalent. This study provides the first report regarding molecular confirmation and ancestral relationship analysis of blood smear positive cases of assorted haemopathogens in Punjab state of India. In endemic areas, the environment where dogs are raised has important implications for vector borne diseases, since environmental conditions are stringently related with favorable conditions for the tick vector, *Rhipicephalus sanguineus*.

**Molecular prevalence, risk factors and haematobiochemical alterations in canine hepatozoonosis:** Of the total 225 canine samples subjected to PCR, an amplicon of 666 bp was detected in 13.78% samples against the routine blood smear examination, which revealed gamonts in 5.78% samples only. The presence of *H. canis* infection was found to be significantly associated with season being highest in summer and lowest in winter.

**Molecular detection of *Hepatozoon canis* infection in dog tick, *Rhipicephalus sanguineus*:** Canine hepatozoonosis, caused by *Hepatozoon canis* is a disease transmitted by the ingestion of brown dog tick, *Rhipicephalus sanguineus*, infected with mature oocysts. *R. sanguineus* ticks (n=60) collected from dogs presented at Small Animal Clinics, GADVASU, Ludhiana, Punjab, India were screened by PCR for the detection of *H. canis* 18S ribosomal RNA gene fragment. PCR revealed an overall prevalence of *H. canis* of 8.33% in the tested ticks.

**Molecular characterization of partial carboxyl esterase gene in synthetic pyrethroid resistant *Rhipicephalus (Boophilus) microplus*:** Larval packet test (LPT) was used for detection of resistance against cypermethrin and deltamethrin, the most commonly used synthetic pyrethroids (SPs) in *Rhipicephalus (Boophilus) microplus* ticks collected from eight districts (Barnala, Bathinda, Fazilka, Ferozepur, Mansa, Moga, Muktsar and Sangrur) of western Punjab. Results revealed level I resistance status against cypermethrin in Barnala, Bathinda and Muktsar isolates while level I resistance against deltamethrin in Mansa, Moga and Sangrur isolates and level II resistance was recorded in Barnala, Fazilka, Ferozepur and Muktsar isolates. These eight field isolates were further investigated for the presence of mutations in a fragment of a carboxylesterase gene by PCR-RFLP (polymerase chain reaction-restriction fragment length polymorphism). RFLP analysis revealed the absence of point mutation in all field isolates of ticks from this region.

**Amitraz resistance in *Hyalomma anatolicum* from Punjab:** Adult immersion test (AIT) indicated level II resistance against amitraz in the field population of *Hyalomma anatolicum* ticks collected from district Sri Muktsar Sahib, Punjab. On increasing the concentrations of amitraz, the survived ticks laid significantly fewer eggs. The mean Reproductive Index of treated ticks showed a decreasing trend whereas a significant increase was recorded in the mean percent Inhibition of Oviposition in treated ticks with increasing drug concentrations.

**Ivermectin resistance in field populations of *Hyalomma anatolicum* from Punjab, India:** Detection of resistance status against ivermectin in *Hyalomma anatolicum* tick populations collected from three districts of Punjab (Amritsar, Moga and Sri Muktsar Sahib) was carried out

using larval immersion test (LIT). The presence of level II resistance status was detected in all the three field isolates. This could be the first report of ivermectin resistance in *Hyalomma anatolicum* from Punjab, India.

**Ivermectin resistance in field populations of *Rhipicephalus (Boophilus) microplus* from Punjab:** Detection of resistance status against ivermectin in *Rhipicephalus (Boophilus) microplus* collected from six districts of Punjab (Amritsar, Fatehgarh Sahib, Fazilka, Moga, Patiala and Sri Muktsar Sahib) was carried out using larval immersion test (LIT). Presence of level I resistance in two (Fatehgarh Sahib and Moga) and level II resistance in four (Amritsar, Fazilka, Patiala and Sri Muktsar Sahib) field isolates was detected.

**Acaricidal activity of *Glycyrrhiza glabra* (Mulethi) against ivermectin resistant *Rhipicephalus (Boophilus) microplus*:** Adult immersion test (AIT) was used to assess the acaricidal activity of various organic extracts (hexane, ethanolic and acetone) of roots of *Glycyrrhiza glabra* (Mulethi) against ivermectin resistant (level II) *R. (B.) microplus* collected from district Faridkot (Punjab). Highest acaricidal property was recorded in hexane extract. The egg mass weight and RI of the ticks treated with different concentrations of mulethi hexane extract was lower than that of control ticks along with slight reduction in percent egg hatchability effect.

**Assessment of acaricidal activity of *Piper longum* L. against amitraz resistant *Rhipicephalus (Boophilus) microplus* isolate:** Higher acaricidal activity against amitraz resistant cattle tick, *Rhipicephalus (Boophilus) microplus* was exhibited by the alcoholic extract of *Piper longum* L. The egg mass weight, RI and egg hatchability of the ticks treated with alcoholic extracts were lower than that of control ticks suggesting that the alcoholic extract of *P. longum* can be used for the control of amitraz resistant tick.

**Assessment of acaricidal activity of *Piper longum*, *Piper nigrum*, and *Zingiber officinale* extracts against *Hyalomma anatolicum* ticks:** A concentration-dependent mortality response of *Hyalomma anatolicum* ticks was recorded with all extracts prepared from seeds of *P. longum* and *P. nigrum* and their combinations. The highest acaricidal property was exhibited by the alcoholic extract of *P. longum* seeds, followed by alcoholic combinations. Thus, ethanolic extracts of *P. longum* and *P. nigrum* and their combinations can be used effectively for tick control in an integrated format.

### **Animal Disease Research Centre**

**Monitoring and surveillance of animal diseases:** A total of 22 outbreaks of different diseases viz Hemorrhagic Septicemia (1), Brucellosis (2), Peste des Petits Ruminants (4), Classical Swine Fever (1), Classical Swine Fever and Porcine Reproductive and Respiratory Syndrome (1), Rabies (1), FMD (1), Theileriosis (1), Anaplasmosis (2), mixed infection of anaplasmosis and theileriosis (2), nitrate toxicity (4), Lungworm infection (1) and Foot Rot (1) were attended and successfully controlled.

An outbreak of Hemorrhagic Septicemia in cattle was reported from Rahian in Ludhiana district. The diagnosis was made on the basis of isolation and PCR. Two outbreaks of brucellosis were attended; one at Maurali Kalan (Ropar) and another at village Kartarpur in district Mohali. Diagnosis was made on the basis of PCR on the aborted material. In village Kartarpur, the



history of abortion was reported. Diagnosis was made on the basis of RBPT from the serum samples collected. Classical Swine fever was reported from village Dehlon in Ludhiana district. The diagnosis was made on the basis of antigen detection ELISA. A mixed infection outbreak of Classical Swine Fever and Porcine Reproductive and Respiratory Syndrome (PRRS) was attended at Rajpura in Patiala district. The diagnosis of mixed infection was made on the basis of PCR. Four outbreaks of Peste des Petits Ruminants (PPR) in goats were reported. Three outbreaks were reported in Ludhiana district (Motibagh colony, village Rasulpur and village Khudai Chak) and one at Malerkotla in Sangrur district. The diagnosis of PPR was made on the basis of clinical signs, ELISA and PCR. An outbreak of Rabies in village Maru in Patiala district was reported. Six buffaloes were susceptible, out of which two were affected and two died. The diagnosis was made on the basis of FAT and PCR. Foot and Mouth Disease was reported at GADVASU dairy farm, Ludhiana. The diagnosis of O Serotype of FMD virus was made.

Two outbreaks of anaplasmosis in cattle were attended; one at Nabha in Patiala district and the second at Behrampur Bet in Rupnagar. The diagnosis was made on the basis of blood smear examination and PCR. One outbreak of Theileriosis was attended at Ludhiana (Rahian) in cattle and diagnosis was made by blood smear examination and PCR. Mixed infection (anaplasmosis and theileriosis) in cattle was reported from Ferozepur (Asal) and Ludhiana (Gureh) and conventional diagnosis was made by Blood smear examination. Lungworm infection in goats was reported at Baretein Mansa district and the diagnosis was made on the basis of gross lesions. Foot rot was diagnosed on the basis of clinical signs in cattle from Batala in Gurdaspur district. Four outbreaks of nitrate toxicity were attended. Toxicities were reported in buffaloes and the diagnosis was made by DPB testing.

### **Centre for Wildlife Studies**

**Study on water quality at zoo and possible risk to zoo animal health:** A study was undertaken to determine the physicochemical and microbiological quality of drinking water meant for captive wild animals and to find any possible association between water quality and health status of animals.

**Molecular epidemiology and diagnosis of bacterial and parasitic pathogens in wild ungulates and carnivores:** A study was undertaken to know the prevalence and understand the molecular epidemiology of bacterial and parasitic pathogens from the faeces of captive wild animals and free ranging wild animals as well as domestic animals at wildlife-livestock interface in Punjab and Jammu and Kashmir. The endoparasitic infection in captive wild animals was 44.6% while it was 52.4% in free range wild animals and domestic livestock at Abohar and 50.6% in and around Dachigam National Park. In captive animals, the frequency of *E. coli* isolation was 74.8% while at Abohar and Dachigam it was 65.6% and 76.2 %, respectively.

In both captive and free range animals, *Bla<sub>Tem</sub>* was the most common antibiotic resistant gene. In captive animals, virulence genes were detected in 33 (25.78%) isolates and *stx<sub>2</sub>* was the most prevalent gene (n=26, 20.3%). In free range at Abohar, virulence genes were detected in 16.37% isolates and *stx<sub>1</sub>* gene (n=10, 8.6%) was the most prevalent. However, in Dachigam National Park, virulence genes were detected in 9.2% isolates and *eae* gene (6.25%) was the most prevalent. In captive animals, the prevalence of *Salmonella* was 0.6% while at Abohar and



**L: Examination of a sick lion**



**R: Ultrasonography of a lioness**



**Clinical sample collection at Deer Safari**

Dachigam it was 1.1% and 0.44%, respectively. The phenotypic antimicrobial resistance was seen in 66.7% of the isolates and resistance was higher for tetracyclines and beta lactam group (50.0% each). The *Bla<sub>Tem</sub>*, *aac-3(IV)*, *sul*, *gyrA* and *tetA* resistance genes were recorded.

All the *Salmonella* isolates were positive for one or more virulence genes *ssaQ*, *invA*, *mgc*, *prgH* and *pipA* gene. In captive animals, 55.3% samples were positive for acid fast bacilli on microscopy while three samples were positive for *Mycobacterium avium* subspecies *paratuberculosis* by PCR (two from Hyenas and one from jungle cat) and all three were having 'Indian Bison Type' genotype. In free range, at Abohar 87 (55.7%) fecal samples were positive for acid fast bacilli and on culture, two samples were positive - one each from black buck and sheep. PCR-REA revealed the presence of "Indian Bison type" genotype in both animals. In free range animals at Dachigam, 61 (61.6%) fecal samples were positive for acid fast bacilli and two samples were positive by PCR.

### **Veterinary Pharmacology and Toxicology**

**Evaluation of efficacy of commonly used antibacterials in pericarditis:** The comparative pharmacokinetic profile of cefquinome alone and in combination with tazobactam was studied in clinical cases of adult cattle suffering from pericarditis. Ten cases were having high level and two cases were having moderate level increase in fibrinogen/immunoglobulin concentration in blood. Out of the total twelve cases, seven were suffering from fibrinous pericarditis, three from effusive pericarditis, one from constrictive pericarditis and one from suppurative pericarditis. The results suggested good clinical outcome of cefquinome in cattle suffering from pericarditis. A single IM injection of 0.81 mg.kg<sup>-1</sup> cefquinome alone and 0.25 mg.kg<sup>-1</sup> in combination with tazobactam was found to be effective for up to 12 h in cattle suffering from pericarditis.

**Therapeutic potential of an indigenous plant of Punjab:** The medicinal potential of *Kiegella Africana*, which is used in Indian traditional medicine, was evaluated for antibacterial, anti-inflammatory, antipyretic, neurobehavioural, muscle relaxant, grip strength and other pharmacological activities. The anti-inflammatory activity was comparable with the standard drug Diclofenac and Methyl salicyclate ointment used to treat inflammation.

**Toxicity studies on insecticides in livestock:** Bifenthrin is a newly introduced type-I pyrethroid with eight stereoisomers, of which the cis-isomer is the active moiety. Pesticide ingestion either by direct or indirect exposure may lead to the generation of reactive oxygen species (ROS), which are detrimental to health. The oxidative stress inducing potential of bifenthrin was investigated in eight male buffalo calves. Bifenthrin treated animals showed significantly increased lipid peroxidation. Blood glutathione levels decreased significantly from 17<sup>th</sup> day with maximum decline (16.5%) on the last day of treatment. There was a significant increase in the enzymic activity of superoxide dismutase on and after 17<sup>th</sup> day (96.5%) of administration. Similar alterations were observed in the activity of glutathione peroxidase with maximum incline of 28.8% on 21<sup>st</sup> day. Thus, bifenthrin has a potential to induce oxidative stress on repeated sub-acute exposure in buffalo calves.

**Nitrite toxicity, an emerging problem in Punjab:** Study on sub-chronic toxicity of sodium nitrate was undertaken in buffalo calves. Sodium nitrate @ 4.5 mg/kg/day for 90 consecutive days produced significant increase in the extent of lipid peroxidation (28.1%) and enzymatic

activity of glutathione peroxidase (18.3%), but a significant decrease in blood glutathione (20.1%), superoxide dismutase (25.1%) and catalase (12.8%) in buffalo calves. Daily oral exposure of sodium nitrate for 90 days produced significant elevation in lipid peroxidation (27.5%), glutathione peroxidase (25.0%) and nitric oxide (35.2%) levels, but a significant decline in blood levels of glutathione (22.6%), superoxide dismutase (23.6%) and catalase (27.5%) in buffalo calves.

**Pesticide-induced adverse effects:** Effect of flubendiamide was studied on Balb/c fibroblast cell culture and rats of either sex belonging to Sprague dawley stock. There was significant alteration in relative organ weight (heart, liver, kidney, testes and uterus with ovary) and biochemical (AST, ALT, LDH, ALP, GGT, glucose and BUN), hematological (TLC, TEC, PCV, MPV and platelet count), antioxidant (CAT, GPx, GST, LPO, GSH, GR and G6PD) and hormonal (T3) parameters.

Significant changes were observed in body weight from 6-10 weeks in males, relative organ weight (kidney and brain) and biochemical (ALP, direct bilirubin, GGT, cholesterol, creatinine, CK, Na<sup>+</sup>, total bilirubin, K<sup>+</sup> and SGPT), hematological (TEC, PCV, MCV, MCH, MCHC, platelet count and MPV), antioxidant (GSH and G6PD) and hormonal (T3, T4 and insulin) parameters. In addition significant reduction in sperm count and resultant reduced number of pregnancies compared to control was noted.

In F1 generation rats, no significant changes in body weight were observed. In the neuro-immune subset significant changes in biochemical (BUN, Ca<sup>2+</sup>, cholesterol, Mg<sup>2+</sup>, phosphorus, SGOT, CK, GGT, SGPT and Na<sup>+</sup>) and hematological (TLC and MCHC) parameters were observed. There was increase in time spent in locomotion and reduced sleeping time with damage to brain. Histopathological examination revealed congestion and necrosis of glial cells and astrocytes. Loss of white pulp in spleen could be seen histopathologically. In reproductive subset significant changes in biochemical (albumin, BUN, Ca<sup>2+</sup>, creatinine, GGT, glucose, LDH, Mg<sup>2+</sup>, K<sup>+</sup>, Na<sup>+</sup>, SGOT, SGPT, phosphorus, total bilirubin and total protein), hematological (TEC, Hb, PCV, MCHC, MPV and platelet count) and hormonal (T3, T4 and insulin) parameters was observed. Non linear increase in toxicity with increase in dose rate was observed and toxicity varied with sex as well. The pesticides were thus found to be toxic to reproductive, immune and nervous system at different dose levels.

**Ameliorative measures for enrofloxacin-induced testicular toxicity in rats:** Enrofloxacin administration showed oxidative stress, testicular degeneration and decreased sperm counts in male rats. Repeated administration of enrofloxacin (80 mg /kg body weight) to male rats produced reduction in the testicular weight in comparison to control group. Rats were pre-treated as well as fed simultaneously with  $\alpha$ -tocopherol, along with enrofloxacin for amelioration of toxicity and various parameters were studied in treated and control groups.

### **Veterinary Physiology and Biochemistry**

**Effect of *Terminalia arjuna* on antioxidant status, metabolic profile and reproductive performance of buffaloes exposed to environmental arsenic and lead pollution:** Buffaloes exposed to environmental arsenic or lead pollution exhibited increased oxidative stress and altered biochemical profiles which were correlated to decreased conception rate. Arsenic or lead

induced toxicity in buffalo lymphocytes *in vitro* was found to be mediated via the generation of reactive oxygen species and oxidative stress. *Terminalia arjuna* bark powder treatment @ 42mg/kg b. w. for 30 days modulated the oxidative stress, biochemical response and improved the conception rate in buffaloes environmentally exposed to arsenic or lead contamination. Lower dose of *Terminalia arjuna* bark extract was required for ameliorating the oxidative stress in lymphocytes exposed to lead acetate (10mM) as compared to sodium arsenite (10mM) *in vitro*.

**Amelioration of effects of heavy metal exposure on mice by herbal antioxidant:** A study was carried out on mice to assess the tissue level effects of the heavy metal exposure. Mice exposed to Nickel and/or Chromium revealed disorganization of normal histo-architecture and loss of activity of various enzymes of the liver, kidney and ovary. Supplementation of herbal antioxidant in the form of amla-extract lowered the toxic alteration in these vital organs. Thus, amla supplementation can ameliorate the adverse effects caused by heavy metal contamination.

**Mesenchymal stem cells derived from buffalo bone marrow:** Shortest population doubling time and higher viability percentage lead to early proliferation and faster growth of Mesenchymal Stem Cells in slow freezing as compared to fast freezing. Cryopreservative media II (7% DMSO and 3% Glycerol) and V (Commercial serum free media) were found to be the best for cryopreservation of mesenchymal stem cells derived from buffalo bone marrow.

**Role of outer membrane proteins of *Pasteurella multocida* in pathogenesis in *Bubalus bubalis*:** Binding assays were performed for studying interaction between buffalo fibronectin and outer membrane proteins of *Pasteurella multocida* by ELISA and western blotting. ELISA revealed that the heparin binding domain of fibronectin has a major role in adhesion by *P. multocida*.

**Effect of *Yea sac*<sup>1026</sup> supplementation on rumen profile and physiological and metabolic status of buffalo calves in summer season:** Supplementation of *Yea sac*<sup>1026</sup> @ 1 bolus (25 billion live yeast cells per animal per day for 21 days) in buffalo calves resulted in restoration of rumen microbial population and optimization of rumen metabolites concentration (Total Volatile Fatty Acids, Individual Volatile Fatty Acids, Ammonia Nitrogen and Total Nitrogen) during summer season. Vital health and biochemical parameters were also improved with *Yea sac*<sup>1026</sup> supplementation in buffalo calves during the summer season.

### **Veterinary Anatomy**

**Anatomical, histological, histochemical, and electron microscopic studies related to hormonal and biochemical profile of female reproductive organs in buffalo:** Follicular Atresia in preantral and antral follicles was studied. Expression of proliferating cell nuclear antigen was studied in healthy and atretic follicles.

**Identification of species on morphological and molecular characterization of skin and hair:** Histomorphological, histochemical and scanning electron microscopic studies were carried out on samples of buffalo skin and tissues from head, neck, thorax, abdomen and tail regions and hair samples of cattle and buffalo.

**Development of animation and sketch based teaching aids for Veterinary Anatomy:** Animated sketches were prepared for the arterial supply to the body, digestive, respiratory and



urogenital systems and histological pictures of various systems of buffalo.

**Veterinary education for sustainable growth, entrepreneurial skills and self reliance:**

A survey was conducted in North Indian states of Jammu and Kashmir, Himachal Pradesh, Punjab, Haryana, Rajasthan and Uttar Pradesh. About 700 people across the academic departments in 6 veterinary universities of North India and veterinary practitioner's headquarters were surveyed and 50 respondents each from veterinary faculty, veterinary undergraduate students and veterinary practitioners were covered. The results of the survey will help to draw future strategies for veterinary and animal husbandry education in India.

**Livestock production management**

**Improved practices of livestock production management:**

Coarse grinding as feed processing technology was found to reduce feeding cost of broiler with improved performance. Additional zinc supplementation was found to improve growth performance of Beetal goats under stall fed condition.

Tunnel ventilated environment controlled sheds ensured better economic return in broiler production at 10% higher stocking density and growth performance.

LED was found to be a better light source than incandescent bulb to reduce energy consumption, higher economic return, performance and welfare of broilers.

Ultrasound was employed for objective assessment of body condition score in Beetal goats.

The Department of LPM supplied Beetal goats to the govt. of J&K to improve milk production in Kargil region of J&K state.

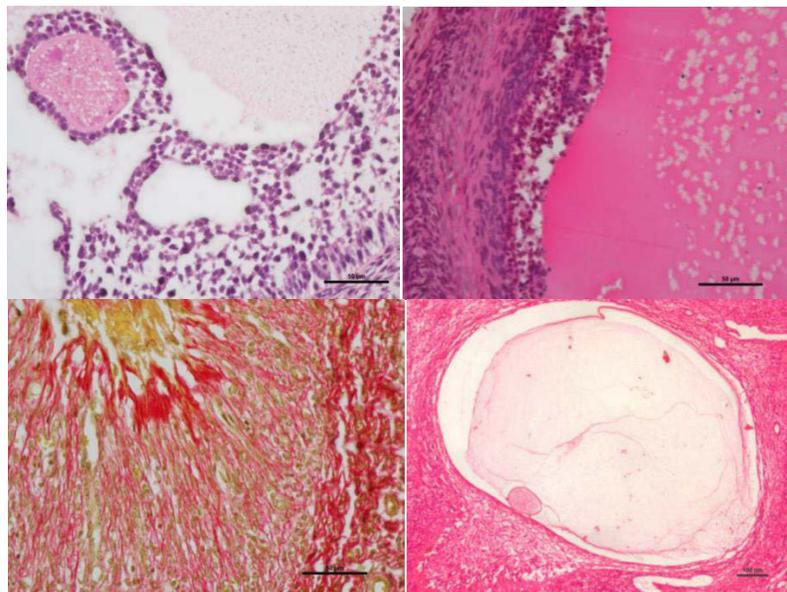
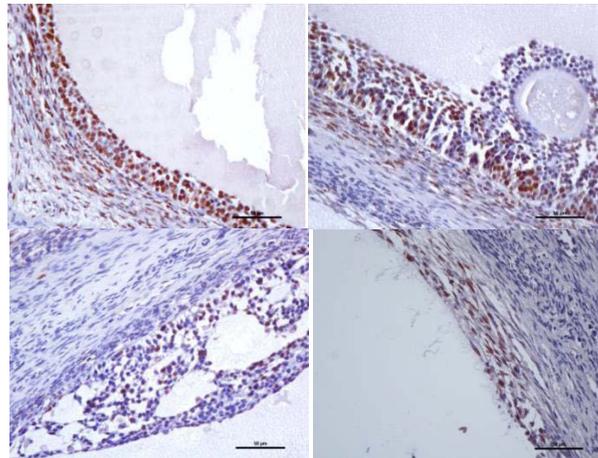
**Animal Nutrition**

**Effect of feed supplementation on Methane production**

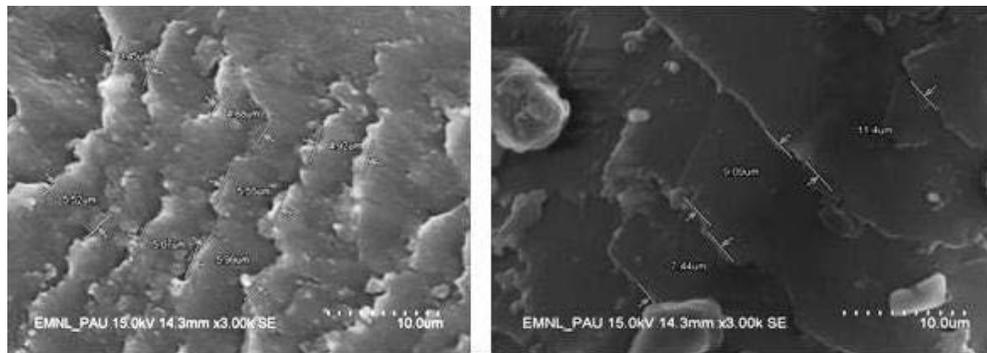
**Fruit and vegetable wastes:** The methane production potential and nutritional worth of fruit and vegetable wastes (FVWs) as livestock feed was assessed. The selected FVWs [cabbage leaves (CabLs), cauliflower leaves (CauLs), empty pea pods (PPs), sarson saag waste (SSW) and fruit juice waste without peels (FJW)] were found to be rich in protein. Methane production was the highest with pea pods and lowest in case of CauLs and CabLs. The digestibility of NDF and true OM in CabLs was comparable with that of FJW, CauLs and peapods, but significantly higher than SSW. The availability of ME was highest from FJW followed by that from PPs and lowest was observed in CauLs. Amongst the FVW evaluated, the total volatile fatty acids (TVFAs) and individual VFA production were observed to be significantly higher from FJW, followed by SSW and CauLs and lowest was from that of pea pods. The degradation rate (except that of NDF), effective degradability, true digestibility, potential and apparent extent of digestion were observed to be significantly higher in FJW and SSW. Amongst the tested FVWs, sarson saag waste and fruit juice waste followed by cauliflower leaves and pea pods have great potential as livestock feed and can serve as novel, alternate feed resources for livestock and can supplement or replace the costly feedstuffs.

**Vegetable oils:** The effect of vegetable oils (VOs) carrot seed oil, canola seed oil and rape seed oil on rumen fermentation and methanogenesis was assessed. Methane production was the lowest in rape seed oil supplemented group. Methane production was significantly higher in VO supplemented groups as compared to control group. Supplementation of diet with rape seed oil

### Expression of PCNA in healthy and atretic follicles



### Follicular atresia in antral follicles



Scanning electron micrographs: L. buffalo neck hair R. cattle abdomen hair

### Ultrastructural study on buffalo and cattle hair



@ 2–3% on dry matter basis had an edge over other oils and levels. Methane production was the lowest ( $P<0.05$ ) in cotton seed oil supplemented at 1% level as compared to other VOs, but it increased ( $P<0.01$ ) linearly with the level of VO supplementation. Thus, cotton seed oil supplemented at 1% level to the TMR mitigated the methane production significantly.

**Tree leaves:** The effect of supplementing TLs viz. *Eucalyptus globules* (safeda), *Psidium guajava* (guava) and *Phoenix dactylifera* (khajur) @ 1% on DM basis, either individually or in combination on the *in-vitro* fermentability and methane production potential of the TMR was assessed. Methane production was lowest ( $p<0.05$ ) when diet was supplemented with safeda, guava and khajur, but comparable with un-supplemented control diet. The increased fermentation efficiency by addition of leaves of safeda, guava and khajur had decrement effect on methane production. Thus, the tree leaves supplemented at the rate of 1% each (DM basis) to complete feed seems to have positive impact on *in-vitro* fermentability and in suppressing methane production.

**Effect of vitamins on *in vitro* digestibility and fermentability of complete feeds:** Supplementing the complete feeds with niacin and vitamin E combination improved digestibility of true OM and ME availability significantly ( $P<0.05$ ) as compared to control diet or diet supplemented with biotin or vitamin E alone. However, biotin may not have any additional benefit in improving the *in vitro* digestibility of nutrients and availability of ME. Thus, a combination of niacin and vitamin E supplementation improved the utilization of complete feed *in vitro*. Free choice salt and mineral licks (multi and fertility licks) increased the milk yield by 2 kg per cow per day in crossbred cows as compared to control group, whereas multi lick also improved the milk fat and protein content. Supplementation of free choice multi and fertility licks did not affect levels of blood biochemical profile and monitored plasma microminera 1 content of crossbred cows.

**Fodder Quality:** A study was conducted for two consecutive years to examine the effect of foliar spray of  $\text{FeSO}_4$  on the development, herbage yield, nutritive composition and quality of teosinte grown in Iron (Fe) deficient alkaline field. The results revealed an increase of 29.6 to 32.6% in green herbage yield (GHY) and 53.3 to 60.8% in dry matter yield (DMY) with 1.0 and 2.0% foliar sprays of  $\text{FeSO}_4$  at 30, 37 and 44 DAS over control. Fe foliar spray enhanced nitrogen (N), phosphorus (P), potash (K) and iron (Fe) content of herbage, however Mn content decreased due to antagonism.

**Poultry nutrition:** A study was conducted to assess the effect of reducing crude protein level without and with the addition of enzyme protease in diet of meat type birds reared in environment controlled broiler house (ECBH). Results showed 2% reduction in CP than prescribed improved ( $P\leq 0.05$ ) weight gain and FCR during starter phase. For overall growth period 1% CP reduction showed improved ( $P\leq 0.05$ ) growth and feed efficiency. Thus, in ECBH, CP can be reduced by 2% in starter and 1% during overall growth period than the recommended levels without affecting the growth and carcass parameters.

### **Livestock Products Technology**

**Encapsulation of natural bioactive compounds and micronutrients for the enhancement of nutritive, preservative and processing functionality of meat products:** Lemon grass essential

oil (LGEO) showed increase in antioxidant properties with increase in concentration with maximum DPPH and ABTS activities at 1.0% concentration (68.23% and 57.25%) respectively. Minimum inhibitory concentration (MIC) of LGEO ranged from 500-3000ppm against different pathogenic and spoilage organisms. In the zone inhibition assay *Staphylococcus aureus* was the most inhibited organism. Encapsulation of LGEO through external gelation was carried out. The average release rate of LGEO per hour was found to be maximum for 3% alginate concentration. The effectiveness of encapsulated LGO was compared against direct addition of LGO into emu meat emulsion. Standard Plate Count, coliform count and psychrophilic counts indicated more stable product storage when encapsulated LGO was used. Sensory profiling of the product showed significant masking of sharp and undesirable LGO odor after encapsulation in alginate matrix.

Clove oil was tested for its antioxidant and antimicrobial properties. DPPH and ABTS radical scavenging activity was increased with increase in concentration and was found to be 66.92% and 50.79% respectively, at 1% oil concentration. MIC of clove oil was found to be 3000 ppm when tested against nine pathogenic bacteria. Well diffusion antimicrobial assay exhibited maximum activity against *Salmonella enterica*. Clove oil was encapsulated in maltodextrin by spray drying. Moisture content showed significant decrease with increase in inlet temperature.

Process protocols have been standardized for development of nanoemulsions of LGO, cinnamon oil and clove oil using alginate and maltodextrin as stabilizers with tween 80 as surfactant. Stability of nano-emulsions ranged between 78.5 to 96.4%. The nano-emulsions thus prepared were characterized for average particle size with lowest size (103.4 nm) observed in emulsion sonicated for 5 minutes at 40% amplitude.

**Development of extended storage life meat products by incorporating bioactive phyto-extracts:** The ethanolic extract (90%) of *Aloe vera* and cinnamon bark exhibited higher *in-vitro* antioxidant ability than aqueous extract at time, temperature combination of 15 min for 65°C and 9 hr for 60°C, respectively. *Aloe vera* and cinnamon may be popularized as a source of natural antioxidant in different food products. The preparation of phytoextracts with high antioxidant activity from *Aloe vera* and cinnamon may be of great value. Various levels of phyto-extracts from *Aloe vera* and cinnamon bark were incorporated in chevon rolls at different level to develop novel functional meat products. Incorporation of phyto-extracts of *Aloe vera* and *Cinnamon* bark extract in chevon patties was found to be very useful to control the oxidative and microbial quality of chevon roll and it could be successfully stored for 28 days in aerobic packaging and upto 35 day in MAP under refrigeration (4±1°C). The ethanolic extract of watermelon rind was found to have a potential to enhance storage stability of aerobically packaged pork patties stored at refrigeration temperature (4±1°C) owing to its antioxidant and antimicrobial potency.

**Processing of meat and egg into newer value added products for better marketing:** Low-Fat Pork Patties were developed with 40% lower calories and similar sensory quality and improved processing attributes using 1% Sweet Potato Powder and 9% added water as fat replacer. Fibre-enriched chicken meat biscuits were developed by incorporation of wheat bran and oat bran. The bran incorporation resulted in significantly lowering ( $p<0.05$ ) of the pH values, fat content, water



activity and calorific values whereas moisture content, ash and crude fiber content increased. Bran treated samples were found to have improved oxidative stability during storage. Oat bran incorporated chicken meat biscuits were found to better maintain sensory characteristics than wheat bran and control throughout the storage study. Meat *wadi* was developed with 19.59% protein 17.17% fat and 93 Kcal/serving of 20g.

*Meat Mathi*: Moisture, protein and fat content increased significantly ( $p < 0.05$ ) whereas pH showed a decreasing trend with the increasing levels of meat in mathi. The flavour, juiciness, texture and overall acceptability were significantly ( $p < 0.05$ ) higher for mathi with 40% meat.

**Development of designer meat and egg products for health benefit and marketing:** Egg paneer is a processed egg product and its technology has already been transferred to various entrepreneurs for commercial benefits. The textural and sensory quality of egg paneer could be successfully improved with the incorporation of 1.5% carrageenan in whole egg liquid. The nutritive value of egg paneer prepared from the egg white/albumen was found to be appropriate for health conscious consumers and can be categorized as a Functional Egg Product. The overall quality and acceptability of the whole egg paneer was found to be better than other varieties of egg paneer.

**Development and dissemination of processing technologies of meat products:**

Emu meat nuggets incorporated with Pearl Millet were developed and quality evaluation was done. Microbial count increased significantly ( $P < 0.05$ ) with the advancement of storage period. The developed products were safe upto 21 days of refrigerated storage.

Emu meat nuggets incorporated with turmeric extract were found to have better shelf life as compared to control as depicted by reduced lipid oxidation parameters viz. TBARS, FFA and PV and microbial counts at the end of storage period.

Sorghum flour (10%) incorporated in emulsion based pork patties was found to be optimum to increase the functionality of meat and reduction of total cost.

**College of Fisheries**

**Herbal products as growth promoting immune-stimulators in aquaculture:**

**Garlic powder as a growth promoting immune-stimulating supplement in carp feed:** The growth promoting efficacy of garlic powder from medicinal herb, garlic (*Allium sativum L.*) was evaluated in common carp, *Cyprinus carpio L.* Garlic supplementation did not affect water quality, nutrient status and plankton production in experimental tanks. Significantly higher fish growth was recorded in all garlic fed groups ( $P \leq 0.05$ ), but maximum growth, in terms of net weight gain and specific growth rate, was recorded with 2% garlic feed. Garlic did not affect fish survival up to 2% incorporation level. Garlic supplementation @ 2% resulted in 93.49% higher fish harvest which not only compensated high cost of garlic supplemented feeds, but also resulted into extra earnings. Garlic improved flesh quality of fish in terms of higher protein content at all incorporation levels. Higher serum total proteins, albumin and globulin concentrations were recorded in fish fed with 2% garlic feeds. Overall results indicated a positive effect of garlic on fish growth, flesh quality and immunity, which reveals that garlic powder can be used as a feed additive @ 2%, not only for higher fish production, but also for producing fish with better health and flesh quality.

***Aloe vera* (gel and extract) as growth promoting immune-stimulating supplement in carp feed:** The growth promoting efficacy of medicinal herb, aloe (*Aloe vera*) was evaluated in common carp, *C. carpio* L. Fish growth (in terms of body length and body weight) was higher in the *A. vera* fed groups. Feed cost increased with increasing dose of *A. vera* supplementation. Over 60% and 100% higher fish harvest was obtained with AVG (2%) and AVE (2%) supplemented diets, which not only compensated for the higher feed cost, but also resulted into extra earning. Thus, although *A. vera* (both gel and extract) can be incorporated up to 2% level (20g kg<sup>-1</sup> feed) in common carp feed for more production in a given period of time, the maximum benefits can be obtained by incorporating AVE @ 1% (10g kg<sup>-1</sup> feed).

**Culture of ornamental aquatic plants with different organic manures:** Ornamental aquatic plants viz. Water Wort, Water Wisteria and Red Ludwigia were cultured in indoor conditions (net house) on different doses of organic manures viz. poultry droppings (PD), cow dung (CD), goat dung (GD) and vermicompost (VC). Plants responded best in terms of growth in PD followed by CD, GD and VC @ 2% level.

**Efficiency of natural (carrot) carotenoids and synthetic carotenoids ( $\beta$ -carotene) in growth, pigmentation and health improvement of ornamental fish:** Carrot (natural  $\beta$ -carotene) and synthetic  $\beta$ -carotene incorporated diet (25 and 50 ppm each) were developed for growth, pigmentation and health improvement in ornamental fish, koi carp, *C. carpio* (Linnaeus). Natural  $\beta$ -carotene from carrot meal incorporation in koi carp diet @ 25 ppm increased the carotenoid content in fish skin and muscle (2.23  $\mu\text{g g}^{-1}$  wet weight basis). In addition to colour enhancement, natural  $\beta$ -carotene @ 25 ppm and synthetic  $\beta$ -carotene @ 50 ppm also increased fish growth by 82.19% and 43.83% respectively along with health improvement in terms of total blood serum protein, SOD, catalase, AST and ALT levels.

**Introduction of indigenous ornamental fish species:** Two indigenous ornamental fish species i.e. rosy barb (*Puntius conchonius*) and Zebra fish (*Danio sp.*) were procured from market, acclimatized and are being reared (indoor / outdoor unit) for brood stock production under local climatic condition.

**Culture of murrel (*Channa marulius*) for diversification:** Fry of *C. marulius* was procured and reared successfully with high protein diet (cooked slaughter house waste mixed with rice bran and mustard cake) to fingerling stage. Fingerling overwintered successfully under polyhouse conditions.

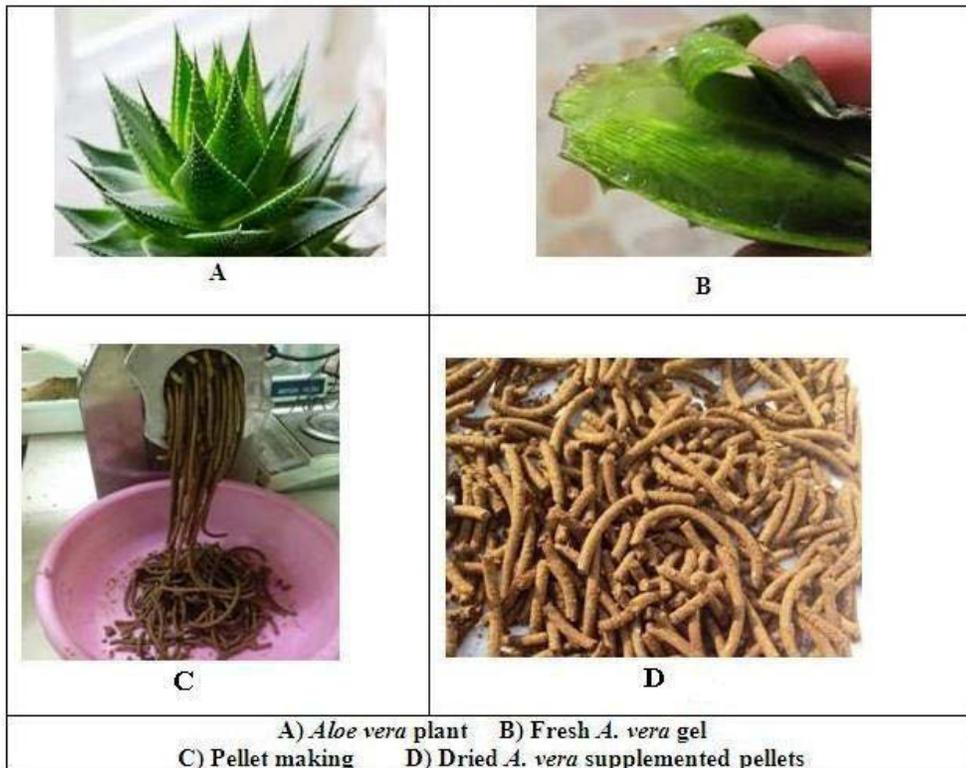
**Effect of different formulated supplementary diets on survival, growth and reproductive potential of Molly, *Poecilia sphenops*:** Fish fed diet D3 with highest protein level resulted in significantly ( $P < 0.05$ ) higher final weight, weight gain and specific growth rate along with significantly ( $P < 0.05$ ) lower FCR. The number of fry produced and their survival in treatment D3 were also significantly ( $P < 0.05$ ) higher compared to other two diets. Thus, 20% fish meal (protein) is adequate for growth and reproductive performance of molly.

**Methionine modulated bioavailability of inorganic zinc in common carp (*C. carpio* L.) fed with diets containing tricalcium phosphate (TCP):** Methionine modulated bioavailability of inorganic zinc (Zn) as ZnSO<sub>4</sub> · 7H<sub>2</sub>O, in common carp (*C. carpio*) fed with diets containing TCP as inhibitory agent was studied. Significantly higher Protein efficiency ratio (PER) was recorded



**Prawn and ornamental fish unit at College of Fisheries**

**Aloe vera as growth promoting immune-stimulating supplement in carp feed**



**Trials of Aloe vera as fish feed supplement at CoF**

**Natural (carrot) carotenoids, synthetic carotenoids ( $\beta$  - carotene) in growth, pigmentation and health improvement of ornamental fish**



**A - Control (without carotenoid source)**



**B- Synthetic  $\beta$ -carotene @ 25 ppm**



**D – Natural  $\beta$ -carotene @ 25 ppm**



**C- Synthetic  $\beta$ -carotene @ 50 ppm**



**E- Natural  $\beta$ -carotene @ 50 ppm**

**Experimental fish at termination of experiment showing skin colouration**

**Natural carotenoids in growth of fish**



**Left: Floating feed for catfish formulated and manufactured at CoF;**



**Right: Fish silage from carp waste**

**Fish breeding and seed production**



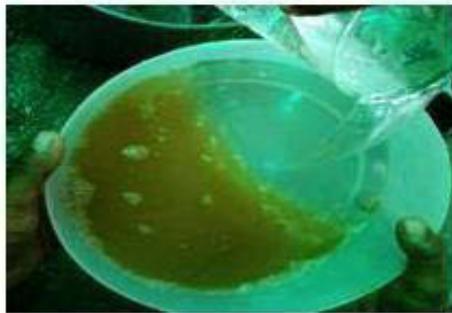
**Hormone injection**



**Stripping of female for egg collection**



**Stripping of male for milt collection**



**Degumming of adhesive eggs with clay mud water**



**Hatching pool for incubating fertilized egg**

**Fish breeding and seed production**



**Haul of brackish water 'Vannamei' shrimp harvested from farmers pond in village Ratta Khera, District Shri Mukatsar Sahib**

**Shrimp culture in Punjab under the guidance of GADVASU**

in fish fed with diets containing 1% methionine. Similarly, significantly ( $P \leq 0.05$ ) higher concentration of Zn was recorded in flesh and bone of fish fed with diets containing 1% methionine. It was found that  $ZnSO_4 \cdot 7H_2O$  as inorganic zinc source can be added up to 40 mg  $kg^{-1}$  in the formulated diets of common carp fingerlings without negative effect on the survival and growth to improve protein uptake to mitigate negative effect of TCP.

**Formulation and manufacturing of floating feed for catfish:** Floating feed for Pangas catfish was formulated and manufactured in extruder machine using locally available agro-industrial by-products i.e. De-oiled Groundnut oil cake, Soybean oil cake and Rice Bran containing overall protein content of around 28%. Feed cost was reduced by 31.5% as compared to the commercial floating catfish feed available in the market.

### **Fish / shellfish breeding and seed production**

**Preliminary breeding trials of Pangas catfish:** Pituitary hormone extract induced breeding trials on 3yrs old Pangas catfish (*Pangasianodon hypophthalmus*) were conducted successfully under the agro-climatic conditions of Punjab for the first time.

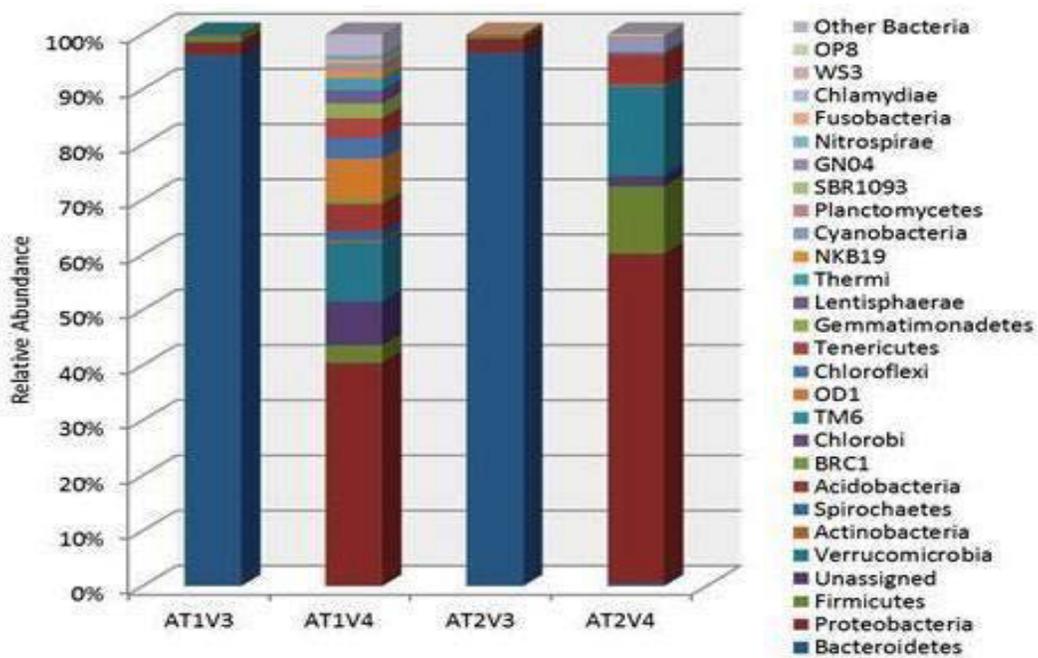
### **Aquaculture Health Management**

**Study of microbial diversity in aquaculture environment by Next Generation Sequencing (NGS) based 16S-rRNA metagenomics:** A total of 95 samples (31 soil, 37 water and 32 fish samples) were collected from freshwater and inland saline water aquaculture areas of Punjab. 16S rRNA amplicon library preparation and NGS has been completed for 30 samples (soil, water, fish gut). Proteobacteria followed by Verrucomicrobia were the most dominant phyla in sediment and fish gut samples. Firmicutes were quite abundant in fish gut and appeared to play a role in digestion of complex carbohydrates. Common probiotic bacteria showed very low presence in fish gut and it seems that they are not able to establish themselves in fish gut. Fish gut microbiota is dynamic and changes during growth stages as well as with health status of fish.

**Prevalence of potentially pathogenic *Vibrio* spp. in aquaculture environment:** From 95 aquaculture samples, 165 bacterial isolates were presumptively identified as belonging to *Vibrio* spp. After biochemical testing, PCR and 16S rRNA gene sequencing, 81 bacterial isolates were confirmed as belonging to Genus *Vibrio* and species level identification was carried out for these isolates. Out of these 81 confirmed *Vibrio* spp. isolates, *V. cholerae* were found to be most prevalent (88%) whereas other vibrios were found to be 1-3%.

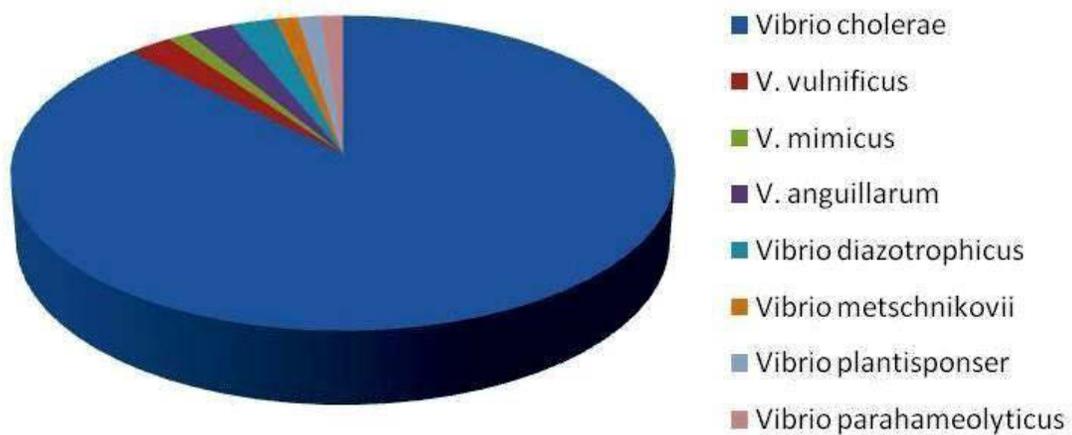
**Antibody based flow through assay kit for detection of *Vibrio parahaemolyticus*, the causative agent of shrimp EMS:** A flow through assay kit for detection of *V. parahaemolyticus* (causative agent of shrimp EMS) based on polyclonal antibodies against toxic PirA protein was developed. Farmers can use the kit for screening the procured shrimp seed for detection of *V. parahaemolyticus*. The diagnostic kit can also be used at ports for screening SPF (specific pathogen free) shrimp brood stock.

**Fish/shell fish processing/value addition:** Functional fish products prepared by adding jowar and oat flour can be added @ 10% to enrich rohu meat based cutlets without affecting their sensorial acceptability. Processing of Pangas fish was standardized in the form of fish fillets and steaks. Pangas cooking methodology based on sensory and culinary acceptability was standardized under different cooking techniques. Fish silage from carp fish waste was prepared



**Taxonomic comparison of estimated bacterial diversities in soil (AT1) and fish gut samples (AT2) by V3 and V4 primer sets**

**Bacterial diversity in soil and fish gut samples**



***Vibrio* species identified in aquaculture environment**

through acidification process (with formic acid) having 6 months shelf life. The protein content in fish silage ranged between 14-16%, fat 4-5%, moisture 60-63% and ash 11-13.5%. This silage can be further used in fish and poultry feed as a source of protein.

### **Data base generation**

**Cultural and socio-economic status of aquaculture units in salt affected areas:** Survey of 51 aquaculture units established in 13 villages in three salt affected districts Sri Mukatsar Sahib, Fazilka and Ferozepur was conducted.

**Eco-chemical assessment of river Sutlej using fish as bio-indicator:** Water, sediment and selected fish species (*Labeo rohita*, *Wallago attu*, *Aorichthys seenghala*, *Notopterus chitala* and *Channa marulius*) of river Sutlej were studied with respect to physicochemical profile, pesticide and heavy metal accumulation to assess the effect of pollution on the ecosystem of river Sutlej. The samples were collected from the two different sites; one was before confluence of Buddha Nallah (S1) and another was after confluence of Buddha Nallah (S2). All the physicochemical parameters were found to be within the optimum range at both the sites except for dissolved oxygen which was low at site 2. The bio-indicator bacillariophyceae species (found more in polluted sites) was relatively higher at Site-2 as compared to Site-1, indicating a higher degree of pollution at this site. The bio-indicator protozoa species was also higher at Site 2 as compared to Site 1. All the heavy metals detected were within the maximum permissible limits, except for lead, which was above the maximum permissible limits in water and in sediment at Site-1 and Site-2, respectively. The highest concentration of lead was found in the flesh of *W. attu* and gills of *A. seenghala* at Site-2 during the pre-monsoon period. Maximum concentration of PCB-28 and permethrin was detected in water samples while PCB-28 was detected in maximum concentration in the gill samples of *Cirrihinus mrigala* and *H. fossils* at Site-2. Fipronil was detected in soil samples at Site-2 only. p,p'-DDD was detected in flesh samples of *C. mrigala* and PCB-28 was detected in flesh samples of *C. catla* at Site-2. Similarly, PCB-52 was detected in the gill samples of *H. fossils* at Site-2 while as Mirex was detected in gill samples of *C. catla* at Site-1. All the POP's detected in water, sediment and fish samples were within the maximum permissible limits.

### **College of Dairy Science and Technology**

**Nanotechnology based Vitamin D<sub>2</sub> fortification in food system:** A nanotechnology based novel technique and food ingredient in the form of water dispersible vitamin D<sub>2</sub> powder has been developed which is a suitable for fortification into any food matrix including milk and milk products.

#### **Benefits of the developed technology:**

- ❖ Ready to use ingredient for Vitamin D enrichment of foods and drinks.
- ❖ Against the inherent hydrophobic nature of Vitamin D, developed powder would be readily water dispersible.
- ❖ Encapsulation improves the stability of Vitamin D during processing and storage of fortified food.
- ❖ Due to size reduction to nano-scale, bioavailability of Vitamin D increases many folds.
- ❖ No added chemicals (completely food grade in nature).



**Phytosterols in food:** Phytosterols are naturally occurring components of plants, especially seeds and oils with potential cholesterol-lowering properties. A stable oil-in-water emulsion has been developed as a potential delivery system for incorporation of phytosterols in aqueous food systems using health promoting ingredients, phytosterols, rice bran oil, emulsifiers and beta-glucan as a stabilizer. Technology of functional phytosterol fortified *lassi* has been optimized using the developed emulsions. The shelf life of the product has been extended upto 18 days using biopreservatives. The product was found to be highly acceptable among consumers.

**Gluten Free Cookies:** Different pearl millets cultivars were characterized and optimization of process for the preparation of Gluten Free Cookies is going on.

**Protein enriched chocolate:** Process and formulation for the preparation of protein enriched chocolate have been optimized.

**Kit for detection of adulteration in milk:** A kit was developed to detect common adulterants like sugar, starch, urea, neutralizers, hydrogen peroxide, glucose, salt, formalin, nitrates (pond water), and ammonium compounds for qualitative analysis. The costs of the kit for 5 and 10 adulterants tests are Rs. 300/- and 2,500/-, respectively. These kits are stable for minimum 6 months and are very useful for the consumers, farmers and small scale dairy processors.

**Dairy Microbiology:** Compatibility of starter culture with zinc salts upto 90 mg/10 ml of skim milk was tested for their resistance to zinc salts. Starter culture NCDC 144 (NDRI, Karnal) was finally selected for final product development based on their growth enhancement in skim milk media fortified with 250 ppm Zn<sup>++</sup> ions and increased acidity in the final product when compared to control (Skim milk media only). Initial trial of product formation with goat milk fortified with 8 mg/100 ml has shown high possibility of functional fermented milk product formation. Final optimization with RSM software is under process.

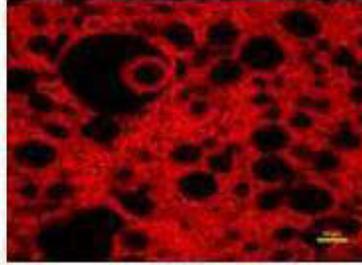
**Dairy Engineering:** A method for sterilizing milk using solar concentrator was developed. The milk was found suitable in its sensory and shelf life evaluation. It is a batch type process and also a water saving method which in existing methods has to be drained. Further investigations to make it commercially viable are being taken up.

**Dairy Economics:** Data is being collected from indigenous and cross bred cattle farmers on monthly basis across the state. The analysis of such a data will precisely determine the true economic worth of cattle. The disparity that exists between the realizable stream of profits from indigenous and cross bred cattle over the economic life span of an animal will be clearly delineated. Incentives for better adoption of elite indigenous cattle will be determined based on the relative economic worth of its unique attributes. Data is being collected from the dairy plant on regular basis for estimating the process- wise cost of milk products. The cost of milk products is being monitored regularly. The results of analysis of data will be helpful for the farmers to reduce the per unit cost of milk products and enhancing the profit levels.

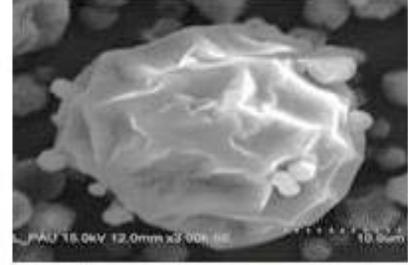
## Nanotechnology for Vitamin D2 fortification of milk



Developed encapsulated  
Vitamin D<sub>2</sub> Powder



Confocal Microscopic image of  
redispersed powder



Scanning Electron Microscopic  
image of powder particles



Phytosterols fortified lassi developed by CoDST, GADVASU



## **EXTENSION**

The Directorate of Extension Education geared up extension activities through its wings like Farm Advisory Service, Training and Visit to villages. In order to transfer the new technologies evolved by the university, training courses were organized for the farmers, field veterinarians and scientists from other universities. Faculty published about 128 extension articles in various magazines, journals, newspapers etc. in order to disseminate information important to farmers. The faculty members also delivered 36 TV and 55 radio talks on the topics assigned by the Directorate of Extension Education.

### **Training programmes organized for Veterinary Officers of Animal Husbandry department, Punjab**

The University has liaison with Animal Husbandry Department, Punjab. University provides latest technical know-how to Veterinarians of the State to refresh their knowledge and enhance professional skill. The trainings organized for the officers of state department.

### **Animal Welfare Camps**

The Directorate of Extension Education organized 7 animal welfare camps in the rural areas of Punjab for the treatment of sick animals. In these camps the farmers and the field functionaries were advised/made aware of the recommended animal health practices. The technical support in the form of animal welfare camps and PashuPalanMelas has been regularly provided to Regional Research and Training Centres and KVKs.

### **Expert Lectures/Technical guidance**

The faculty members delivered extension lectures to the farmers in collaboration with the other animal welfare agencies of the state and in the trainings organized by the KrishiVigyanKendras. On these occasions, demonstrations regarding the collection, dispatch and transport of clinical material like blood, mucous discharge and faeces from the animals, correct method of milking, teat dip, computation of ration, silage making, acaricide drug application and heat detection were carried out in the field for livestock farmers.

### **Pashu Palan Melas**

The faculty actively participated in organizing the PashuPalanMela of the Guru AngadDev Veterinary & Animal Sciences University held in the months of March and September every year. In these melas the departments of constituent Colleges of the University arranged exhibition stalls to show the new technologies/innovations developed for the farmers. On this occasion the other government and private agencies involved in animal welfare work also displayed their exhibits much of the importance to the farmer community. A large number of farmers visited the melas and discussed their problems with the experts of the university. On this occasion the mela highlights depicting the services and facilities available at university and other informational materials were distributed to the farmers. The university also participated as knowledge partner in the KisanMelas at BalowalSaunkhadi, Gurdaspur, Bathinda, Rauni, Tarntarn/Amritsar, and Faridkot Regional Research Stations/KVKs of PAU for the benefit of the Livestock farmers.



### **Chief Minister Awards**

To give a push to the livestock farming, Guru AngadDev Veterinary and Animal Sciences University, Ludhiana conferred Chief Minister Award to progressive farmers of the state. Chief Minister's Awards 2017 have been conferred on three livestock farmers of the state. The awards carry a plaque, a shawl and a citation along with the cash. In the cattle category, Sh. Gurmukh Singh, VPO Kairon Distt. Tarn Taran, in the buffalo category, S. Rajinder Pal Singh, VPO Dahedu, Distt. Ludhiana and in the goat farming category, Sh. Rahul Kasnia, Vill.Ramsra, Distt. Fazilka have won the awards.

### **Farmers Associations**

Various farmers associations are working under the aegis of Guru AngadDev Veterinary and Animal Sciences University, Ludhiana. The Directorate of Extension Education is involved in regulating the activities of different livestock farmer associations. The regular monthly meetings/seminars of members of these associations are being held at GADVASU, Ludhiana. Besides giving lectures on technical information, the queries/ problems of farmers are solved by university experts. These meetings provide a common platform for both scientists and farmers to solve problems at field level expressed by the farmers.

### **Farmers Advisory Helpline**

The telephonic helpline in the Department of Veterinary and Animal Husbandry Extension Education attends to the queries of livestock owners regarding the animal health and management problems. Telephone helpline was started with the motto "You ask, we reply". The University has also been receiving calls from distant areas like Haryana, U.P, Bihar, Rajasthan and M.P. The farmer queries attended on helpline for on the spot solution and the queries are also answered through postal letters aswell.

### **Farmers Information Centre**

The Farmers Information Centre runs by the university act as a single window system to cater the needs of the farmer at one place. The farmers have been given technical advice during their visit to the University. The various university publications/extension literatures are available in the farmer information centre for the use and purchase by the farmers. The faculty of the department attends to the farmer queries on various subject matters in this centre.

### **Linkage with other departments**

The University has liaison with line departments of Punjab State viz; Animal Husbandry, Dairy Development and Fisheries for undertaking animal welfare activities. The University participates as knowledge partner in various livestock promoting activities viz. Zonal Livestock Shows, North zone livestock championship, dairy training programmes, Animal welfare camps/field days etc. organized by the State departments every year and the exhibitions were arranged at various places of events.

Directorate of Extension Education, GADVASU provided the technical assistance in establishing the modern dairy farm at Gurudwara Karmsar Sahib, Rarra Sahib. Hon'ble Vice Chancellor, GADVASU inaugurated the same.

### **Guided Visits/ Farmers Exposure Visits**

To provide the latest technical know-how existing at farms of progressive farmers, the trainees



**Chief Minister's award conferred on progressive farmers**



**KVK Barnala bags first prize at Pashu PalanMela**



are taken to these model farms to get exposure about the practices being followed so that they can practically judge the pros and cons of the practices for adoption at their farm and the trainees of different associations like ATMA, Punjab Dairy Development Board have been provided with facilities to visits the farms.

**Utility services:** The University is providing the following utility services at very nominal rates for the livestock farmers:

**I. Information Services –**

For up gradation of knowledge of the farmers, extension functionaries, scientists and subject matter specialist the Directorate of Extension Education has been bringing out following publications.

**a. Publications(Books)**

- Package of Practices for Veterinary and Animal Husbandry (English & Punjabi)
- **Vigyanak Pashu Palan (Monthly Punjabi Magazine)**
- Hand book on Infectious Animal Diseases
- Veterinary Punjabi Shabad Kosh
- Dairy Farming
- Goat Farming in Punjab (English & Punjabi)
- Pashuan Da Parjanan Parbandh
- Santulit Ate Miyari Pashu Khurak
- GADVASU handbook (Punjabi and English)
- Poultry Farming
- Indigenous practices of farmers
- Reproductive management of dairy animals (Punjabi and Hindi)
- Vigyanik Soor Palan
- Paltuu Kutia De Samb Sambhal
- Reproductive calender

**b. T V/ Radio talk**

**c. Telephone helpline: 0161-2414005,2414026**

**II. Technical services:**

- a. O.P.D. /Indoor services for sick animals.
- b. Surgical treatment of animals
- c. Blood/faeces/urine/mucous/milk testing
- d. Feed and fodder evaluation
- e. Testing of water sample of farmers' ponds

**III. Input services:**

- a. Mineral mixture.
- b. Uromin lick
- c. Semen
- d. Breeding bulls/calves
- e. Mastitis Kit
- f. Disease outbreaks



- g. Sale of carp fish seed and ornamental fish seed/table size fish
- h. Maintenance of aquaria

**IV. Chartered services:**

- a. Animal Welfare Camps/days
- b. Expert lectures (oncampus/field)
- c. Training programmes for farmers, field functionaries (oncampus/field)
- d. Tailor made courses (on campus/field)

**Krishi Vigyan Kendra, Booh (Tarn Taran)**

**Training Programmes**

Name of the training programme	Duration (days)	No. of trainings held	No. of participants
Scientific pig farming training course under ICAR scheme	5	1	12
5 days Training programme on “Scientific fish farming” under ICAR scheme	5	1	20
5 days Training programme on “Integrated fish farming” under RKVY-07 scheme	5	1	15
5 days Training programme on “Scientific practices for Mushroom cultivation” under ICAR-14 scheme	5	1	14
5 days Training programme on “Sardi Diyan Sabziyan Da Maharat Sikhiya Korse” under ICAR-14 scheme	5	1	28
5 days Training programme on Scientific poultry farming training programme under ICAR-14 scheme	5	1	20
5 days Training programme on “Product preparation from fruits”	5	1	20
5 days Training programme on “Freshwater Carp Culture: Innovative Approach” under NFDP sponsored ICAR-47 scheme	5	1	20
5 days Training programme on “Ornamental Fish Breeding, Culture, Trade and Aquarium Services” under NFDP sponsored ICAR-47 scheme	5	1	20
7 days Training Programme on “Scientific Techniques of Honey Bee Keeping” under ICAR-14 scheme	7	1	18
7 days Training Programme on “Scientific Techniques of Bee Keeping” under RKVY-09 scheme	7	1	2



**Promotion of women empowerment at KVK Tarn Taran**



**L: Soil testing laboratory at KVK Tarn Taran; R: Training of women on healthy life style**



**Training on bee keeping at KVK Tarn Taran**



Name of the training programme	Duration (days)	No. of trainings held	No. of participants
6 days Training Programme on “Scientific Techniques of Honey Bee Keeping for Self Employment” under ICAR-14 scheme	6	1	2
6 days vocational training programme on “Integrated fish farming for self employment” (ICAR 14)	6	1	
6 days vocational training programme on “Integrated fish farming for self employment” (RKVY 09)	6	1	20
Insect pest and disease management in summer moong	1	1	25
Conservation of green fodder as silage	1	1	14
Conservation of green fodder as silage	1	1	12
Direct seeding of rice	1	1	15
Interpretation of soil test report	1	1	14
Formation of self help group	1	1	13
Balance diet and diet management	1	1	24
Water saving techniques at household level	1	1	25
Interpretation of soil test report	1	1	13
Fertilizer management in Kharif crops	1	1	14
Empowerment of women	1	1	12
Judicious use of organic and inorganic sources of nutrients in Kharif crops	1	1	27
Aquatic weed management in fish ponds	1	1	17
Integrated fish farming	1	1	12
Integrated fish farming with livestock	1	1	22
Integrated Parthenium management	1	1	67
Formation of self help group	1	1	15
Scientific Pig Farming (19-25.7.2016)	1	1	12
Scientific Fish Farming (11-18.8.2016)	1	1	20
Scientific practices for Mushroom cultivation (15-22.9.2016)	1	1	14
Design and development of low cost diet	1	1	23
Diet management for diabetic, obese and anemic patients	1	1	21



Name of the training programme	Duration (days)	No. of trainings held	No. of participants
preservation of seasonal fruits and vegetables	1	1	45
Women empowerment	1	1	22
Control of weeds in wheat	1	1	12
Integrated nutrient management in wheat	1	1	15
Demonstration on soil sampling	1	1	14
Goat management practices at household level	1	1	13
weed management in Rabi crops	1	1	16
Integrated nutrient and pest management in gobhi sarson	1	1	15
Preservation of fruits and vegetables	1	1	31
Scientific cultivation practices for cool season crops (24 - 28.10.2016)	1	1	26
Scientific Poultry Farming (01 - 07.11.2016)	1	1	17
Scientific preservation of seasonal fruits (01 - 07.11.2016)	1	1	16
Scientific Goat Farming (02 - 08.12.2016)	1	1	20
Soil sampling technique	1	1	20
Scientific Goat Farming	1	1	20
Scientific Fish Farming	1	1	20
Scientific Fish Farming	1	1	20
Importance of micronutrient - deficiencies and correction	1	1	20
Soil sampling and nutrient management	1	1	20
Scientific cultivation of cucurbit crops	1	1	19
Bee Keeping	1	1	25
Bee Keeping	1	1	18
Soil health management for sustainable agriculture	1	1	19
Cultivation practices of summer moong	1	1	26
Weed, nutrient and water management in summer moong	1	1	18



Name of the training programme	Duration (days)	No. of trainings held	No. of participants
Package practices for summer moong cultivation	1	1	27
Role of organic manure in INM	1	1	12
Inculcating healthy lifestyle habits among adolescents	1	1	38
Inculcating healthy lifestyle habits among adolescents	1	1	39
Promotion of women empowerment in border areas	1	1	79
Inculcating healthy lifestyle habits among adolescents	1	1	25
Promotion of women empowerment in border areas	1	1	30
Cultivation of different oilseed crops including gobhi sarson	1	1	8
Use of resource conservation technologies in crop production	1	1	8
Management of insect pest diseases and weed control in gobhi sarson	1	1	13
Insect pest and diseases control in gobhi sarson	1	1	15
Management of insect pest diseases and weed control in gobhi sarson	1	1	9

**Krishi Vigyan Kendra, SAS Nagar Distt. Mohali Training Programmes**  
**Training Programmes**

Name of the training programme	Duration (days)	No. of trainings held	No. of participants
Honey harvesting	01	01	11
Protected cultivation of vegetable and flower crops	01	01	12
Goat Farming	05	01	25
Off season vegetables	01	01	12



**Deworming camp at Salimpur Khurd organized by KVK Mohali**



**Training of women in fabric painting organized by KVK Mohali**



**Training on integrated farming at KVK Mohali**



Preservation of tomatoes	01	01	17
Cultivation practices of rainy season vegetables	01	01	15
Mastitis control and management	01	01	34
Integrated pest management of sugarcane	01	01	13
Planting and layout of orchard	01	01	15
Integrated farming under Rashtriya Krishi Vikas Yojna	05	01	16
Propagation of fruit crops	01	01	23
Fabric embellishment using basic embroidery stitches	01	01	18
Poultry Farming training course	06	01	30
Insect pest and weed management by natural enemies	01	01	21
Horticulture (Protected cultivation)	05	01	40
Value addition of milk	01	01	15
Insect, pest & disease management in sesame	01	01	28
Scientific approach to dairy farming and value addition of milk	05	01	20
Scientific approach to dairy farming and value addition of milk	05	01	37
Nursery raising techniques in vegetable crops	01	01	20
Preservation of lemon	01	01	33
Designing and stitching of necklines	05	01	24
Scientific cultivation of carrot (Horticulture)	01	01	12
Protected cultivation of horticultural crops (Horticulture)	05	01	30
Basic embroidery stitches and fabric painting	01	01	22
In-service Training Cum Refresher Course For Horticultural Development Officers/Agriculture Development Officers and Extension Functionaries	01	01	7
Fabric embellishment by using fabric painting techniques	05	01	10
Bee Keeping	05	01	31



Cultivation practices of Rabi season vegetables	01	01	11
Pig Farming	05	01	15
Preservation of fruits and vegetables	05	01	33
Late sown wheat	01	01	14
Organic Farming	05	01	10
Use of indigenous medicines in livestock	01	01	15
Nutrient management of horticultural crops	01	01	12
Training and pruning of fruit crops	01	01	17
Block printing	01	01	22
Techniques of block printing	01	01	13
Dairy Farming	05	01	40
Pest management in kitchen garden	01	01	14
Integrated Farming	05	01	30
Scientific cultivation of sugarcane	01	01	36
Vegetable cultivation entitled scientific cultivation of cucurbitaceous vegetables	01	01	25
Formation of self help group	01	01	19
Cultivation of summer season vegetables	01	01	21
Entrepreneurship development through agri-allied activities	05	01	30
Value addition to farm produce and entrepreneurship development	05	01	26
Goat Farming	05	01	31
Post harvest management and value addition of horticultural crops	05	01	28
Value addition to farm produce and entrepreneurship development	05	01	23
Year round fodder cultivation and its preservation for enhanced milk production	01	01	09

### **Krishi Vigyan Kendra, Handiaya, Distt. Barnala**

#### **Training Programmes**

In addition to skill based long duration trainings KVK, Barnala has conducted 47 one day training programmes and benefiting 905 farmers and farm women to enhance the productivity and profitability of agriculture, animal husbandry and related fields in the district.



Name of the training programme	Duration (days)	No. of trainings held	No. of participants
Bee Keeping	05	03	79
Scientific Goat Farming	05	01	64
Scientific Pig Farming	05	02	89
Integrated Fish Farming	05	03	63
Delicious snacks & beverages preparation	05	01	23
Packed lunch, food items for rural folk for self employment	05	01	15
Decorative items for self employment for rural youth	05	01	06
Preservation of fruits & vegetables	05	01	27
Mushroom cultivation	05	01	17
Ornamental fish breeding culture trade and aquarium services	05	01	23
Poultry farming for self-employment	05	01	41
Techniques of Tie & Dye	05	01	24
Artificial insemination techniques	45	01	20
Dairy Farmer Entrepreneur	45	01	20

### RRTC Kaljharani

#### Training Programmes

Name of the training programme	Duration (days)	No. of trainings held	No. of participants
Goat Farming Training	05	02	84

### RRTC Talwara

#### Training Programmes

Name of the training programme	Duration (days)	No. of trainings held	No. of participants
Animal Welfare Camp	01	03	71
Training Course on Goat Farming	05	01	15

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**Extension activities of KVK Barnala**



**Training of village farmers at KVK Barnala**



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17. Amrood: Paushtikta ate sehat sambhandhi fayade - Parul Gupta and Yashwant Singh
18. Kinnow de khuraki tattan de lakshan ate roktham- Munish Sharma and Yashwant Singh
19. Choleyan di change kaashat layi sifarashan- Munish Sharma, Harmeet Kaur and Yashwant Singh
20. Moongi di change kaashat layi sifarashan- Harmeet Kaur, Munish Sharma and Yashwant Singh
21. Pradhan Mantri Fasal Bima Yojana- Harmeet Kaur, Munish Sharma and Yashwant Singh
22. Parali di sucha jivarton lai sujaa- Harmeet Kaur and Yashwant Singh
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## LIBRARY AND NETWORKING

The University Library is central to the academic, research and extension activities of GADVASU. It has state-of-the-art infrastructure and ultra-modern facilities supporting the goals of the University through collection, organization and dissemination of information and knowledge. The Library is fully automated in its operations using LSEase (Libsys) Library Management Software.

The library provides a single platform to access various e-resources through its website i.e. Cyberary (<http://www.gadvasu.in/>) throughout the campus. The library provides access to about 3900+ journals through the Consortium for electronic Resources in Agriculture (CeRA). In addition, links have been given to various open access electronic information resources. The Library provides the facility of Online Public Access Catalogue (OPAC) not only inside the library but throughout the campus wide intranet.

The library has established a Campus wide Network connecting all buildings and offices of the University with more than 500 access nodes. The internet services are provided throughout the Campus through user base authentication. The Library hosts Intranet Web Server to provide Library Services throughout the Campus from Cyberary Website. The centralized controlled Antivirus has been installed on desktop computers in Library premises. The networking facility of GADVASU has also been extended to cover hostels using Wi-Fi Technology.

In addition to the routine functioning, the library is providing data inputs to the National Information System on Agricultural Education Network in India (NISAGENET). The Library is also ensuring data inputs to the All India Survey on Higher Education (AISHE) portal initiated by the Ministry of Human Resource Development (MHRD) to build a robust database and to assess the correct picture of higher education in the country. The library is also entrusted with the job of ensuring compliance to the e-waste management and handling.

The GADVASU library is central to the academic and research activities of the University. The various operations and services of Library are fully automated using LSEase Library Management System. The Library remains open from 9:00 a.m. to 7:00 p.m. on all working days and from 9:00 a.m. to 5:00 p.m. on Saturday, Sunday and holidays throughout the year with closings only on 5 National holidays, i. e. 26<sup>th</sup> January, 15<sup>th</sup> August and 2<sup>nd</sup> October, Holi and Diwali. The library staff works in two shifts i.e. from 9:00 a.m. to 5:00 p.m. and from 11:00 a.m. to 7:00 p.m. to facilitate library services for extended hours. The library provides single window access to its various e-resources, services and other important information through its website Cyberary (<http://www.gadvasu.in/>). The website of library is continuously updated to facilitate current information to users. The library is a member of Consortium for e-Resources in Agriculture providing access to about 3900+ journals in the broad spectrum of Agricultural Sciences including Veterinary Sciences, Animal Husbandry, Livestock Management & Poultry Sciences, Fisheries and Aquaculture, Dairy Technology, Biotechnology, Animal Nutrition and allied accessible through website of the library. In addition, the website provides access to various forms/ proformas relevant to the fraternity of GADVASU. Web-links have been given to various open access electronic information resources to access the scientific literature. The other Information Technology based services of library includes automated



circulation, creation of ID cards, database management for the books, journals, theses etc.

During the year 2016-17, the university library has strengthened its books collection with addition of nearly 1500 text and reference books. The online-book collection for the academic community of GADVASU was also strengthened with addition of 18 titles. The library is developing a model laboratory (Laboratory of Pathology) to demonstrate recent teaching technology comprising of interactive LED-TV integrated with visualizer. The library has taken initiative to develop audios and videos of clinical and other practices related to veterinary science and animal husbandry. These audios and videos are expected to be useful to veterinarians (including faculty, practitioners, students and researchers) and farmers in uplifting the animal husbandry and livestock farming in the state. In addition to this, the university library has also submitted a research proposal entitled, “Impact of digital tools on students’ farmers’ learning process” to the Indian Council of Agricultural Research.

In addition to the routine functioning, the library is providing data inputs to the National Institutional Ranking Framework (NIRF), All India Survey on Higher Education (AISHE) and National Information System on Agricultural Education Network in India (NISAGENET). Library is also taking care of the compliance to the e-Waste Management & Handling Rules 2011 by the university. Under these rules it is mandatory on part of university to ensure that e-waste generated by them is channelized to authorized collection center or registered dismantler or recycler. The Water-Mist (Fire Extinguisher) to handle heavy fire accident has been procured by the Library.

### **Networking**

The University Library has established campus wide network in GADVASU connecting more than 500 nodes throughout the campus. The library provides various services like Internet, E-Mail, and Access of Library through Intranet website in GADVASU Campus through Campus Wide Area Network. The Library provides Network Server Management under which the internet services are provided through the Campus Wide Area Network on Fiber Optic Cable. The internet services are provided throughout the Campus through User base authentication. The Library hosts Intranet Web Server to provide library services throughout the Campus from Cyberary Website. The centralized controlled Antivirus has been installed on desktop computers in Library premises.

The Library provides the E mail services to the staff on the domain @gadvasu.in. This Email service can be accessed worldwide. The Information Technology personnel of library manage and control the server for Apache Web-server, Mail Services, Network Management System, CD Server and Server for Antivirus Software. The library monitors the traffic and security of Local Area Network through the monitoring software like CISCO LAN Assistant, Cisco Adaptive Security Device Manager 6.1 etc. In addition, library maintains, troubleshoots and administers the use of Local Area Network (LAN) which has more than 500 nodes to access the services of Intranet and Internet. The facility for managing network switches for continuous smooth functioning of internet services is also rendered by library. During the year 2016-17 the Library procured i5 and i7 computers with high speed processing and quality display features to provide state of the art information technology infrastructure to students, researchers and faculty.



## SPORTS AND CO-CURRICULAR ACTIVITIES

The university has created adequate facilities to promote sports activities among the students. A large number of students (both boys and girls) from constituent colleges have shown keen interest in sports activities. 10<sup>th</sup> Annual Athletic Meet of the university was held on March 15-16, 2016. Sports contingent of 40 athletes participated in 16<sup>th</sup> All India Inter Agricultural Universities Sports & Games Meet held at Tamilnadu Agricultural University, Coimbatore from Feb. 22-26, 2016. During the year under report the students participated in various North Zone Inter-varsity Tournaments as given below:

Sr.No.	Events /Games	Organizing University	Dates of Competition
1.	Chess (M&W)	G.J.U.S.&T., Hisar (HR)	13.10.16 to 17.10.16
2.	Volleyball (M)	Punjabi University, Patiala(PB)	13.10.2016 to 18.10.16
3.	Badminton (M&W)	Maharishi Dayanand University, Rohtak (HR)	17.10.16 to 23.10.2016
4.	Basketball (W)	D.C.R. University, Murthal(HR)	02.11.2016 to 06.11.2016
5.	Handball (M&W)	Punjabi University, Patiala (PB)	18.11.2016 to 22.11.2016
6.	Cricket (M)	CCSU, Meerut, (UP)	21.11.2016 to 5.12.2016
7	Football (M)	Desh Bhagat University, Amloh Road, Mandi Gobindgarh (PB) District Fatehgarh Sahib, (PB).	17.1.2017 to 23.1.2017
8	Boxing (M)	L.P.U., Jalandhar (PB)	30.1.17 to 4.2.2017
9	Fencing (M&W)	GNDU, Amritsar (PB)	3.2.17 to 6.2.2017
10	Power Lifting (M)	Punjab University, Chandigarh	23.2.17 to 26.2.2017

A contingent of 40 GADVASU athletes participated in 17<sup>th</sup> All India Inter Agricultural University Sports & Games Meet 2016-17 at CCS Haryana Agricultural University, Hisar from 25 March 2017.

### Cultural Activities

Cultural Activities Wing of the directorate has been entrusted with the responsibility of promoting the cultural and co-curricular activities among the students, sharpening of their skills in the fields of Fine Arts, Theatre, Drama etc. and to provide them a platform to articulate the creativity. To achieve this objective, the wing organizes regular camps, seminars, meetings and interactions with eminent artists/personalities from the field of art and culture and facilitates the participation of students in cultural programmes in and out of the University. During the period under report:

- 1) 7<sup>th</sup> Youth Festival of GADVASU was conducted from 22<sup>nd</sup> to 28<sup>th</sup> October 2016.
- 2) In 32<sup>nd</sup> inter University North Zone Youth Festival (UNIFESTS) for the session 2017 was held at Chhatrapati Shahu Ji Maharaj University, Kanpur from 2<sup>nd</sup> to 6<sup>th</sup> January, 2017. The students of university participated and won following prizes  
Rangoli Making – 1<sup>st</sup> Prize  
Photography - 3<sup>rd</sup> prize



- 3) 32<sup>nd</sup> All India National Youth Festival 2017 was held at Shivaji University Kolhapur (Maharashtra) from 10<sup>th</sup> to 14<sup>th</sup> February 2017. The students of university participated and won following prizes
- Rangoli Making - First time National 2<sup>nd</sup> Prize
  - Photography - First time National 2<sup>nd</sup> Prize
- 4) 32<sup>nd</sup> All India Agricultural University Youth Festival was held at Rajasthan University of Veterinary and Animal Sciences Bikaner from 22<sup>nd</sup> to 25<sup>th</sup> February. The students of university participated and won following prizes
- Group Song (Patriotic) - 3<sup>rd</sup> Prize
  - Rangoli Making - 3<sup>rd</sup> prize
  - On the spot Painting - 3<sup>rd</sup> Prize

### **National Service Scheme**

The NSS Unit organized 7-Days NSS Special Winter Camp from January 25-31, 2017 with the theme 'Mat ko banao Bahumat' in the wake of Assembly elections in the state. Another seven-day NSS Special Camp was organized from October 7-13, 2016 at KCVAS, Amritsar. During the winter camp, a total of 85 NSS volunteers attended the camp to spread awareness for exercising their right to vote. Poster making competitions, Essay writing, quiz were organized. On January 31, 2017, NSS Volunteers became a part of 65 km long human chain at Hardy's World that registered a record in India Book of Records for being the Longest Human Chain for Voters' Awareness.

A two day Yoga Fest was organized from May 4-5, 2016 at TVCC Campus of KCVAS. During the camp, students were sensitized about the health benefits of Yoga in promoting physical, mental and spiritual health by arranging lectures of Yoga experts. Two lectures were organized on Prevention of Drug Addiction and Female Foeticide where in 100 NSS volunteers participated. International Yoga Day was observed on June 21, 2016 wherein Mr. Ravinder Gupta from Patanjali Yog Samiti guided the participating volunteers about different Yoga postures and their benefits in routine life.

NSS volunteers planted more than 100 saplings in the Administrative Block during a Tree Plantation Drive on 19.8.16. Four cleanliness drives under Shramadaan (Swatchh Bharat Abhiyaan) were performed and the works like cleaning of labs, classrooms, painting of pavements were carried out.

The NSS Unit also observed various important days such as National Youth Day, World Health Day, Anti-Terrorism Day, World No Tobacco Day, World Red Cross Day, World Environment Day, Sadbhawana Divas, Teachers Day, International Literacy Day, International Peace Day, NSS Day, Social Justice Day, National Blood Donation Day, National Integration Day, World AIDS Day, World Human Rights Day, Road Safety Week, Van Mahotsav Week, and Qaumi Ekta Week. The volunteers also provided their services in creating awareness on various social issues in rural areas as well as in urban slum areas. NSS volunteers also took part in various activities of social welfare and got associated with problems related to environment and the society in the city/State.



**Annual Athletic Meet at GADVASU, Ludhiana**



**GADVASU athletes in action**



**Athletes pushing hard to succeed**

## **Celebration of International Yoga Day at GADVASU**



**Tree plantation during celebration of World Environment Day at GADVASU**



**NCC Cadets at Annual Training Camp, Malout**



**Cancer awareness campaign at NCC Unit GADVASU**



**L: Girls participating in tug of war at NCC camp; R: Horse jumping by NCC cadet**



**GADVASU Girls' Basket Ball team**



**GADVASU Fencing team**



**Winners receiving a trophy from the Vice Chancellor at GADVASU Annual Athletic Meet**



**Winners with trophies**



**Winners of various cultural events from College of Fisheries**



**Mime artist students of College of Fisheries**



**A girl student from College of Fisheries poses with the dignitaries after receiving a prize**



## **ESTATE ORGANIZATION**

Landscaping wing developed three lawns in the newly constructed Girls hostel. Landscaping wing organizes *Van Mahotsav* (Tree Plantation Drive) on 19.08.2016 in university campus with the theme '*Join Hands to Make Change Today*'. Tree plantation drive was inaugurated by Dr. A. S. Nanda, Vice Chancellor, GADVASU. Plantation work was carried out in & around the administrative block, Farmer Hostel/Scientist Hostel, COVS building, Silver jubilee block, Dairy farm and GADVASU hostels. A total of 600 plants were planted in different areas of campus. Different types of plants *viz*; trees (Neem, Sukhchain, Amaltas, Gulmohar, Dharek /Bakain etc.), Fruit trees (Mango, Jamun, etc.) and shrub plants/small trees (Hamelia, Chandani, Jatropha, Har shingar, Plumeria rubra etc.) were planted.

## **INFRASTRUCTURE DEVELOPED/RENOVATED**

The University has added a new Girls Hostel in its existing infrastructure. The hostel is well equipped with common room facility and a basketball court for the students. The University has planned to provide solar water heating systems in the girl's hostel. The building of Small Animal Hospital, College of Dairy Science and Technology, Milk Plant, School of Animal Biotechnology, and School of Public Health are near completion. The work of the University auditorium is in progress and is expected to be completed by the end of 2017.



## CONFERENCES AND TRAININGS ORGANIZED

S. No.	Name	Organizing department	Dates	Sponsoring/ collaborating agency, if any
1	Annual Review Meeting of the Outreach Programme on 'Estimation of methane emission under different feeding systems and development of mitigation strategies'	Dept. of Animal Nutrition, GADVASU	July 8 <sup>th</sup> , 2016	ICAR
2	Hands on training on nutritional technologies for dairy farmers	Dept. of Animal Nutrition, GADVASU	October 17-21, 2016	
3	Hands on training on nutritional technologies for dairy farmers	Dept. of Animal Nutrition, GADVASU	November 21- 25, 2016	
4	Workshop on virus free seedlings in potato	KVK, Handiaya	September 14, 2016	ICAR
5	Artificial insemination technician training	KVK, Barnala	February 17 to March 03, 2017	PMKVY, ASCI
6	Dairy farmer/Entrepreneur training	KVK, Barnala	February, 20 to March, 22, 2017	PMKVY, ASCI
7	14 <sup>th</sup> Annual Review Meet of Network Project on Buffalo Improvement	GADVASU, Ludhiana	July 4-5, 2016	GADVASU in collaboration with ICAR
8	29 <sup>th</sup> Advanced training course on "Diagnostic imaging and minimally invasive surgical techniques for Veterinary patients"	Centre of Advanced Faculty Training, Department of Veterinary Surgery and Radiology, COVS, GADVASU, Ludhiana	Oct 5-25, 2016	ICAR
9	Training programme on "Small animal soft tissue surgery"	Department of Veterinary Surgery and Radiology, COVS, GADVASU, Ludhiana	Jan 30-Feb 03, 2017	ICAR
10	Training programme on "Small Animal orthopaedic surgery"	Department of Veterinary Surgery and Radiology, COVS, GADVASU, Ludhiana	13-17 Feb, 2017	ICAR
11	Practical training course in Techniques in Veterinary Microbiology and Molecular Biology' for B.Sc./B.Tech. and M.Sc. Biotechnology/Microbiology students.	Dept. of Vety. Microbiology, GADVASU, Ludhiana	June 1-30, 2016	
12	Goat Farming training	RRTC, Kaljharani	February 14 -18, 2017	General Training
13	Goat Farming training	RRTC, Kaljharani	March 6-10, 2017	RKVY Scheme & General Training



14	International Winter School on “Role of Molecular Biology in Disease Diagnosis and Development of New Generation Vaccines”	School of Animal Biotechnology, GADVASU, Ludhiana	Nov14-20, 2016	University of Saskatchewan, Canada
15	4 weeks Hands on Training Program in School of Animal Biotechnology	School of Animal Biotechnology, GADVASU, Ludhiana	June 1-30, 2016	GADVASU, Ludhiana
16	6 weeks Hands on Training program in School of Animal Biotechnology	School of Animal Biotechnology, GADVASU, Ludhiana	June 1 to July 15, 2016	GADVASU, Ludhiana
17	International Symposium & VII-IMSACON-2016 on New Horizons for Augmenting Meat Production and Processing to Ensure Nutritional Security, Food Safety and Environmental Sustainability	GADVASU, Ludhiana	November 10- 12, 2016	Indian Meat Science Association
18	One day International Workshop on Food Quality and Safety	GADVASU, Ludhiana	November 9 <sup>th</sup> -, 2016	GADVASU & Indian Meat Science Association
19	One-Day Industry-Academia-Farmers Interface	GADVASU, Ludhiana	November 10, 2016	GADVASU, Ludhiana
20	2-days Farmers Training Program on Egg Drink Concentrate	GADVASU, Ludhiana	June 4-5, 2016	On payment basis under ToT program
21	2-days Farmers Training Program on Egg Paneer	GADVASU, Ludhiana	June 10-11, 2016	On payment basis under ToT program
22	8-days Model Training Course Value Addition to Livestock Products and Entrepreneurship	Department of LPT, GADVASU	January 16 to 23, 2017	Ministry of Agriculture, Govt. of India
23	Training course on the cutting-edge technologies to enhance fertility in farm animals	ICAR Centre of Advanced Faculty Training in Veterinary Gynaecology and Reproduction, Department of Veterinary Gynaecology & Obstt, GADVASU,	November 04-24, 2016.	ICAR
25	Training of farmerson clean milk production& milk hygiene practices	SPHZ, Ludhiana	September 06, 2016	Public Health Found. of India
26	Training on “Extension Strategies for Sustainable Entrepreneurship in Livestock Sector”	Directorate of Extension Education GADVASU, Ludhiana	August 1-8, 2016	Ministry of Agriculture, Govt of India
29	Workshop-cum-training course on "Precision Livestock Management for Sustainable Animal Production"	Directorate of Extension Education GADVASU, Ludhiana	February 8, 2017	Indian Council of Agricultural Research



**AWARDS AND HONORS TO FACULTY**

Name of the faculty	Details of the award / honor received	Year of the award
<b>College of Veterinary Science</b>		
<b>Animal Disease Research Centre</b>		
Dr M S Bal	Best Oral Presentation Award at International Symposium and 7 <sup>th</sup> Conference of Indian Meat Science Association (IMSACON-VII) organized by Department of Livestock Products Technology, GADVASU, Ldh.	2016
<b>Department of Animal Genetics and Breeding</b>		
Dr. Simrinder Singh Sodhi	First prize in Poster Presentation at International Symposium & 7 <sup>th</sup> Conference of Indian Meat Science Association organised by the Department of Livestock Products Technology, GADVASU, Ludhiana	2016
	Third prize in Oral Presentation at 35 <sup>th</sup> Annual Convention of Indian Society for Veterinary Medicine and National Symposium organized by the Department of Veterinary Medicine, Veterinary College and Research Institute, Tirunelveli	2017
Dr. Saroj Kumar Sahoo	1 <sup>st</sup> Prize in Poster presentation, ISAGB conference, ICAR-IVRI, Izatnagar, Bareilly (UP)	2017
<b>Department of Animal Nutrition</b>		
Dr. Manju Wadhwa	Certificate of Appreciation, Conference on Innovations for sustainable feed industry, Benison Media, Karnal	2017
Dr. Jasmine Kaur	Best Poster Award in the 15 <sup>th</sup> Convocation of National Academy of Veterinary Sciences (NAVS) and National Symposium at Khalsa College of Veterinary and Animal Sciences, Amritsar	2016
<b>Department of Veterinary Anatomy and Histology</b>		
Dr. Devendra Pathak	Consolation Prize for Poster Presentation at Dr. S.S. Guraya Memorial Seminar on Advances in Animal Reproduction held at Deptt. of Zoology, PAU Ludhiana	2016
	Best Paper Presentation Award and Medal at XXXI Annual Convention of IAVA and National Symposium held at College of Veterinary Science, PVNRTVU, Rajendranagar, Hyderabad	2016
Dr. Neelam Bansal	Award of Honour and 2 <sup>nd</sup> Best Oral and Poster Presentation Awards at NCMLS-2016, BFUHS, Faridkot	2016
Dr. Opinder Singh	Reviewer Excellence Award by Indian Journal of Animal Research & Asian Journal of Dairy & Food Research	2016
<b>Department of Veterinary Gynecology and Obstetrics</b>		
Dr. Sumit Singhal	Best Poster Award at XXXII Annual Convention of ISSAR held at Tirupati A. P.	2016
Dr. Navdeep Ratta	R D Sharma Award at XXXII Annual Convention of ISSAR held at Tirupati A.P.	2016



	Best Poster Award during XXXII Annual Convention of ISSAR held at Tirupati A.P.	2016
Drs. A K Pandey SPS Ghuman G S Dhaliwal, and S K Agarwal	Neil's Lagerlof Award at XXXII Annual Convention of ISSAR held at Tirupati A.P.	2016
V K Gandotra	Elected as Vice-President, ISSAR during XXXII Annual Convention of ISSAR held at Tirupati A.P.	2016
Drs.Zodinsanga V RS Cheema, and PS Mavi	N C Sharma Award at XXXII Annual Convention of ISSAR held at Tirupati A.P.	2016
<b>Department of Livestock Production Management</b>		
Drs. Sharma, A., Kaswan, S., Singh, N. and Saini, A.L.	Second Best Oral Presentation Award at International Symposium and 7 <sup>th</sup> Conference of Indian Meat Science Association (IMSACON) Ludhiana, India	Nov 10-12, 2016
Drs. Singh, G., Malik, D.S., Kaswan, S. and Saini, A.L.	Third Best Oral Presentation Award at International Symposium and 7 <sup>th</sup> Conference of Indian Meat Science Association (IMSACON), Ludhiana, India	Nov 10-12, 2016
Drs. Kaur M, Sharma A, Singh Y, Sethi APS and Singh C	Second Best Oral presentation award for paper "Carcass characteristics and quality in tunnel ventilated <i>vis-a-vis</i> open sided conventional shed under different stocking density in summer.	Nov 10-12, 2016
<b>Department of Veterinary Parasitology</b>		
Dr. L.D. Singla	Admitted as Fellow of National Academy of Veterinary Science (NAVS) at 15 <sup>th</sup> Convocation of NAVS at Khalsa College of Veterinary and Animal Sciences, Amritsar	2016
	Fellowship of Indian Association for the Advancement of Veterinary Parasitology (IAAVP) at 26 <sup>th</sup> National Congress of Veterinary Parasitology and International symposium held at Veterinary College, Shimoga, Karnataka	2017
	Editorial Excellence Award of Indian Journal of Animal Research for significant and outstanding contribution to the journal as Associate Chief Editor	2016
	Appointed Regional Editor, Research Journal of Parasitology Regional Editor Pakistan Journal of Life and Social Sciences Associate Editor Academic Journal of Veterinary Sciences Editorial Board Member of International Journal of Medical Sciences & Pharmaceutical Research, and Editorial Board Member, International Journal of Research in Science & Technology	2016-17



	Nominated as Member of Research Council, Nanaji Deshmukh Veterinary Science University, Jabalpur	
	Selected Member of Technical Programme Committee of Conference of Zoology (CZ 2016) held at Nanjing, China	2016
	Member of Scientific Committee of 2 <sup>nd</sup> International Conference on Zoonoses held at Multan, Pakistan	2016
	Member, Symposium Advisory Committee for Drug Development Through Natural Products (DDTNP) at Maharaja Agrasen University, Baddi	2017
	Nominated External Expert Member of Research Degree Committee to Rani Durgavati Vishwavidyalaya, Jabalpur.	
	Member, International Scientific Committee from India 26 <sup>th</sup> World Association for the Advancement of Veterinary Parasitology (to be held from 4-8 September, 2017)	2017
Dr. N.K. Singh	UGC-Raman Post Doctoral Fellowship (2016-17) to pursue PDF at United State Department of Agriculture (USDA), Edinburg, Texas, USA	2016
	Associate of the National Academy of Agricultural Sciences	2017
Drs. N.K. Singh, Harkirat Singh, & S.S. Rath	Second Best Oral Presentation Award at the XXV National Congress of Veterinary Parasitology, held at Chennai	2016
Ms.Mranalini P, Drs. Harkirat Singh, Jyoti, N.K. Singh and SS Rath	Second Best Oral Presentation Award at 34 <sup>th</sup> Annual Convention of ISVM & National Symposium, held at GADVASU, Ludhiana	2016
Drs. Rahul Parashar, L.D. Singla & Paramjit Kaur	Best Poster Presentation Award at 15 <sup>th</sup> Convocation of National Academy of Veterinary Sciences (NAVS) and National Symposium at Khalsa College of Veterinary and Animal Sciences, Amritsar	2016
Drs. MS Bal,V. Mahajan, G. Folia, C.K. Singh & Paramjit Kaur	First Best Oral Presentation Award at 7 <sup>th</sup> Conference of IMSACON at GADVASU, Ludhiana	2016
<b>Department of Veterinary Pathology</b>		
Drs. O K Baba, Sood N K, Gupta K, Sharma S, Mohindroo J, Anand A and Uppal S K	Best Oral Presentation Award at the 34 <sup>th</sup> Annual Convention of ISVM held at COVS, GADVASU, Ludhiana	2016



Drs. Lalankimi, Deka D, Sharma D, Gupta K and Singh A.	Best Poster Award (3 <sup>rd</sup> Position) at the 15 <sup>th</sup> Convention of National Academy of Veterinary Sciences (NAVS) and National Symposium at Khalsa College of Veterinary and Animal Sciences, Amritsar	2016
Drs. Phom Langnyei L, Leishangthem Geeta D, Gupta K and Singh A	Dr. C M Singh Memorial Award, 2015 for the best article published in Indian Journal of Veterinary Pathology at the Annual IAVP Conference held at Chhatisgarh Kamdhenu Vishwavidhyalaya, Anjora Durg	2016
Drs. Baba O K, Sood N K, Gupta K and Narang D.	Prof. S. Ramachandran Memorial Award, 2016 for the Best Research Presentation on Molecular Oncology at the Annual IAVP Conference held at Chhatisgarh Kamdhenu Vishwavidhyalaya, Anjora Durg, India	2016
<b>Department of Teaching Veterinary Clinical Complex</b>		
Dr. Raj Sukhbir Singh	Fellowship for undergoing 3 months training at Western College of Veterinary Medicine, University of Saskatchewan, Saskatoon, Canada under scheme "Second Push to Agricultural Development in Punjab – Training of Scientists Abroad" funded by Punjab Government through The Punjab State Farmers' Commission, Mohali	2016
Dr SPS Ghuman	'Niels Lagerlof Memorial Award-2016' at 32 <sup>nd</sup> Annual Convention of ISSAR and National Symposium held at Sri Venkateswara Veterinary University, Tirupati	2016
<b>Department of Veterinary Medicine</b>		
Drs. BK Bansal Shukriti Sharma D.K. Gupta and Khushmeet Kaur	Best Research Paper Presentation Award at National Conference on Medical & Life Sciences organized by University Centre of Excellence in Research, Baba Farid University of Health Sciences-Faridkot	2016
Dr SNS Randhawa	Award of Recognition at International Dairy Meet and Expo-2016 at New Orleans, USA	2016
Drs. Rajdeep Brar, Swaran Singh, C S Randhawa, Ashwani Kumar, N K Sood, B K Bansal, S K Uppal, S N S Randhawa and Asmita Narang	Best Oral Presentation Award at 35 <sup>th</sup> Annual convention of Indian Society for Veterinary Medicine and National Symposium held at Veterinary College and Research Institute, Tirunelveli	2017
Drs Swaran Singh, Neetu Saini, Gurpreet	3 <sup>rd</sup> Best Oral Presentation Award at 35 <sup>th</sup> Annual convention of Indian Society for Veterinary Medicine and National Symposium held at Veterinary College and Research Institute,	2017



Singh, Reetu Verma, SKUppal	Tirunelveli	
Drs. B.K.Bansal and D.K. Gupta	Appreciation award for organizing ISVM conference 2016	2017
Asmita Narang (Ph.D. student)	INSPIRE Best Research Plan for PhD Research at national level	2017
<b>Department of Veterinary Microbiology</b>		
Dr Paviter Kaur	Second Best Research Poster Award at Brucellosis International Research Conference 2016 NASC New Delhi	2016
Dr s HR Holt, WA Beauvais, P Kaur, JS Bedi, NS Sharma, R Kumar, P Mangtani and J Guitian	Best Research Poster Award at Brucellosis International Research Conference 2016 held at NASC New Delhi	2016
Drs. Deepti Narang, Gursher Singh Sidhu, Dinesh Kumar, Deepak Sumbria, Mudit Chandra, Gursimran Folia, Amarjit Singh, Sikh Tejinder Singh	Best Poster Award at the 15 <sup>th</sup> Convocation & National Symposium of National Academy of Veterinary Sciences (NAVS) Khalsa College of Veterinary & Animal Sciences, Amritsar	2016
Drs. Mudit Chandra, Sunita Thakur, Deepti Narang, Gurpreet Kaur and N S Sharma	Consolation Prize for Poster at IMSACON-VII held at Deptt of LPT, GADVASU, Ludhiana	2016
Dr. Hari Mohan Saxena	Global Health Travel Award of Bill and Melinda Gates Foundation, USA.	2016
	European Patent granted for the new "Superagglutination test"	2016
<b>Department of Veterinary Physiology and Biochemistry</b>		
Drs. Dash S K, Nayyar S, & Jindal R	Best Poster Presentation Award (First prize) at Dr. S. S. Guraya Memorial Seminar on "Recent Advances in Animal Reproduction" organized by the Department of Zoology, PAU, Ludhiana	2016
Drs. Dash S K, Nayyar S, Jindal R & C S Mukhopadhyay	Poster Presentation Award (Third prize) at National Conference on Medical and Life Sciences organized by University Centre of Excellence in Research, Baba Farid University of Health Sciences- Faridkot, Punjab	2016
Dr. Chanchal Singh	Best Poster Award at Annual Convention and National Symposium of SVBBI, Department of Veterinary Biochemistry, COVS, OUAT, Bhubaneswar	2016



<b>Department of Veterinary Pharmacology and Toxicology</b>		
Drs. V. K. Dumka, S. K. Sharma, Kuldip Gupta, P. S. Daundkar, B. Vemu and Simerjot Singh	Best Poster Award at 36 <sup>th</sup> Annual Conference of Society of Toxicology of India and International Conference held at Amity University, NOIDA	2016
Dr. V. K. Dumka	Elected Joint Secretary, Society of Toxicology (STOX), India	2016
<b>Department of Veterinary Surgery and Radiology</b>		
Drs. Singh G, Udehiya R, Mohindroo J and Singh T.	Gold Medal for Best Poster Presentation at XXXX Annual Congress and Symposium of I.S.V.S. held at TANVASU, Chennai (TN) India.	
Drs. Gaur R, Mohindroo J, Mahajan SK, Verma P and Udehiya R	Appreciation Award for Paper at XXXX Annual Congress and Symposium of I.S.V.S. held at TANVASU, Chennai (TN) India	
Drs. Ahmad,R, Balaji C, Mahajan SK, Mohindroo J. and Singh N	Appreciation Award for Paper at XXXX Annual Congress and Symposium of I.S.V.S. held at TANVASU, Chennai (TN) India	
<b>Department of Livestock Product Technology</b>		
Dr. Kumbhar Vishal Hanamant	ICAR-SRF	2016
<b>Department of Veterinary and Animal Husbandry Extension Education</b>		
Dr Jaswinder Singh	Australia Fellowship Award, University of Sydney, Australia.	2016
Dr. Parminder Singh	CLAFMA Award in Dairy Nutrition at Annual Symposium at Kolkata	2016
Drs. Ravdeep Singh, Jaswinder Singh, R.Kasrija, M. Sharma and H.K.Verma	Best Poster Presentation Award at IMASCON at GADVASU	2016
<b>School of Animal Biotechnology</b>		
Drs. Arif Pandit, Choudhary S, Verma R, Singh B and Sethi RS.	Best Paper Award at International School organized by School of Public Health and Zoonoses, GADVASU, Ludhiana	2016
Drs. Geetika	Best Paper Award (First Prize) at International Winter School	2016



Verma, CS Mukhopadhyay, Ramneek and R S Sethi	organized by School of Animal Biotechnology, GADVASU, Ludhiana	
Drs. Rabia Bhardwaj, R S Sethi, J S Arora, Simarjeet Kaur, C S Mukhopadhyay	Best Paper Award (3 <sup>rd</sup> Prize) at International Winter School organized by School of Animal Biotechnology, GADVASU, Ludhiana	2016
Drs. Manpreet Kaur Taluja, Vidushi Gupta, Garima Sharma, Jaspreet S Arora	First Prize in Oral Presentation in Conference on “Physiology Update 2016” at Government Medical College, Patiala	2016
Drs. Jaspreet Kaur Gill, J S Arora, BV Sunil Kumar, CS Mukhopadhyay & Simarjeet Kaur	Best Poster Award (First Prize) in NAVS National Symposium at Khalsa College of Veterinary and Animal Sciences, Amritsar (Punjab)	2016
<b>Livestock Farm</b>		
Dr. B.K. Bansal	Award of Honor at 35 <sup>th</sup> Annual Convention and National Symposium of Indian Society for Veterinary Medicine, Tirunelveli, Tamil Nadu	2017
Dr. Simarjeet Kaur	Best Poster Presentation Award at National Symposium of SOCDAB held at the Kerala Veterinary and Animal Sciences University, Mannuthy, Thrissur	2017
	Elected Executive Member of Society for Conservation of Domestic Animal Biodiversity (SOCDAB)	2017
Dr. Navdeep Singh	Young Scientist Award for Best Poster Presentation at XXXII Annual Convention of ISSAR , organized by SVVU, Tirupati	2016
	Dr. R.D.Sharma Award for Best Paper at Annual Convention of ISSAR , Organized by SVVU, Tirupati	2016
<b>School of Public Health and Zoonoses</b>		
Dr. JS Bedi	DST travel grant to attend IUFOST International Conference at Dublin, Ireland from 21-25 August 2016	2016
Drs. Shalini Thakur , JS Bedi, Randhir Singh , JPS Gill, AK Arora, Neeraj Kashyap	Second Best Poster Award at International Brucellosis Conference held at New Delhi	2016
Dr. BB Singh	One Health Eco Health Fellowship to attend Fourth International One Health Congress and 6 <sup>th</sup> Biennial Congress of the International Association for Ecology and Health held	2016



	at Melbourne, Australia	
Dr. Simranpreet Kaur	Award of Honour by Vets Club, Ludhiana on World Veterinary Day 2016	2016
<b>College of Dairy Science and Technology</b>		
Dr. Amandeep Sharma	3 <sup>rd</sup> Prize for Best Oral Presentation at International Symposium and 7 <sup>th</sup> Conference of IMSA held at GADVASU, Ludhiana	2016
Dr. S Siva Kumar	Best Poster Award at International Symposium and 7 <sup>th</sup> Conference of IMSA held at GADVASU, Ludhiana,	2016
Drs. Nitika Goel, P.K. Singh, S.K. Kanawjia and Inderpreet Kaur	3 <sup>rd</sup> Prize for Poster at International Symposium and 7 <sup>th</sup> Conference of IMSA held at GADVASU, Ludhiana	2016
Drs. Sandeep Singh, Sunil Kumar Khatkar, Rekha Chawla, Harsh Panwar and Anil Kumar Puniya	Best Poster Award at National Seminar on Food Processing India 2017 Held at GJUS&T, Hisar	2017
<b>College of Fisheries</b>		
Dr. Anuj Tyagi	Best Participant Award in Summer school training programme organized by Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar	2016
Dr. Naveen Kumar B.T.	Scientist of the Year Award from Society of Biological Sciences and Rural Development	2016
<b>KVK- Mohali</b>		
Drs. Yashwant Singh & Randhir Singh	Third Best Paper Awarded at the International Symposium and 7 <sup>th</sup> Conference of Indian Meat Science Association held at GADVASU, Ludhiana	2016
Drs. Yashwant Singh and Vikas Phulia	Third Best Oral Presentation Award at the International Symposium and 7 <sup>th</sup> Conference of Indian Meat Science Association held at GADVASU, Ludhiana	2016
<b>KVK- Barnala</b>		
Dr. P.S.Tanwar and his team	1 <sup>st</sup> Prize in State Pashu Palan Mela, organised by GADVASU, Ludhiana	2016
<b>KVK- Tarantaran</b>		
Dr SS Hassan	Scientist of the Year Award (2016) at XXIX Annual Conference of NESA organized by National Environmental Science Academy (NESAs), New Delhi at Panjab University, Chandigarh	2016
	Best Scientist Award (2016) at PEARL Educational Excellence Awards to Higher Education Institutions in India at Madurai	2016
	SESR Ecologist of the Year Award (2016) by Society for Educational & Scientific Research at Bengaluru	2016



**PARTICIPATION OF FACULTY IN CONFERENCES / SYMPOSIA / WORKSHOPS / TRAININGS**

**International**

S. No	Name of the Conference / Symposium / Workshop /	Name of the organizing agency and place	Dates during which held
1.	International Symposium & 7 <sup>th</sup> Conference of Indian Meat Science Association on “New Horizons for Augmenting Meat Production & Processing to Ensure Nutritional Security, Food Safety and Environmental Sustainability”	Department of Livestock Products & Technology, GADVASU, Ludhiana	November 10-12, 2016
2	Comprehensive Climate Risk Assessment and Management	GIZ, New Delhi	November 3-4, 2016
3	Feed Tech Animal Feed Technology Expo 2017	New Grain Market, Karnal, Haryana	February 23 , 2017
4	Conference on Entomology	Punjabi University, Patiala	December 3-5,
5	One Health Leadership Experience	University of Saskatchewan, Canada	August 26-28, 2016
6	Brucellosis International Research Conference 2016	NASC, New Delhi	November 17-19, 2016
7	Keystone Symposium on Human and Veterinary Vaccines	Keystone Symposium, Cape Town, South Africa	May 22 – 26, 2016
8	4 <sup>th</sup> International One Health Congress and 6 <sup>th</sup> Biannual Congress of the International Association of Ecology and Health	International Association of Ecology and Health held at Melbourne, Australia	December 3-7, 2016
9	International School on “One Health - A Team Science Approach for the Protection of Animal, Human and Environmental Health”	School of Public Health and Zoonoses, COVS, GADVASU, Ludhiana	February 9-15, 2016
10	International Livestock Conference and Expo & 23 <sup>rd</sup> Annual Convention of ISAPM	ISAPM at Hyderabad, Telangana State, India	January 28- 31, 2016
11	62 <sup>nd</sup> International Congress of Meat Science & Technology (ICOMST, 2016) on Meat for Global Sustainability	Meat Technology Research Network Center, Faculty of Agricultural Technology King Mongkut's Institute of Technology, Bangkok,	August 14-19, 2016
12	PhD Pre-congress Course, ICOMST 2016	Meat Technology Research Network Center, Bangkok, Thailand	August 13, 2016
13	18 <sup>th</sup> International Congress on Animal Reproduction	Tours, France	June 26-30, 2016



14	International Conference and Annual Meeting of Myanmar Veterinary Association	Yangon	December 3-4, 2016
15	IUFoST 2016 Dublin – the 18 <sup>th</sup> World Congress of Food Science and Technology	Dublin, Ireland	August 21-25, 2016
17	iCOMOS: 2 <sup>nd</sup> International Conference on “One Medicine One Science”	University of Minnesota, Minneapolis, USA	
18	International Workshop on Milk: Naturally Nanostructured Food	Organised by ICAR-NDRI, Karnal and University of Queensland, Brisbane supported by Australia-India Council Grant at ICAR-NDRI,	November 30, 2016
19	International Conference on Recent Advances in Emerging Technology (ICARET-2016)	Held at Guru Granth Sahib World University, Fatehgarh Sahib Punjab	February 23-24, 2016
20	Climate Change Adaptation: Ecological Sustainability and Resource Management for Livelihood Security	ICAR-CIARI, Port Blair	December, 8-10, 2016
21	International Conference on Innovative Trends in Engineering Science and Management	YMCA, New Delhi	May 28, 2016
22	International Conference on "Latest Concepts in Science, Technology and Management" (ICLCSTM-16)	IETE, New Delhi	June 19, 2016



**National**

S. No.	Name of the Conference / Symposium / Workshop / Training	Name of the organizing agency	Dates during which held
1.	Challenges in Quantitative Genetics for Improvement of Indigenous Animal Genetic Resources (XIII National Conference of ISAGB)	ICAR-IVRI, Izatnagar, Bareilly (UP)	January 19-20, 2017
2	Promoting Public-Private Sector Partnership in Enhancing Food Value	National Productivity Council New Delhi	November 3-4, 2016
3	Model training course on “Value Addition to Livestock Products and Technology”	GADVASU, Ludhiana	January 16-23, 2017
4	Library Services and Management – A Platform Approach	Panjab University, Chandigarh	November 2016
5	Workshop cum training programme on oilseeds	DMR, Bharatpur (Rajasthan)	October 7-8, 2016
6	Skill development training	PAMETI, PAU, Ludhiana	October 26-28,
7	National Workshop of KVKs Zone-1	Directorate of ATARI, Zone 1 Ludhiana, held at CSKHPAU Palampur	2016
8	National Workshop on Skill Development	Ministry of Agriculture, New Delhi	January, 5, 2017
9	Zonal Workshop on Cluster Frontline Demonstration	Directorate of ATARI, Zone 1, Ludhiana, PAU,	January, 23-24 2017
10	Workshop- cum- training on Precision Livestock Management for Sustainable Animal Production	DEE, GADVASU, Ludhiana	February, 8 2017
11	Workshop- cum- training on Precision Livestock Management for Sustainable Animal Production	Directorate of Extension Education, GADVASU, Ludhiana	2016-17
12	Twenty one days training course	CSS Haryana Agricultural University, Hisar	November 4-24, 2016
13	Workshop on Rabi crops	Punjab Agricultural University, Ludhiana	August, 16-17 2016
14	Dairy Farmer-Entrepreneur Trainer Assessment	ASCI	2016-17
15	National Orientation Workshop for the Fisheries SMS	NFDB, Hyderabad	June 16 -17, 2016
16	Fishery Workshop	ICAR-NBFGR, Lucknow	October 07, 2016
17	Orientation Workshop on Skill Development in Agriculture	ICAR- ATARI Zone-I, Ludhiana	October 26-28, 2016
18	Value Addition to Livestock Products and Entrepreneurship Development	Department of Livestock Products Technology, College of Veterinary Science, GADVASU,	January 16-23, 2017



19	10 days Training on “Recent Models and Methods For Analysis of Farm Animal Data for Devising Suitable Breeding and Management Strategies”	Central Sheep and Wool Research Institute (CSWRI), Avikanagar, Rajasthan	July 11-20, 2016
20	Advanced Tools for Conservation of Domestic Animal Diversity”	NBAGR, Karnal in collaboration with Education Division, Indian Council of Agricultural Research (ICAR), New	October 17-26, 2016,
21	21 days Training on “The Cutting Edge Technologies To Enhance Fertility In Farm Animals”	Center of Advanced Faculty Training in Gynaecology& Reproduction, GADVASU,	November 04-24, 2016
22	XXXII Annual Convention of ISSAR on Animal fertility and fecundity at crossroads: addressing the issues through conventional and advanced reproductive technologies	The Indian Society for Study of Animal Reproduction /Organised by SVVU, Tirupati	December 6-8, 2016
23	National Symposium of SOCDAB on “Biodynamic Animal Farming for the Management of Livestock Diversity Under Changing Global Scenario”.	Society for Conservation of Domestic Animal Biodiversity held at Kerala Veterinary and Animal Sciences University, Mannuthy, Thrissur	February 8-10, 2017
24	35 <sup>th</sup> Annual Convention and National Symposium of Indian Soc. For Vet. Medicine	Veterinary College and Research Institute, Tirunelveli, Tamilnadu	February 22-24, 2017
25	Workshop on “Group approaches for developmental professionals”	Extension Education Institute, Nilokheri and PAMETI Ludhiana, Punjab	June 14-17, 2016
26	21 days Summer School on ‘ICT use in Agriculture’	Department of Extension Education, PAU, Ludhiana	July 5-25, 2016
27	Fishery Workshop	National Fisheries Development Board (NFDB), Lucknow	October 07, 2016
28	21days Winter School on “Innovations in Educational Technology”	Department of Extension Education, MPUAT Udaipur Rajasthan	December 1- 21, 2016
29	9 <sup>th</sup> Global Agriculture Leadership Summit 2016	Indian Council of Food and Agriculture, New Delhi	September, 8-9, 2016
30	Zonal Workshop of KVKs of Zone-I	CSK HPKV, Palampur and ATARI, Ludhiana held at CSK HPKV, Palampur	December12-14, 2016
31	Model training course on extension strategies for sustainable entrepreneurship in livestock sector	Directorate of Extension Education, GADVASU, Ludhiana	August 01-08, 2016



32	Precision Livestock Management for Sustainable Animal Production	Directorate of Extension Education, GADVASU, Ludhiana	February 08, 2017
33	Model Training Course on 'Value Addition to Livestock Produce and Entrepreneurship Development'	Department of Livestock Products and Technology, GADVASU, Ludhiana	January 16- 23, 2017
34	Advance training course on Beekeeping	Directorate of Extension Education, PAU, Ludhiana	February 06-10, 2017
35	Improving e-Governance in Agriculture	PAMETI, Ludhiana	August 16-19, 2016
36	40 <sup>th</sup> Annual Congress of Indian Society for Veterinary Surgery	TANUVAS, Chennai, Tamil Nadu	Dec 2-4, 2016
37	32 <sup>nd</sup> Annual Convention of ISSAR and National Symposium	Sri Venkateswara Veterinary University,	December 6-8, 2016
38	Scoping Assessment on 'Climate Change Adaptation - Rural Areas - India (CCA-RAI) demonstration project in Punjab'	Organized by PSCST, Chandigarh and GIZ, GmbH supported by	Feb 28, 2017
39	XIV Convention of Indian Society for Advancement of Canine Practice & National Symposium on "Newer Approaches in Management of Canine Health and Rewarding Clinical Practices as well as Trade"	COVAS, Pantnagar, Uttarakhand	February 09-11, 2017
40	XXXIII Annual Conference of Indian Association of Veterinary Pathologists, 7 <sup>th</sup> Annual Meeting of Indian College of Veterinary Pathologists and National Symposium on Innovative Approaches for Diagnosis and Control of Emerging and Re-emerging Diseases of Livestock, Poultry & Fish	Chhattisgarh Kamdhenu Vishwavidyalaya, Anjora, Durg, Chhattisgarh	Nov. 9-11, 2016
41	XXXX Annual Congress of I.S.V.S. and Symposium on "Biomaterials and Stem Cells for Tissue Repair and Regeneration in Veterinary Surgery"	TANVASU, Chennai	Nov. 2-4, 2017
42	International conference on new insights & multidisciplinary approaches in toxicological studies and 36 <sup>th</sup> Annual Conference of Society of Toxicology of	Amity University, NOIDA	August 3-5, 2016.
43	XVI Annual Conference of Indian Society of Veterinary Pharmacology & Toxicology	Navsari Agricultural University, Gujarat	Nov 23-25, 2016
44	ICT use in Agriculture	Deptt. of Extension Education, PAU, Ludhiana	July 5-25, 2016



45	15 <sup>th</sup> Convocation & National Symposium on “Sustainable Livestock Development for Food and Nutritional Security: Way Forward”	NAVS & Khalsa College of Veterinary & Animal Sciences, Amritsar	October 22-23, 2016
46	Dr. S. S. Guraya Memorial Seminar on “Recent Advances in Animal Reproduction”	PAU, Ludhiana	October, 12 <sup>th</sup> 2016.
47	Training “M Extension”	MANAGE & TNAU at Madurai, Tamil Nadu	Sept 12-16, 2016
48	Conference of the Indian Society for Study of Animal Reproduction	College of Veterinary Sciences, Tirupati	Dec 5-8, 2016
49	International Symposium on “New Horizons for Augmenting Meat Production and Processing to Ensure Nutritional Security, Food Safety and Environmental Sustainability”	Department of Veterinary and Animal Husbandry Extension Education, COVS, GADVASU, Ludhiana	Nov 10-12, 2016
50	Conference on “Physiology Update 2016”	Government Medical College, Patiala	March 12, 2016
51	Conference on Medical and Life Sciences-2016	Baba Farid University of Health Sciences, Faridkot	April 11-12, 2106
52	National Symposium on Sustainable Livestock Development for Food and	Khalsa College of Veterinary & Animal	October 22-23, 2016
53	44 <sup>th</sup> Dairy Industry Conference	NDRI, Karnal	February 18-20,
54	Global Biotech Summit	DBT, New Delhi	February 5-6, 2016
56	25 <sup>th</sup> National Congress of Veterinary Parasitology and National Symposium on "One Health Approach – Plausible Solution for Sustainable Parasite Control"	Indian Association for the Advancement of Veterinary Parasitology at Veterinary College, Chennai	February 17-19, 2017
57	“A Team Science Approach for the Protection of Animal, Human and Environmental Health”	School of Public Health and Zoonoses, GADVASU in collaboration with University of Saskatchewan, at Ludhiana	February 9-15, 2016
59	34 <sup>th</sup> Annual Convention of ISVM and National Symposium on “Newer Approaches in Diagnosis and Management of Animal Diseases for Sustainable Health and Production”	Department of Veterinary Medicine, GADVASU, Ludhiana	February 17–19, 2016.
60	26 <sup>th</sup> National Congress of Veterinary Parasitology and International Symposium on “Current Concepts in Diagnosis & Control of Parasitic Diseases to Combat Climate Change”	Indian Association for the Advancement of Veterinary Parasitology at Veterinary College, Shimoga	February 15-17, 2017



61	Seminar of existing IPR cells and other universities / Engineering Institutions for Implementation of National IPR policy	Punjab State Council for Science and Technology, MGSIPA Complex, Chandigarh	January 17, 2017
62	Annual Convention and National Symposium of SVBBI	COVS, OUAT, Bhubaneswar	March 11-12, 2016
63	Short course on “Biology of Physiological Adaptation and Production Stress in Farm Animals”	IVRI, Izatnagar (UP)	January 11-31, 2017
64	CAFT training programme on Recent Trends in Comparative Animal Nutrition	CAFT- Dept. of Animal Nutrition, ICAR-IVRI, Izatnagar (U.P.)	Sep 16- Oct 06, 2016
65	ICAR Summer School on “ICT use in Agriculture”	Department of Extension Education, P.A.U.	July 5-25, 2016.
66	Massive Open Online Course (MOOC) on “Competency Enhancement for Effective Teaching”	ICAR-NAARM, Hyderabad	18/11/2016-22/12/16
67	XXXI Annual Convention of IAVA and National Symposium on “Emerging Scenario in Veterinary Anatomy Teaching and Research Abreast with the Current Cyber Age – Its Application to Animal Welfare”	College of Veterinary Science PVNRTVU, Rajendranagar, Hyderabad	21 <sup>st</sup> to 23 <sup>rd</sup> December, 2016
68	Annual Convention of ISVM & Conference on “Innovative Techniques, Emerging Issues and Advancement in Veterinary Medicine to Meet The Challenges - Present And The Future”	Veterinary College and Research Institute, Tirunelveli, Tamilnadu	February 22 <sup>nd</sup> to 24 <sup>th</sup> 2017
69	One-Day Industry Academia- Farmers Interface	GADVASU & IMSA at Ludhiana	10.11.2016
70	Short training course on “ Strategies in Development of Functional Livestock Products”	Deptt of LPT, COVS & AH, DUVASU, Mathura, UP	Nov 21-30, 2016
71	XXXII Annual Convention of ISSAR on Animal Fertility and Fecundity at cross roads: Addressing the success through conventional and advanced reproductive technologies	Indian Society for the Study of Animal Reproduction at Tirupati, A.P.	Dec 6-8, 2016
72	Workshop on Advancement in Bovine Reproduction Biotechnologies to Increase Breeding Efficiencies	New Delhi	18 <sup>th</sup> October 2016
73	Use of WHONET for surveillance of antimicrobial resistance	World Health Organization, WHO	
74	Antimicrobial Resistance Workshop for Veterinary Microbiologists	Postgraduate Institute of Medical Education And Research (PGIMER), Chandigarh	



75	XIV Annual Conference of Indian Association of Veterinary Public Health Specialists & National Symposium on Innovative Approaches to Promote Food Safety and Reduce the Risk of Zoonotic Diseases in Context of Climate Changes	IAVPHS and COVS, Udaipur, Rajasthan	
76	21 days ICAR Summer School on “Engineering and Technology Innovations in Developing Health Foods”	ICAR-Central Institute of Post-Harvest Engineering and Technology, Ludhiana	June 08-28, 2016
77	Summer School on “ICT Use in Agriculture”	Department of Extension Education PAU, Ludhiana	05-25 July, 2016
78	Skill Development Training	ATARI Zone-I at PAMETI, PAU, LDH	26-28 Oct. 2016
79	Workshop of “KVKs of Zone-I”	ATARI Zone-I and CSKHPAU Palampur (HP)	12-14 Dec., 2016
81	Zonal Workshop of Cluster Frontline Demonstration on Oilseeds	ATARI Zone-I at Directorate of Extension Education PAU Ludhiana	23-24 Jan., 2017
83	Workshop on “Training Challenges and E-Learning Solutions Summit”	Commlab India at hotel Hayat Place, Gurgaon (Haryana)	9 <sup>th</sup> March, 2017
84	National Conference on Medical & Life Sciences	Baba Farid University of Health Sciences, Faridkot	April 11-12, 2016
85	Workshop on “Biomedical Waste Management”	DMC Ludhiana	20-05-2016
86	Inception workshop for launching the project ‘Towards Sustainable Livestock Production System in Punjab’	Chandigarh	20.05.2016
87	NABARD Foundation Day Seminar on “Doubling Farmers’ Income by 2022”	Vigyan Bhawan, New Delhi	12 July, 2016
88	Chairman Review Committee of ICAR-Niche area research project on Centre for Zoonosis	ICAR- MAFSU at Nagpur Veterinary College, MAFSU	2016
89	15 <sup>th</sup> Convocation and National Symposium of NAVS	Khalsa College of Veterinary and Animal Sciences, Amritsar	Oct. 22-23, 2016
90	21 days training on Diagnostic imaging and minimally invasive surgical techniques for veterinary patients	GADVASU, Ludhiana	5- 25 October, 2017
91	National Symposium on Newer approaches in management of canine health and rewarding clinical practice as well as trade	By ISACP and GBPUAT, at GBPUAT, Pantnagar, Uttranchal	7 March, 2017



92	ISVM-2017	Department of Veterinary Medicine, Veterinary College and Research Institute, Tirunelveli (TN)	Feb. 22-24, 2017
93	AIU North Zone Students' Research Convention - 2017 "ANVESHAN"	Chitkara University, Rajpura (Punjab)	20 to 21 <sup>st</sup> January, 2017
94	Innovative Food Processing Technologies for Food and Nutritional Security	National Conference at CIPHET, Ludhiana	29-30, Sep 2016
95	ICAR sponsored 21 days Winter School	SMC College of Dairy Science, at Anand, Gujarat	16 <sup>th</sup> Nov to 6 <sup>th</sup> Dec 2016
96	21 days training on "Qualitative technologies for agriculture policy research"	NAARM, Hyderabad	18 <sup>th</sup> Feb to 9 <sup>th</sup> March 2016
97	XXV Indian Convention of Food Scientists & Technologists (ICFoST) on "Food Processing for Sustainable Agriculture and Industry"	Guru Nanak Dev University (GNDU), Amritsar, Punjab	10 to 12 November, 2016
98	Innovative Food Processing Technologies for Food and Nutritional Security	ICAR-Central Institute of Postharvest Engineering and Technology, Ludhiana, Punjab	September 29-30, 2016
99	Food Processing India-2017	Department of Food Technology, GJUS&T,	
100	XXV Indian Convention of Food Scientists & Technologists on "Food Processing for Sustainable Agriculture and Industry"	Guru Nanak Dev University, Amritsar, Punjab	10 to 12 <sup>th</sup> November, 2016
101	CAFT Training Programme on "Application of Medicated Feed in Aquaculture"	ICAR sponsored CAFT training Central Institute of Fisheries Education (CIFE), Mumbai	February 13-23, 2017
103	21 days Summer school training programme on "Application of nanotechnology and molecular diagnostics in fisheries & aquaculture"	Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar	20 <sup>th</sup> July - 09 <sup>th</sup> August, 2016.
104	Write-shop on "Best management practices for freshwater ornamental fish production"	National Fisheries Development Board (NFDB), Hyderabad	July 25-27, 2016
105	Second workshop on Sustainable Aquaculture Production Systems with Integrated Disease Management On Focal Areas	Cochin University of Science and Technology, Cochin	22-24 July, 2016
106	Workshop on Inland Saline Aquaculture: Waste into Wealth and Way Forward:	ICAR, Rohtak, Haryana	20 <sup>th</sup> June 2016



107	Second National Students' Convention On Innovative Approaches For Academic Excellence In Higher Fisheries Education	ICAR- Central Institute of Fisheries Education (CIFE) Mumbai	March 3-5 <sup>th</sup> , 2017
108	Workshop to assess the training needs of extension functionaries of agriculture and allied sectors departments	PAMETI, Ludhiana	Nov 17, 2016
109	Workshop-cum-Training Course on 'Precision Livestock Management for sustainable Animal Production	Directorate of Extension Edu, GADVASU, Ludhiana	Feb 8, 2017
110	Punjab Fish Festival - 2016	NFDB, Hyderabad and FICCI, PAU & GADVASU, Ludhiana	24-25 April, 2016
112	Animal Husbandry Officers' Seminar	GADVASU, Ludhiana	
113	20 <sup>th</sup> Punjab Science Congress	IET, Bhaddal, Ropar	7-9 Feb. 2017
114	Zonal Workshop of KVKs of Zone-I	CSK HPKV, Palampur	12-14 Dec, 2016
115	Workshop on Integrated approaches for livestock development: farmer context	Directorate of Extension Education, GADVASU, Ludhiana	21.12.2016
116	Workshop on cluster frontline demonstration on oilseeds	Directorate of Extension Education, PAU, Ludhiana	23 - 24.01.2017
117	ICAR sponsored Winter School on 'Innovations in Educational Technology'	Rajasthan College of Agriculture, MPUAT, Udaipur (Rajasthan)	Dec 01-21, 2016
118	New directions in managing forage resources and livestock productivity in 21 <sup>st</sup> Century' at RVSKVV, Gwalior (MP)	ICAR-Indian Grassland and Forage Research Institute, Jhansi	March 03-04, 2017
119	Group approach for development professionals	PAMETI, Ludhiana	June 14-17, 2016
120	Improving e-Governance in Agriculture	PAMETI, Ludhiana	August 16-19, 2016
121	Advances in Experimental Data Analysis	IASRI, New Delhi	October 06-26,
122	National Orientation Workshop for the Fisheries SMS	NFDB, Hyderabad, Telangana	June 16-17, 2016
123	ICAR sponsored Winter School training programme on Optimization of production efficiency of integrated fish - livestock farming	ICAR- Research Complex for Eastern Region (ICAR-RCER), Patna, Bihar	November, 17-07 December, 2016



## INVITED LECTURES DELIVERED BY THE FACULTY

Name of the faculty member	Title of the lecture	Place and date	Name of the inviting agency / organization
Dr. Simrinder Singh Sodhi	Importance of Pig Farming	21.10.2016 Ludhiana	Young Innovative Farmers Club Directorate of Extension Education, PAU, Ludhiana
Dr. M Wadhwa	Nutritional interventions in developing animal based health foods	10 <sup>th</sup> Nov. 2016 Ludhiana	LPT Department, GADVASU, Ludhiana
	Methane production from animals	PAU, Ludhiana 16 <sup>th</sup> Nov. 2016	CAFT, PAMETI, PAU, Ludhiana
	Utilization of fruits and vegetable wastes as livestock feed and value added products	New Delhi 4 <sup>th</sup> Nov. 2016	NPC, New Delhi
	Utilization of fruits and vegetable wastes as livestock feed & generation of value added products	New Grain Market, Karnal, Haryana 23 <sup>rd</sup> Feb. 2017	Feed Tech Animal Feed Technology Expo, Benison Media
Dr. A P S Sethi	Designer Eggs: A Nutritionist	GADVASU, Ludhiana 17.01.17	Department of LPT, GADVASU Ludhiana
	Feed Analysis	PAU, Ludhiana 11.01.2017	PAMETI, PAU, Ludhiana.
Dr. Jasmine Kaur	Entrepreneurship through mineral mixture and UMMB making	GADVASU, Ludhiana, 2 Aug, 2016	Model training course on “Extension strategies for sustainable entrepreneurship in livestock sector” by Ministry of Agriculture and Farmer’s Welfare, Govt. of India, N Delhi
Sh. Khushvir Singh	Integrated fish-livestock farming	GADVASU, Ludhiana, 5.8.16	GADVASU, Ludhiana
	Balanced diet preparation for culturable fish species	KVK, Tarn Taran, 17.8.2016	KVK, Tarn Taran
	Fish reproduction and quality seed production	KVK, Tarn Taran, 17-08-16	KVK, Tarn Taran
	Ornamental fisheries	KVK, Hoshiarpur 31-08-2016	KVK, Hoshiarpur
	Companion animal zoonosis- a clinical perspective	Vet. College and Res. Institute, Tirunelveli, TN, Feb. 22-24, 2017	35 <sup>th</sup> Annual Convention and National Symposium of Indian Soc. Vet. Medicine
Dr. B. K. Bansal	Demonstration of Color	GADVASU,	ICAR Center of



	Doppler Ultrasonography (Practical) in Advance training program on “the cutting edge technologies to enhance fertility in farm animals”	Ludhiana (Nov. 4-24, 2016)	Advanced Faculty Training, Department of Veterinary Gynaecology and Obstetrics, GADVASU, Ludhiana
Dr. Navdeep Singh	Evaluation of various FTAI protocols in dairy animals: success and economics	GADVASU, Ludhiana 17-11-2016	CAFT Training Program “The cutting edge technologies to enhance fertility in farm animals”, Vety. Gynae & Obst Dept, GADVASU, Ludhiana
Dr. S S Dhindsa	Lecture on “Dairy kitte da machinikaran” in Dairy Da Maharat Sikhya Course	Farmers’ Hostel, GADVASU, Ludhiana 5.5.16	Deptt. of VAHEE, GADVASU, Ludhiana
Dr. Puneet Malhotra	Lecture on “Dairy kitte da machinikaran ate record rakhna” in Dairy Da Maharat Sikhya Course	Farmer Hostel, GADVASU, Ludhiana 28.07.2016	Deptt. Of VAHEE, GADVASU
	Knowledge updation of Vets from 17- 21.10.2016	Directorate of Livestock Farms, Ludhiana	Deptt. of VAHEE, GADVASU, Ludhiana
	Lecture on “Dairy kitte da machinikaran ate record rakhna” in Dairy Da Maharat Sikhya Course	GADVASU, Ludhiana, 09.02.2017	Deptt. of VAHEE, GADVASU
	Protected cultivation of vegetables and flower crops	Kharar (Block level Kisan Goshthi)7.6.2016	ATMA and Department of Agriculture, S.A.S. Nagar (Mohali)
Dr. Munish Sharma	Nutritional gardening	Kharar (District level KisanMela) 26.09.2016	ATMA and Department of Agriculture, S.A.S. Nagar (Mohali)
	Dairy Management of animals	Chatamali, 26.08.2016	Dairy Development Board, Punjab
Dr. Yashwant Singh	Role of minerals in animals	Chatamali, 09.08.2016	Dairy Development Board, Punjab
	Importance of clean milk production	Kharar, 07.06.2016	Agriculture Department, Punjab
	Impotence of minerals in dairy animals	Chatamali, 20.05.2016	Dairy Development Board, Punjab
	Disadvantages of inbreeding in dairy animals and its prevention	Chatamali, 20.05.2016	Dairy Development Board, Punjab
	Diseases in dairy animals	Village Manakpur Sharif,	Dairy Development Department



		30.08.2016 2016	
Dr. Randhir Singh	Soil health management in rice-wheat cropping system of Punjab	Block office, Kharar 5.12.2016	Agriculture Department, Punjab
Dr. Priyanka Suryavanshi	Collection of Soil and water samples	Ratwara Sahib, 06-12-2016	Department of Agri., S.A.S. Nagar (Mohali)
Dr. Harmeet Kaur	Reproduction in carp fish species and production of quality fish seeds Integrated carp fish culture with duck and its specification	Tarantaran; 18.01.2017	KVK, Tarantaran
Vikas Phulia	Echocardiography in canine	ICAR centre of advanced faculty training in Veterinary Surgery & Radiology GADVASU, Oct 05-25, 2016	29 <sup>th</sup> CAF training on “Diagnostic Imaging and minimally invasive surgical techniques for veterinary patients” organized by ICAR
Dr. Navdeep Singh	Diagnosis and surgical correction of Developmental Orthopedic Diseases in Dogs	ICAR centre of advanced faculty training in Veterinary Surgery and Radiology GADVASU, Oct 05-25, 2016	29 <sup>th</sup> CAF training on “Diagnostic Imaging and minimally invasive surgical techniques for veterinary patients” organized by ICAR
	Seasonality of reproduction in buffalo - Strategies for round the year breeding	ICAR-CIRB Hisar, August 22-27, 2016	Herd Health Management of Dairy Buffalo: Nutrition, Breeding, Reproduction, Diseases, Management and Record Keeping’ for SAARC Countries organized at ICAR-CIRB Hisar
Dr SPS Ghuman	Doppler sonography of reproductive tract in bovines	Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana from October 05-26, 2016	21-day training program on ‘Diagnostic imaging and minimally invasive surgical techniques for veterinary patients’ held at ICAR Center of Advanced Faculty Training in Surgery and Radiology



	Strategies to reduce effects of climate change on bovine reproduction	Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana from November 04-24, 2016	21-day training program on ' <i>The cutting-edge technologies to enhance fertility in farm animals</i> ' held at ICAR Center of Advanced Faculty Training in Gynaecology and Reproduction
	Prediction of reproductive events through colour Doppler ultrasonography in cattle and buffalo	Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana from November 04-24, 2016	21-day training program on ' <i>The cutting-edge technologies to enhance fertility in farm animals</i> ' held at ICAR Center of Advanced Faculty Training in Gynaecology and Reproduction
	Lead paper, 'Bovine obstetrics - Advances in prognostic indicators and treatment procedures for salvaging the dam and fetus	College of Veterinary Science & AH, Anand Agriculture University, Anand from December 16-17, 2016	National Seminar on 'Biotechnological Approaches in Management of Health and Reproductive Disorders in Livestock for Sustainable Production' and 'IV Annual Convention of the Society for Veterinary Sciences and Biotechnology'
Dr SPS Ghuman	Practical training in clinical pathology in the for 25 veterinarians	GADVASU, Ludhiana from 27-2-2017 to 3-3-2017	Refresher course 'Specialized training on caprine and swine organized by directorate of extension education
Dr. NK Sood	Canine Urinary Cytology- An Emerging Diagnostic Aid.	COVAS, Pantnagar, Uttarakhand, 09th to 11th February, 2017	14th Convention of Indian Society for Advancement of Canine Practice & National Symposium on "Newer Approaches in Management of Canine Health and Rewarding Clinical Practices as well as Trade"
	Urinary Cytopathology- An Underutilized Diagnostic Aid in Veterinary Practice	Chhattisgarh Kamdhenu Vishwavidyalaya,	33rd Annual Conference of Indian Association of Veterinary Pathologists



		Anjora, Durg, Chhattisgarh from Nov. 9-11, 2016	and 7th Annual Meeting of Indian College of Veterinary Pathologists and National Symposium
Drs. NK Sood, BS Sandhu, Kuldip Gupta and APS Brar	Infectious diseases affecting buffalo reproduction: causes, diagnosis and control.	CIRB Hisar, August 22-27, 2016	In Training programme for the SAARC Countries on “herd Health management of dairy Buffalo: Nutrition, Breeding, Reproduction, Diseases, Management and Record keeping”
Dr. GS Dhaliwal	Measures to improve early embryonic maintenance in dairy cattle.	GADVASU, Nov 4-24, 2016	CAF training programme on “The cutting-edge technologies to enhance fertility in farm animals” held at ICAR Centre of Advanced Faculty Training in Veterinary Gynaecology and Reproduction
	“Pashuan vich bhar paina ate tuu jaan di bimari” (in Punjabi).	GADVASU from March 25 to 30	In the training on “Good Dairy Farming Management Practices for Dairy Farmers of Punjab” held at Directorate of Extension Education
	“Pashuan vich bhar paina ate tuu jaan di bimari di sabh sambhal” (in Punjabi)	GADVASU from March 22-27, 2016	In the training on “Change Saan di Chhon ate masnui garbhdaan duara nasal sudhar” held at Directorate of Livestock Farms
	Alternate therapies for controlling Endometritis	NDRI Karnal, April 25, 2016.	In Brain Storming Session on Uterine Infections in Dairy Animals
	Veterinary Clinic rahi ditia ja rahian sahultan (In Punjabi)	Department of AHEE, GADVASU, 13 February, 2017	Dairy farming course, organized by Department of AHEE
Dr. Raj Sukhbir Singh	Diagnosis of TB and JD in animals	02-08-16 GADVASU,	Deptt of Veterinary and AH Extension



		Ludhiana	
Dr. Deepti Narang	Diagnosis of TB and JD in animals on 15-02-17	06-02-17 to 17-02-17 GADVASU, Ludhiana	Deptt of Veterinary and AH Extension
	Rapid detection of food borne pathogens using molecular approaches	GADVASU, Ludhiana	Deptt. LPT GADVASU, Ludhiana,
Dr. A K Arora and Deepti Narang	Microbiological Quality Evaluation of Livestock Products	16 to 23 <sup>rd</sup> January, 2017, Deptt. LPT GADVASU, Ludhiana	Training programme on “ <i>Value addition to livestock products and entrepreneurship development</i> ” sponsored by Ministry of Agriculture, Govt. of India.
Dr. A K Arora	Collection and evaluation of fine needle aspirates in Veterinary patients.	Department of Veterinary Surgery and Radiology, COVS, GADVASU, 19-10-2016.	29 <sup>th</sup> Advanced Training Course on Diagnostic Imaging and Minimally Invasive Surgical Techniques for Veterinary Patients, Organized by CAFT, Department of Veterinary Surgery and Radiology, COVS, GADVASU, Ludhiana
Dr Kuldip Gupta	Pesticide: Friends or Foe”	10/03/2016, Ludhiana	Punjab College of Technical Education (PCTE), Ludhiana.
Dr R S Sethi	Vector Borne Parasitic Zoonosis: Status and Issues	Nanaji Deshmukh Veterinary Science University, Jabalpur on 27/08/2016 at 10.30 AM	As a mentor under Star college scheme funded by Department of Biotechnology, N.Delhi.
Dr. L.D. Singla	Parasitology and one health : An overview	GNDU, Amritsar on 11.06.2016	Punjab State Veterinary Council, Chandigarh
Dr. Paramjit Kaur	Equine piroplasmiasis: Belles-lettres update with special reference to Indian scenario	On February 15, 2017 Veterinary College, Shimoga during 26 <sup>th</sup> National Congress of	Indian Association for the Advancement of Veterinary Parasitology



		Veterinary Parasitology held from 15-17 February, 2017	
Dr. L.D. Singla	Shelter Management for Dairy Animals"	Chandigarh, 21.11.2016	Punjab Dairy Development Board
Dr. DS Malik	Strategies to improve reproduction in dairy animals through managerial interventions	Ludhiana, 24.10.2016	CAFT in Veterinary Gynaecology and Reproduction, COVS, GADVASU, Ludhiana
Ravi Kant Gupta	Breeding Management of Goat	Rauni, Patiala 22.02.2017	Training on Pig Farming for Veterinary Officers of Dept. of Animal Husbandry, Punjab under "National Livestock Mission"
	Breeding Management of Pig	Rauni, Patiala 22.02.2017	Training on Pig Farming for Veterinary Officers of Dept. of Animal Husbandry, Punjab under "National Livestock Mission"
	Topography of bovine abdomen	October 5-25, 2017	Advanced refresher training course on "Diagnostic Imaging and Minimally Invasive Surgical Techniques for Veterinary Patients" Deptt. of Veterinary Surgery and Radiology GADVASU, Ludhiana
Dr Neelam Bansal	Edible coating as a preservative tool for meat and meat products	21 days winter school on Winter School on a contemporary theme entitled, "Advances in Value Addition and Quality Evaluation of Meat and Poultry Products" from 20th September-10th Oct 2016 at IVRI, Izatnagar	ICAR-IVRI, Izatnagar



Dr M. K Chatli	Egg quality measurements and biodegradable films	One day Workshop on Food Quality and Safety, at GADVASU on 09.11.2016	GADVASU & IMSA
	Impact of farm gate processing technologies on farmer's income	One-Day Industry Academia-Farmers Interface, 10.11.2016	GADVASU
	Encapsulation technologies for meat	One day Workshop on Food Quality and Safety, at GADVASU on 09.11.2016	GADVASU & IMSA
Dr Nitin Mehta	Global best practices in piggery with special reference to Artificial Insemination	NRC Pig, Guwahati, Assam, 28-29.11.2016	NRC Pig, Guwahati
A K Singh	Cutting edge technologies for fertility management in farm animals	Panchgani Maharashtra 05.02.2017	Mahavet Satara
M. Honparkhe	Veterinary Education in India	Yangon, Myanmar 03.12.16	Myanmar Veterinary Association, Yangon,
Ajeet Kumar	Strategies to optimize the reproduction by implementing improved practices in dairy animals	Yangon, Myanmar 04.12.16	Myanmar Veterinary Association, Yangon, Myanmar
	Role of field veterinarians/extension workers in production of safe and wholesome foods of animal origin	16 to 23rd January, 2017	Department of Livestock Products Technology, GADVASU, Ludhiana
Dr. BB Singh	Endocrine disrupting chemicals (edcs): An overview and increasing trends in 26th Advanced Training Course on "The cutting-edge technologies to enhance fertility in farm animals"	Dept. of Vety. Gynaecology and Reproduction, GADVASU, Ludhiana GADAVSU, November 4-24, 2016	Dept. of Veterinary Gynecology and Obstetrics, GADVASU, Ludhiana



Dr. JS Bedi	Meat borne zoonotic diseases: prevention and control	16 to 23rd January, 2017	Department of Livestock Products Technology, GADVASU, Ludhiana
Dr. Lokesh K M Dr. JPS Gill Dr. JS Bedi Dr. RS Aulakh	Hygienic milk production at Veterinary Training Institute	Rauni, Patiala on 27.06.2016.	Department of Animal Husbandry, Punjab
Dr. JS Bedi	Chemical contaminants in food of animal origin: risk assessment to human health	November 10-12, 2016. GADAVSU,	International symposium and seventh conference of the Indian Meat Science Association Ludhiana
	Pesticide and Antibiotic Contaminants in Food: Importance and Health Risks	16 to 23rd January, 2017	Department of LPT, GADAVSU, Ludhiana
	Large Animal Veterinary Practices	Dec 18, 2016.	Department of Animal Husbandry, Jharkhand
S N S Randhawa	Bovine lameness- a herd problem of organized dairy farms	Feb. 22-24, 2017	Lead lecture presented at 35th ISVM conference held at Tirunelveli
Swaran Singh and SNS Randhawa	Improving the Livestock Health in Fluorotic Areas	Feb. 22-24, 2017	Lead lecture presented at 35th ISVM conference held at Tirunelveli
K Dua	Diagnosis and management of Gastrointestinal Motility Disorders in Cattle and Buffaloes	Feb. 22-24, 2017	Lead lecture presented at 35th ISVM conference held at Tirunelveli
S K Uppal, S A Hussain and A K Sharma	Companion animal zoonosis- a clinical perspective	Feb. 22-24, 2017	Lead lecture presented at 35th ISVM conference held at Tirunelveli
B K Bansal and Shukriti Sharma	Transtracheal wash and Bronchoalveolar Lavage for diagnosis of lower respiratory affections in animals	5-25 September, 2016	29 <sup>th</sup> Advanced training course by CAFT, Deptt. of Veterinary Surgery and Radiology, GADVASU, Ludhiana
A K. Sharma	Diagnosis of upper respiratory affections in large animals	5-25 September, 2016	29 <sup>th</sup> Advanced training course by CAFT, Deptt. of Veterinary Surgery and Radiology, GADVASU, Ludhiana
C S Randhawa	Clean Milk Production vis-a-vis Udder Health	7 March, 2017	Round Table conference on "Improving milk quality in India NASC,



			New Delhi
S N S Randhawa and Dhiraj Gupta	Food Safety & Standards in India	15 <sup>th</sup> , Oct 2016 GNDU, Amritsar	Indian Dairy Association (NZ), Punjab Chapter
Dr. Pranav K. Singh	Delivered talk on Value Addition of milk for sustainable and profitable Dairy Business in Model during Training Course on “Value addition to livestock products and entrepreneurship development” from 16 to 23 <sup>rd</sup> January, 2017	17 <sup>th</sup> , January 2017 GADVASU, Ludhiana	Department of LPT, GADVASU, Ludhiana
Dr. Pranav K. Singh	Processing of milk & milk products during training programme on ‘Scientific approach to dairy farming and Value addition of Milk’	20 <sup>th</sup> , September 2016 SAS Nagar	KVK, SAS Nagar
Dr. Pranav K. Singh	Economics analysis of milk & milk Products at training program of Value Addition of Milk for Dairy Farmers	8 <sup>th</sup> , June 2016	CODST, GADVASU
Dr. Inderpreet Kaur	Assessment of financial viability of the project	19 <sup>th</sup> January 2017 Ludhiana	Department of Livestock Products Technology, College of Veterinary Science, Guru AngadDev Veterinary Animal Sciences University in Model Training Course on “Value addition to livestock products and entrepreneurship development”
Dr Varinder Pal Singh	Livestock Enterprises: A profitable venture	9 <sup>th</sup> , November 2016 Ludhiana	PAMETI, PAU in a training programme on “Project Management”
Dr Varinder Pal Singh	Livestock Farm Budgeting	04 <sup>th</sup> , August 2016 Ludhiana	Directorate of Extension Education, Guru Angad Dev Veterinary Animal Sciences University in a training programme on “Extension strategies for



			sustainable entrepreneurship in livestock sector”
Dr. Varinder Pal Singh	“Dairy farming di arthika , 30 Dudharu gaawan de dairy unit de economics di project report, high tech dairy farming and farm da record rakhna (in Punjab)”	10 <sup>th</sup> October 2016	Dairy Sikhlayi ate Visthar Kendra, Bija, Ludhiana
Dr. Varinder Pal Singh	Role of mechanization in traitional dairy products	18 <sup>th</sup> , January 2017 at Model Training Course (MTC) on “Value addition to livestock products and entrepreneurship development”	Livestock production technology department, GADVASU sponsored by Ministry of Agriculture, Govt. Of India.
Dr. GopikaTalwar	Effect of high pressure processing on food borne pathogens in biofilm form of growth	1 <sup>st</sup> , December 2016, Anand, Gujarat	SMC College of Dairy Science and Technology, Anand, Gujarat, in ICAR sponsored Winter School.
Dr. Santosh Kumar Mishra	Milk, its constituents and their nutritional value	15 <sup>th</sup> October 2016 GNDU, Amritsar	Indian Dairy Association (NZ) Punjab chapter
Dr. Nitika Goel	Dairy Science & Technology:a Career Option	15 <sup>th</sup> Oct 2016 GNDU, Amritsar	Indian Dairy Association (NZ) Punjab chapter
Dr. Amandeep Sharma	Membrane Induced Application in Dairy and Food Industry: Novel Approach for Designing Dairy Whitener	3 <sup>rd</sup> , March 2017 Hisar	GJUS&T, Hisar “Food Processing India 2017”
Dr. Sunil Kumar	Novel Dairy Products and Technologies	January 2017, GADVASU	Department of Livestock Products Technology, GADVASU
	Development of new processed products from dairy industry by-products	January 2017, GADVASU	Department of Livestock Products Technology, GADVASU
	Entrepreneurship through value addition of milk on commercial basis	8 <sup>th</sup> Feb 2017, GADVASU	Directorate of Extension Education, GADVASU
	Value addition of milk for sustainability in dairy farming	8 <sup>th</sup> ,Feb 2017, GADVASU	Directorate of Extension Education, GADVASU



	An ecosystem approach for aquaculture development in non-coastal states of India, for livelihood generation and food security	CIARI, Port Blair 9.12.16	CIARI, Port Blair Andaman and Nicobar Islands
Dr. Asha Dhawan	Eco-friendly bio-remediation model for aquaculture	PAU 06.03.2017	PAMETI, PAU
Dr. Meera D. Ansal	Aquaculture options for village ponds	PAU 08.023.2017	PAMETI, PAU
	Aquaculture for village pond management	PAU 19.03.2017	PAMETI, PAU
	“Importance of Village ponds in ecosystem and their conservation” in training programme on “Village Pond Management” (March 6-10, 2017)	PAMETI, PAU March 6, 2017	PAMETI, PAU
Dr. Vaneet Inder Kaur	“Business options in Aquaculture” in training programme on “Agri-prenueurship and Subsidiary Occupation” (21-25 November, 2016)	PAMETI, PAU November 24, 2016	PAMETI, PAU
	“Fishery as an Entrepreneurial activity” in Training programme on “Project Management” (7-11 November, 2016)	PAMETI, PAU November 09, 2016	PAMETI, PAU
	“Latest Technologies in Aquaculture” in Training programme on “Recent Advances in Allied Sectors” Sectors” (23-27 May, 2016)	PAMETI, PAU May 26, 2016	PAMETI, PAU
	“Pangas catfish culture” in training programme “Integrated fish farming”	Barnala on 25.07.16	KVK, Barnala , GADVASU
Dr. Surjya Narayan Datta	Value Added Fish Products	Department of LPT, GADVASU, Ludhiana 22-01-2017	Model Training Course (MTC) on ‘ <i>Value addition to livestock products and entrepreneurship development</i> ’



			Department of Livestock Products Technology, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana
Dr. Ajeet Singh	1. Ornamental fish farming	SAS Nagar, Mohali, 21.11.2016	KVK, Majra (S.A.S. Nagar, Mohali)
Dr. Abhed Pandey	1. Fish health management 2. Pond water quality management	Handiaya (Distt. Barnala), 21-12-2016	KVK, Handiaya (Distt. Barnala)
	Integrated Fish Farming	Handiaya (Distt. Barnala), date 03-03-2017	KVK, Handiaya (Distt. Barnala)
	Options available in dairy enterprise	PAU, Ludhiana Nov 21, 2016	PAMETI, Ludhiana
Dr R K Sharma	Management of dairy animals from adverse impact of climate change	21.02.2017	NAFCC
Dr Balwinder Kumar	Different ways to protect dairy animals from adverse impact of climate change	22.02.2017	NAFCC
	Dudharoo pashuyan vich kushal heha prabhandhan	07.03.2017	NAFCC
	Dudharoo pashuyan vich kushal heha prabhandhan	15.03.2017	NAFCC
	Cultivation of fodder crops	Tarn Taran, 27.04.2016	PDDDB, Tarn Taran
Sh Navjot Singh	Control of poisoning in fodder crops	Tarn Taran, 06.05.2016	PDDDB, Tarn Taran
	Cultivation of fodder crops	Tarn Taran, 02.06.2016	PDDDB, Tarn Taran
	Control of poisoning in fodder crops	Tarn Taran, 23.06.2016	PDDDB, Tarn Taran
	Integrated insect pest management in field crops	09.02.2017	Sir Rattan Tata Trust



## VISITORS TO THE UNIVERSITY

S. No.	Name of the visitor and other details	Date of visit
1.	HE Shri V P Singh Badnore, Governor of Punjab	21.9.1016
2.	Monitoring and Review team of Education Division of Indian Council of Agricultural Research (ICAR)	14.12. 2016
3	Sr. Sukhdev Singh Dhindsa, Member of Parliament (Rajya Sabha) on PMFBY Mela	27.05.2017
4	Dr. Rajbir Singh, Director ATARI on Kisan Sammelan	24.01.2017
5	Dr. R.K. Pundir from ICAR- NBAGR, Karnal	08.04. 2016
6	Inspection team from Veterinary Council of India	12/2016
7	Inspection team from ICAR, New Delhi to review funding under the ICAR development grant, experimental learning and Niche area of excellence	14.12.2016
8	Dr. Inderjit Singh, Director, CIRB, Hisar	20.02 2017
9	National Bull selection committee from ICAR-CIRB and NDRI under the project NWP (B)-Murrah	01.03. 2017
10	Prof Vd K.S.Dhiman, Director General, CCRAS Ministry of AYUSH, Govt of India	04-11-2016
11	Dr Vikram Misra University of Saskatchewan	
12	Dr Suresh Tikoo University of Saskatchewan	
13	Dr Dale Godson University of Saskatchewan	
14	Dr Scott Napper University of Saskatchewan	
15	Dr. Sachin Kumar Department of Biosciences and Bioengineering IIT, Guwahati	
16	Dr. Baldev Singh Sohal, Dean, Akal College of Basic Sciences, Eternal University, Baru Sahib, Dist. Sirmour (HP)	
17	Mr. Tom Graham, Senior Director, National Inspection Division for Canadian Food Inspection Agency	09.11.2016
18	Dr Jaswant Singh, Professor, Department of Veterinary Biomedical Science, University of Saskatchewan, Canada	20.2.2016
19	Johanna Lindahl, Scientist, ILRI, Kenya and Swedish University of Agricultural Sciences, Sweden	14.02.2017- 15.02.2017
20	Prof. Harjinder Singh, Distinguished Professor and Director Massey Institute of Food Science and Technology and Co-Director, Riddet Institute Massey University, New Zealand	06.01. 2017
21	Daizo Sugimoto and Yoshiaki Hayashi , Japanese Scientists from Meijo University, Japan visited College of Dairy Science & Technology, GADVASU, Ludhiana	08.03.2017
22	Dr. A K Das, Principal Scientist, Reservoir & Wetland Fisheries Division, CIFRI, Barrackpore, Kolkata	20.02.2017- 21.02.2017
23	Dr. Rajesh Kumar, Central Institute of Fresh water Aquaculture (CIFA)-ICAR Bhubaneshwar- Odisha	27.02.2017- 28.02.2017
24	Dr. S.C. Rath Principal Scientist, Fish Nutrition and Physiology Division Central Institute of Fresh water Aquaculture (CIFA)-ICAR, Bhubaneshwar- Odisha	7.03.2017- 8.03.2017
25	Dr. B.A. Shamsundra, Ex Professor Department of Fish processing Technology, College of Fisheries Mangalore	14.03.2017- 15.03.2017



**Annual Conference of IMSA organized by LPT department at GADVASU, Ludhiana**



**A training course organized by the LPT department at GADVASU, Ludhiana**



**AYUSH team interacting with the faculty of Pharmacology Department, GADVASU**



**Discussion of AYUSH team with GADVASU officers**



**Shri VPS Badnore, Governor of Punjab interacting with scientists of College of Fisheries**



**A Canadian delegate interacting with officers of GADVASU**



**Dr. G Venkateswarulu (ADG) ICAR interacting with scientists of College of Fisheries**



**Visit of Peer Review Team of ICAR to GADVASU**



## VISITS OF THE FACULTY ABROAD

S. No.	Name of the faculty member	Place of visit	Dates (s) of the visit	Purpose of the visit
1	Dr. Raj Sukhbir Singh	Western College of Veterinary Medicine, University of Saskatchewan, Canada	July 1-September 30, 2016	To attend 3 months training
2.	Dr Narinder Singh	University of Saskatchewan, Canada	August 1-31, 2016	To attend 1 month training
3.	Dr. Tarunbir Singh	Massey University, New Zealand	August 1 - Oct 31, 2016	Training in the field of minimally invasive surgery
4.	Dr. Pallavi Verma	Massey University, New Zealand	January 16 - April 15, 2017	Training in the field of diagnostic imaging techniques
5.	Dr. Jaswinder Singh	Melbourne, Australia	December 3-7, 2016	Attended the 4 <sup>th</sup> International one health congress and 6 <sup>th</sup> biannual congress of the international association of ecology and health
6.	Dr. Satparkash Singh	CMMID, Virginia Tech, USA	April 6- October 5, 2017	Training on "Live Bacterial Vector Based Vaccines"
7.	Dr CS Mukhopadhyay	IOWA State University, IOWA, USA	August 30, 2016 - June 1, 2017	Fulbright Nehru Academic and Professional Excellence Fellowship
8.	Dr Manish Kumar Chatli	Bangkok, Thailand	August 12-19, 2016	To attend and present an oral research paper in ICOMST, 2016
9	Dr. A K Singh	Canada		Advance training at Prairie Swine Centre, Saskatoon, SK, Canada
10	Ajeet Kumar	Yangon, Myanmar	December 3-4, 2016	To present an invited lecture
11		Tours, France	June 26-30, 2016	To attend international conference
12	Dr. JS Bedi	Dublin, Ireland	August 21-25, 2016	To attend International Union of Food Science and Technology meet
13	BB Singh	Melbourne, Australia	December 03-07, 2016	To participate in IV International One Health Congress and 6 <sup>th</sup> biennial congress of International Association for Ecology & Health"
14	Dr SNS Randhawa	USA	June, 2016	Presented invited research papers and chaired a session
15		USA	July, 2016	Visited small animal hospitals and collected \$ 15,000/- for the university corpus fund
16		UK	July, 2016	Visited Royal Veterinary College, London to see advancements in Veterinary & Animal Sciences; ongoing & future collaborative projects
17	Dr. Santosh K Mishra	The School of Food and Nutrition, Massey University, New Zealand	2016	To attend 03 months training
18	Dr. Harsh Panwar	Budapest, Hungary	2016, 03 days	Conference



## **NATIONAL AND INTERNATIONAL LINKAGES**

- Net work program on Brucellosis
- All India Network program on HS
- “International School on One Health: An Integrated View on Infectious Diseases, Food Safety and Zoonoses” organized in collaboration with University of Saskatchewan, Canada.
- Outreach programme on “Estimation of methane emission under different feeding systems and development of mitigation strategies”, ICAR
- Milkfed, Punjab
- Punjab Agro Juices Ltd, Chandigarh
- Limagrains, Bisco Bio Science Pvt Limited, *Secundrabad, Telangana*
- ZDP, Zone-1, Ludhiana “Financial, Technical”
- State Department of Agriculture “Organizing training programmes, Meetings”
- State Department of Horticulture “Organizing training programmes, Meetings”
- State Department of Fisheries “Organizing training programmes, Meetings”
- Department of soil & water conservation “Training programs, Meetings, Discussion etc”
- Department of Dairy Development “Organizing training programmes, Meetings, Discussion”
- PAU, Ludhiana “Seed for FLDs, arrange resource person for training”
- Network project on Diagnostic imaging and surgical management in collaboration with Department of Surgery and Radiology, IVRI, Chennai, Bikaner and Mathura.
- Central Council for Research in Ayurvedic Science (CCRAS), Ministry of AYUSH, Government of India, has established the Collaborative Research Centre for Veterinary Ayurveda at Guru Angad Dev Veterinary and Animal Sciences University Ludhiana
- Central institute for Research on Cattle, Merrut Cantt, UP.
- CIBA (ICAR), Chennai, Supply of brackish water finfish/shellfish and technical support
- CIFA (ICAR), Odisha, Supply of catfish seed and technical support.
- CIFE, Rohtak, Supply of freshwater prawn/brackish water shrimp seed and technical support
- Rajiv Gandhi Centre for aquaculture, Tamil Nadu, Supply of seed of fresh water prawn, GIFT
- Freshwater Fisheries Research Center (FFRC), Wuxi, China, Faculty and Student exchange programme for sharing of scientific information and acquiring advanced training in fisheries.
- GADVASU signed an MoU with NSFDC (National Scheduled Castes Finance and Development Corporation), Delhi on 23.12.2016.
- GADVASU, Ludhiana and NSFDC signed the MoU.
- ICAR Project on Cluster Frontline demonstrations on oilseed and pulses



**Transfer of technology developed at GADVASU to private sector**



**Signing of MoU with NSFDC for welfare of SC farmers RRTC Talwara**



**Dr AS Nanda VC welcoming Prof KS Dhiman, Director General, CCRAS Min. of AYUSH**



**Annual Review Meet on Network Project on Buffalo hosted by GADVASU, Ludhiana**



## RESEARCH PUBLICATIONS

1. Ahirwar KK, Gandotra VK, Ghuman SPS and Honparkhe M. 2017. Seasonal variation in hormonal and enzymatic profile in plasma and follicular fluid of buffalo subjected to ovulation synchronization protocol. *Indian Veterinary Journal* 94 (1): 22 – 24.
2. Ahmad A and Singh CK. 2017. Sensitivity comparison of immuno-histochemical and histopathological approaches for diagnosis of Rabies in animals. *International Journal of Current Microbiology and Applied Science* 6(4): 1-6.
3. Ahmad R, Saini NS, Mahajan SK, Mohindroo J and Singh SS. 2017. Comparison of rigid polymethyl methacrylate and foldable square edge acrylic lens replacement for management of cataract after phacoemulsification in 22 eyes of dogs. *Indian Journal of Animal Research* 51(1): 146-150.
4. Ahuja AK, Cheema RS and Kumar A. 2016. Studies of naturally occurring antisperm antibodies in serum of calves, heifers and cows and their effect on *in vitro* capacitation and acrosome reaction. *Journal of Bioinnovations* 5(6): 874-889.
5. Akondi S, Arora AK and Sharma NS. 2017. Studies on expression of different virulence genes of *Pasteurella multocida*. *Indian Journal of Animal Science* 87(2): 139–142.
6. Ambhore GS, Singh A, Deokar DK, Sahoo SK, Singh M and Divya P. 2016. Heritability estimates of first lactation 300-day milk yield under single versus multi-trait animal models in Phule Triveni cattle. *Indian Journal of Animal Science* 86(6): 682-685.
7. Ambhore GS, Singh A, Deokar DK, Singh M, Sahoo SK and Divya P. 2017. Genetic evaluation of lifetime performance of Phule Triveni cows by univariate and multivariate methods. *Indian Journal of Animal Science* 87(2): 177-181.
8. Ansal MD, Kaur K and Kaur VI. 2016. Efficacy of *Azolla* compost as bio-fertilizer in carp culture – water quality and productivity. *Indian Journal of Animal Nutrition* 33(2): 191-96.
9. Anupma S, Gill JPS and Bedi JS. 2016. Evaluation of biochemical profile alterations and oxidative stress in mice model on oral exposure to Deltamethrin. *Journal of Animal Research* 6(2): 207.
10. Baba OK, Sood NK and Gupta K. 2016. An unusual case of mammary mastocytoma in a female Labrador. *Applied Biological Research* 18(2): 93-98.
11. Baba OK, Sood NK and Gupta K. 2016. Classification, grading and prognostic evaluation of canine mammary tumours. *Indian Journal of Veterinary Pathology* 40(2): 183-86.
12. Bagga A, Randhawa SS, Sharma S and Bansal BK. 2016. Acute phase response in lame crossbred dairy cattle. *Veterinary World* 9: 1204-1208.
13. Bakshi MPS, Wadhwa M and Makkar HPS. 2016. Waste to worth: vegetable wastes as animal feed. *CAB Reviews* 11, No. 012.



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15. Baldwin VI, Capuco RL, Evock-Clover AV, Grossi CM, Choudhary P, Elsasser RK, Bertoni TH, Trevisi G, Harmon E, and McLeod KL. 2016. Consumption of endophyte-infected fescue during the dry period increases milk production in the subsequent lactation. *J. Dairy Sci.* DOI: 10.3168/jds.2016-10993.
16. Bhardwaj R, Mukhopadhyay CS, Deka D, Verma R, Dubey PP and Arora JS. 2016. Biocomputational analysis of evolutionary relationship between toll-like receptor and nucleotide-binding oligomerization domain-like receptor genes. *Veterinary World* 9(11): 1218-1228.
17. Bhat GR, Amin RU and Dhaliwal GS. 2016. Successful per-vaginum delivery of a live ascetic buffalo calf. *Buffalo Bulletin* 35(4) 539-540.
18. Bhat P, Singh ND, Leishangthem GD, Kaur A, Mahajan V, Banga HS and Brar RS. 2016. Histopathological and immunohistochemical approaches for the diagnosis of Pasteurellosis in swine population of Punjab. *Veterinary World* 9(9): 989-995.
19. Bilal AG, Dhindsa SS, Dadarwal D, Honparkhe M, Ghuman SPS and Brar PS. 2017. Influence of behavioural estrus signs on pregnancy rate in buffaloes subjected to modified synchronization protocols. *Indian Veterinary Journal* 94(01): 81 – 83.
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28. Chand N, Uppal SK, Dhaliwal PS and Turkar S. (2016) Therapeutic management of Kennel Cough in dogs, *Intas Polivet* 16(2): 452-453.
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