INTRODUCTION

The College of Veterinary & Animal Sciences was established in 1986 under the leadership of Dr. G.C.Negi, the then Vice- Chancellor of CSKHPKV, Palampur with the objective to produce trained manpower (Veterinarians) to promote livestock production, control of diseases, research and extension under sub mountain, temperate and sub temperate conditions of Himachal Pradesh. Prior to the establishment of this college, the candidates were used to be nominated for B.V.Sc. & AH programmes to other states of India. The role and guidance of Dr. G.C.Negi in the establishment and subsequently in the development of the College during infancy stage will always be cherished. As a mark of respect & recognition, the Government of Himachal Pradesh has kindfully renamed the College after his name & the college hence forth will be known as Dr. G.C.Negi College of Veterinary & Animal Sciences, CSK HPKV,Palampur

The first batch of 25 students was admitted in July, 1986 and to begin with, this College was started with six composite departments. Since 1994-95 academic session, the regulation of the VCI (Minimum Standard of Veterinary Education), minimum standard requirements have been implemented. It is a hard fact that Animal Husbandry has an enormous potential in Himachal Pradesh because it has 7.8 million ha. covering dense forests and another 1.5 million ha. under Alpine-pastures. These pastures and grasslands have their own significance and are major fodder resources for 2.17 million cattle, 0.616 million buffaloes and 2.15 million sheep and goats.

As per the recommendations of VCI, now this College has 18 departments apart from Livestock Farm there is well equipped Veterinary Clinic, that also serves as a apex tertiary referral Veterinary facility of the State. Students for B.V. Sc. & A.H. programme are selected on the basis of their performance in entrance test conducted by this University. This College also offers Post-graduate Programmes leading to M.V.Sc. in 13 disciplines besides, Ph.D degree in six disciplines i.e Animal Nutrition, Animal Breeding and Genetics including Biostatistics, Veterinary Surgery and Radiology Veterinary Anatomy & Histology, Veterinary Microbiology & Immunology and Veterinary Clinical Medicine, Jurisprudence and Ethics.

So far, 374 students have qualified for B.V.Sc. and A.H. degree including 35 during the year 2005-06 to serve in different parts of Himachal Pradesh, Central Institutions, RVC, BSF, SSB, Veterinary Immunological, Wildlife health programmes, Nationalized banks, Medical and Paramedical Institutions, Pharmaceuticals, livestock feed plants besides establishing their own polyclinic and other different positions in Pvt. Sector. The students of this institution have excelled in National Competitions for the award of Jr. ResearchFellowship and brought immense pleasure and laurels to *alma mater*. The well trained graduates of this College have performed excellently well overseas, also.

The revised curriculum as per the VCI comprises of 187 credit hours spread over a period of 4½ years both in theory and practicals followed by compulsory internship for one semester. 10% of the meritorious students in each class are awarded College merit scholarship worth Rs. 250/- each per month. However, during Internship each student receives stipend worth Rs. 2000/ -PM.

The College, in its existence of 20 years, has adequate infrastructural facilities for teaching and research that are vital for any institution. Since 1986, till date this daunting task of developing the Veterinary and Animal Sciences College from its infancy has been phenomenal.

All the departments of the College are contributing their utmost efforts to create an impact on livestock development programmes in the state. The comparatively young highly qualified, energetic and devoted faculty has been pivotal in the continuous growth of the College. Many of faculty members have won National and International recognition; despite several impediments, the College continues to perform excellently.


View of College Campus

First block of the main building of the College was occupied in 1991. Phase –II of the College was completed this year. Other buildings of the College include: Experimental Animal's Sheds, Physiology Block, Veterinary Teaching Clinical Complex, Radiology Block, Gynecology Block, Fishery Block, Disease Research Laboratory-cum-Necropsy complex, and Indoor Clinic for each species of livestock, rest room for attendants of indoor patients referred

from different parts of the state. The College also holds regular clinical camps in different villages, even in remote mountainous parts of the state where experts from the College treat sick animals at the door-steps of the farmers.The Veterinary Teaching Clinical Complex is the hub of activity of the College. It provides a training platform for graduates and postgraduates and also attracts referral cases through out the state. The Disease Investigation Laboratory of the College attends to field outbreaks of various diseases/conditions; it establishes the etiology of the disease as well as determines the kind of effective drug against infectious agents and suggests treatment/control measures.

The College also renders consultancy services to the farmers for economical dairying, poultry, rabbitry and scientific feeding and management of various species of livestock.The College is, comparatively young yet several need based and location specific research priorities have been identified by various departments. To name some of these are: very low milk production potential of local cattle, buffaloes and yaks, low and inferior quality of wool production in Gaddi sheep, acute shortage of nutritive fodders, poor quality grasses and quality feeds, lack of scientific know-how for the proper management of exotic and crossbred animals; prevalence of various infectious and non infectious diseases among different species of livestock also those of yaks, pashmina goats, Spiti horses and Angora rabbits, sterility and infertility problems in various species of livestock, physiological parameters of yaks and Gaddi goats; toxicological studies of certain poisonous plants, chronic bovine haematuria and *Lantana* toxicity, anatomy and histology of yaks, Spiti horses and Gaddi goats,sedative standardization in yaks and autogenous synovial transfusion in animals. A number of research projects have been sanctioned by various agencies of the state and Central Governments, ICAR, Department of Biotechnology, Private Pharmaceuticals and NATP etc. and are in operation in the College.

SCOPE:

The prime objective of the teaching curriculum is to train veterinary graduates for (a) providing clinical treatment to ailing livestock (b) prevention and control of infectious diseases (c) intensive extension activities concerning improved livestock production (d) specialized service in regard to breeding, feeding, management and disease control to progressive livestock farmers and organized sectors (e) Veterinary services like meat inspection, maintaining disease free animals for experimental purposes(f), public health and zoonosis (g) on the spot diagnosis of various diseases. The graduates so trained; both in livestock health and production serve not only in veterinary hospitals but also look after the livestock extension activities, as well as also compete in the Veterinary and Remount Corps of Army, SSB, BSF, nationalized banks, medical and para-medical institutions, pharmaceuticals, livestock feed plants, livestock & poultry product industries besides establishing their own polyclinics. The number of candidates to be admitted each year to BVSc & AH programme is decided in consultation with the Directorate of Animal Husbandry, Himachal Pradesh. Five nominees of VCI are also admitted each year as per their directions.

Teaching Progrmmes :

The revised curriculum as per the VCI comprises of 187 credit hours both in theory and practical. The curriculum has been modified to make it more practical oriented, which is the prime motive of the Veterinary Education. Tutorial system is to help and guide the students to receive education for all round development of their personality. Educational tours are arranged according to the course requirements and an All India level tour (only once) to get them acquainted with various on going activities pertaining to the profession. Ten per cent students in each class are awarded College Merit Scholarship @ Rs.250/- each per month.

The college was accorded accreditation in 2004 by the Indian Council of Agricultural Research-New- Delhi

Academics:

- The college is one of the leading institute in the country which adopted the minimum standards of veterinary education as per the Veterinary Council of India act 1984, and switched over to the annual system of external examination
- Teaching in the college is extensively being undertaken using the modern audio visual aids including multi media projectors. Further, with intensive computerization and Internet connectivity, web based teaching has also been initiated.
- The college has attached Veterinary teaching clinical complex catering to the complicated referred cases through out the state thus the students are also exposed to such complications and obscure ailments. The clinic of the college has some of the most modern diagnostic and surgical equipments viz. large and small animal x-ray machine, ultra sound, endoscope, fully conditioned small and large animal modern operation theatre, auto blood analyzer. Further

laparoscopic surgery is also undertaken in animals.

- The college has attached Livestock farms for teaching purpose including Poultry, Rabbitory, Goat and Sheep section. A herd of 240 dairy animals is being maintained on line with scientific management.

Student Strength

Year	Students
I- Professional year	35
II- Professional Year	33
III- Professional year	40
IV- Professional year	37
V- Professional year	41

Result of examination with divisions (2005-06)

Year	Appreared	Pass	Fail	%
I- Professional year	35	31	4	88
II- Professional year	40	38	2	95
III- Professional year	37	35	2	96
IV- Professional year	41	41	0	100
V- Professional year	35	35	0	100

Extra Curricular Activities:

The students of this College have scored the following positions in the athletic meet of the University during academic year 2005-2006:

Inter College Volleyball match in progress

Vice-Chacellor Trophy Winner:
Best Athlete: Sh. Ajay Thakur
(100, 200, 400 Metre short races)

Men Athletic Meet Achievements

1.100 mtr. Ajay Thakur (Ist)
2.100 mtr. Munish Julka (IInd)
3.200 mtr. Ajay Thakur (Ist)
4.400 mtr. Ajay Thakur (Ist)
5.400 mtr. Vikas Saklani (Third)
6.800 mtr. Arun Thakur (Third)
7.10000 mtr. Parvinder Singh (IIIrd)

2.Relay Race
1.4x100 Ajay, Manish, Vikas, Vikram (Ist)
2.4x400 Ajay, Prateek, Amit, Aman (IInd)

3.Discuss Throw
1.Vikas Saklani (Ist)
2.Prashant Mandvya (IInd)
3.Sughar Chand (IIIrd)

4.Hop Step jump
1.Vikram Patial (IInd)

5 .Shot Put
1.Vikas saklani (Ist)

6.Javelin Throw
1.Tarun Thakur (Ist)

7.High Jump
1.Vikram Patia (IInd)

8.Hammer Throw Nishant Verma (Ist)

Women Athletic Meet Achievements

1.100 mtr. Sona Katoch (IInd)
2.200 mtr. Sona Katoch (IInd)
3.Relay
1.4x100- Namrata, Himani, Divya, Sonia (1st)
4.Long Jump
1.Divya Sen (Third)
5.Discuss Throw
1.Namrata (IIIrd)

Sports & Co-curricular Activities :

Students of the Fourth year of the College namely Avaninder and Anil Chauhan represented the University at the Inter University Debate Contest on the topic " Is youth more vulnerable to HIV/ AIDS in India". held at Punjab University Chandigarh from 22 to 24 September and were awarded an Appreciation Award.

Sports Events:

1. Basketball (Boys): Inter-college championship of the University was won by the students of this College.
2. Athletics: Inter-college championship of the University (Boys) was won by the students of this College.
3. Volleyball: Both Boys and Girls Inter-college championship of the University were won by the students of this College.
4. Badminton: Inter-college championship of the University was won by the students (Boys & Girls; Doubles & Single) of this College.
5. Chess: Inter-college championship of the University was won by the students (Boys & Girls) of this College

ICAR JRF:

14 students cleared ICAR exam including 4 getting 'JRFs' in the All India ICAR JRF examination conducted during the month of May 2006. Although 14 out of the 24 appeared secured positions at the national level but only 10 students appeared for counselling at ICAR New Delhi. Karam Chand negi scored Ist position in the ST category and bagged M.V.Sc in Virology from IVRI Izaatnagar with a monthly stipend of Rs. 8000/-. Similarly Pawan Kumar secured 3rd rank in SC category and bagged M.V.Sc in Pathology from IVRI - Izaatnagar with a monthly stipend of Rs. 8000/-. Rajneesh Pathania got 38th rank at the All India Level and got a seat in M.V.Sc in Pharmocology at GADVASU Ludhiana with a monthly stipend of Rs. 8000/-

Students of the college recieving certificates from the Vice Chancellor of CSK HPKV during NSS camp held at Vill Aima Palampur

Students of the college in a class

S.NO	NAME	ALL INDIA RANK
1	RAJNEESH PATHANIA	38
2	RITA KAUSHAL	42
3	PAWAN KUMAR	59
4	PRABHDEEP KAUR	82
5	MAYUR VARSHNEY	96
6	VIPIN KUMAR NAIN	143
7	PANKAJ SHARMA	148
8	VINAY KANT GUPTA	168
9	KARAM CHAND NEGI	183
10	RITESH ROY	278

SIGNIFICANT RESEARCH HIGHLIGHT

- The women beneficiaries selected and trained were given all the equipments and other inputs and lay-out of layer sheds with locally available materials was carried out at their sites. Finally layer units were established and all the managemental operations were performed by the beneficiaries in a well co-operative manner. The data regarding biological performance of layers from one week to 18 weeks of age were collected. The average gain in weight was 1010.13 g with FCR of 5.55 and mortality of 1.56 % observed at different sites. Perusal of laying data for six months of lay showed that on an average 20.50 eggs were laid with average egg weight of 48.94g, Average egg mass of 3236.81, Feed consumed per dozen egg of 1931.00g and 68.34% average percent hen day egg production at different sites. However, no mortality due to any disease was observed at any site. Overall an average profit of Rs. 4.66/ bird/ month was achieved during six month of lay at different sites. In general, 83% women were interested in broiler rearing, however, only 3% in layer rearing.
- Ciprofloxacin, Gentamycin & Enrofloxin had high sensitivity in vitro against microbes isolated from uterine discharges of endometritic cows. In addition to above antibiotics streptopencillin also demonstrated good inhibition zones in discharges collected from buffaloes. Ciprofloxacin & Gentamycin at therapeutic dose were effective for treatment of endometritis in cows. & PGF_2á given alone during mid luteal phase was not effective in endometritic cows. Further Uterine biopsy gave more conclusive information regarding endometritis than uterine discharge.
- Quick detection of chlamydiales and chlamydiaceae employing two PCR tests provided superb sensitivity as well as easy recognition to chlamydial infections as compared to labour intensive isolation procedures and indirect micro-immunofluorescence test.
- A field investigation of bacterial etiology of abortions among migratory sheep and goats in north-west hill states showed that chlamydial abortions are more likely to occur in goats than in sheep and that *Brucella* abortions occur more often in sheep.
- Studies revealed that poultry broilers are highly susceptible to Hydro pericardium Syndrome (HpS) followed by Japanese quail, whereas pigeons and ducklings are resistant to HpS infection.
- Under AICRP research project on " Improvement of feed resources and nutrient utilization for raising animal production" it was found that the farmers of agroclimatic zone III were getting higher income (Rs. 7.20 thousand/ Per annum) from livestock, as compared to zone I and II. The analysis of mineral status of feed and fodder, indicated that copper was below normal critical range, zinc was within normal range, where as iron concentration was higher than critical level in all feed & fodder samples of zone I, II & III. On the basis of results of mineral level in blood of animals, feed & fodder etc. the deficient elements has been identified in different zones. After supplementation of minerals for period of one month, the percentage of animals deficient in various macro and micro minerals was drastically reduced. In both the blocks 21.67% animals were deficient in Na^+, which was reduced to 1.67% after one month supplementation. Similarly Cu and Zn deficiency was observed in 50% and 53% of animals, which was reduced to 21.67% and 26.67 % respectively, post supplementation. A variable increase in milk yield, considerable decline in number of anoestrus animals as well as increased number of acyclic animals showing cyclicity were some other salient observations, after strategic mineral supplementation.
- Studies under the ICAR Adhoc Research project on "Effect of the Season on the Histology and Histochemistry of the Male Genital System & the Pineal Gland of the Gaddi Goat and Gaddi Sheep" revealed that the histochemical parameters were more or less similar in both the species of the animals i.e. Gaddi goat and Gaddi sheep. The reaction for protein was observed in the cytoplasm of the pinealocytes in all the seasons but the intensity was more in summer than in other seasons.As per the micrometrical observations on all the organs of the male genital system, the epithelial height was maximum in autumn season and minimum in summer season indicating all the organs were more active in autumn. In the pineal gland, the density of pineal cytes was maximum in summer indicating the gland was more active in that season. The cellular density of pinealocytes was in reducing order in spring, winter

and autumn respectively. The cytoplasm of the pinealocytesa showed strong reaction for protein which might be indicative of the enzyme (HIOMT) present in the gland

.•Studies on certain anaesthetic techniques in dogs with special reference to propofol was conducted on 31 clinically healthy Adult mongrel dogs of either sex weighing 12 to 35 kg, to evaluate propofol alone or propofol-thiopental mixture in combination with detomidine/medetomidine for induction of surgical anaesthesia. The present study indicated that medetomidine propofol combination proved to be excellent for the induction of surgical anaesthesia in atropinized dogs. It produced anaesthesia of considerable duration with minimum cardio respiratory side effects and was least expensive.

•Studies On The Efficacy Of Seabuckthorn (*Hippophae Sp.*) Oil In The Healing Of Gastric Ulcers In Dogs was conducted on 32 healthy adult mongrel dogs. It was concluded that seabuckthorn seed oil has prophylactic efficacy against development of dexamethasone-induced GUE in dogs to a certain extent in the initial periods and it also has therapeutic efficacy in the healing of GUE in dogs as it helps in faster regeneration of damaged gastric mucosa.

STAFF PATTERN

After re-organisation and establishment of 18 departments, the faculty of College has **13** Professors, **24** Associate Professors and **16** Assistant Professors.Universities in developing countries particularly the faculties of agriculture and veterinary medicine are under increasing governmental pressure to make direct, visible, and relevant contributions to National Research and Development. The teaching, research, and extension services are expected to be in line with National strategies for meeting the challenges of food security, economic growth, and sustainable environmental management. To improve teaching activities, research performance and extension activities, existing faculty positions need to be strengthened further with **8** Professors, **16** Associate Professors/Scientists, **32** Assistant Professors/ Assistant Scientists in very near future to comply with the norms of Veterinary Council of India.

DEPARTMENT	FACULTY STRENGTH	QUALIFICATIONS	
		M.V.Sc	Ph.D
Veterinary Anatomy and Histology	4	2	2
Veterinary Physiology	2	0	2
Veterinary Biochemistry	2	0	2
Veterinary Pharmacology and Toxicology	2	0	2
Veterinary Parasitology	2	0	2
Veterinary Microbiology	6	5	1
Veterinary Pathology	2	0	2
Veterinary Public Health	2	0	2
Animal Nutrition	6	4	2
Animal Breeding and Genetics including Biostatistics	3	0	3
Livestock Production and Management	4	1	3
Animal Reproduction, Gynecology and Obstetrics	3	0	3
Veterinary Surgery and Radiology	5	0	5
Clinical Veterinary Medicine including Ethics and Jurisprudence	3	0	3
Livestock Products Technology	0	0	0
Veterinary Epidemiology and Preventive Medicine	2	1	1
Veterinary and Animal Husbandry Extension	2	1	1
Department of Fisheries	2	0	2
Veterinary Clinical teaching complex	1	0	1
Total	**53**	**14**	**39**

BUDGET

SALARY	TA	MEDICAL	CPF/GPF CONTRIBUTION	CONTINGENCY	TOTAL
4,71,18,431.00	36381	80941	39,62,453.00	1,16,34,706.00	6,22,18,005.0
REVOLVING FUND SCHEME				56,23,126.00	56,23,126.00
SELF FINANCE SCHEME				8,38,266.00	8,38,266.00
RESEARCH PROJECTS					
9,99,354.00	1,11,786.00			12,68,735.00	26,19,875.00
TOTAL BUDGET OF THE COLLEGE					
4,81,17,785.00	**1,48,167.00**	**80941.00**	**39,62,453.00**	**1,93,64,833.00**	**7,12,99,272.00**

LIBRARY CUM READING ROOM

The reading Room in the College of Veterinary & Animal Sciences was started in 1997 as a humble start with the donation of the books from the faculty members of the College and Veterinary professionals. Later on, some text books were purchased under Dr. G.C. Negi Memorial Fund. Now, it has acquired a special place in the College campus.

It has a sitting capacity of 15-20 readers with a provision of 25 lockers for students for safe custody of their belongings. The "mini-library" has around 700 text books of different disciplines of Veterinary and Animal Sciences in addition to 1250 periodicals. More structural additions are required to be made to the reading room in near future.

DEPARTMENT OF VETERINARY PHYSIOLOGY

Teaching Activities

The department offered courses to undergraduate and postgraduate students during academic year 2005-2006.

Research

AICRP research project on "Improvement of feed resources and nutrient utilization for raising animal production".

In Himachal Pradesh the rural economy is predominantly dependent on livestock husbandry, and the state has been divided graphically into four agro climatic zones. In the state, the farmers prefer cattle rearing over buffaloes, and sheep and goat rearing is also predominant in agroclimatic zones II, III & IV. Small ruminants are reared exclusively on grazing, while large ruminants are reared in mixed production system. Large variety of fodder trees is used for feeding cattle, besides seasonal grasses which are harvested post rainy season, to be used during the lean period.

The socioeconomic survey indicated that farmers of agroclimatic zone III were getting higher income (Rs. 7.20 thousand/ Per annum) from livestock, as compared to zone I and II. The analysis of mineral status of feed and fodder, indicated that copper was below normal critical range, zinc was within normal range, where as iron concentration was higher than critical level in all feed & fodder samples of zone I, II & III. On the basis of results of mineral level in blood of animals, feed & fodder etc. the deficient elements has being identified in different zones. At the same time, we have also observed that some elements are in for excess concentration than requisite level in blood plasma as well as feed and fodder. However due to great variation in altitude at districts level, as well as degree of precipitation the macro and micro mineral concentration was found varying at block level too, thus study has to be focused to blocks/tehsils and village as unit. Certain indigenous plants/forage trees and grasses have been identified in different agro climatic zones, which are commonly used as fodder source to animals. The mineral content of these plants is being analysed. Strategic mineral supplementation work was carried out in two blocks i.e. Baijnath and Panchrukhi. After identifying animals, deficient in various macro and micro minerals, were supplemented with specially prepared mineral mixtures. After supplementation of minerals for period of one month, the percentage of animals deficient in various macro and micro minerals was drastically reduced. In both the blocks 21.67% animals were deficient in Na^+, which was reduced to 1.67% after one month supplementation. Similarly Cu and Zn deficiency was observed in 50% and 53% of animals, which was reduced to 21.67% and 26.67 % respectively, post supplementation. A variableincrease in milk yield, considerable decline in number of anoestrus animals as well as increased number of acyclic animals showing cyclicity were some other salient observations, after strategic mineral supplementation.

Sheep Grazing in High Alpine Pasture

RESEARCH PUBLICATIONS

A. Books Edited: Studies on the adaptational aspects of migratory sheep Goat of Himachal Pradesh by: K. B. Sharma & R. Kumar.

B. Extension Brochure Entitled, "Pashu Aahar mein Khanij tatboan ka mehtab by K. B. Sharma & R. Kumar.

C. Research Papers:

1. R L Bhardwaj, **R.Kumar**, K B Sharma, Rajesh Rajput and Sonia Sharma (2005) Macro and micro mineral concentration in genital tissues of Gaddi Goat. Indian Journal of Animal Physiology 1 (1): 33-34.
2. K.B. Sharma, **R. Kumar** & Y.P. Thakur (2005) Haematological profile of Chegu Goats. Indian Journal of Animal Physiology. 1(1): 31-32.
3. Girish Sharma, K. B. Sharma and **R. Kumar** (2005) Plasma Mineral profile of anestrous cows treated with vitamin-A and Mineral supplementation. Indian Journal of Animal Physiology. 1(1): 26-30.
4. Madan Verma, R Kumar and K B Sharma (2005) Effect of specific mineral supplementation on haemato-biochemical parameters of crossbred cows of Himachal Pradesh Indian Journal of Animal Physiology. 1(1): 6-11.

5. Madan Verma, R Kumar and K B Sharma (2005) Strategic supplemenstation studies on trace minerals in cattle of Himachal Pradesh. Paper presented at XXI Annual convention of ISSAR and Nationa l Symposium held at RS Pura Jammu w.e.f. Nov. 23-25, 2005.
6. R Kumar, K B Sharma, Manjinder Sharma and Ravi Sharma (2006) Mineral status of thelivestock of sub-hill areas of Himachal Pradesh. Paper presented at XVth Annual Conference of SAPI and national Sympo sium held at Mumbai w.e.f. Jan 5-7, 2006.
7. K B Sharma, R Kumar and M K Lonare (2006) Mineral profile of high altitude dairy animals of Himachal Pradesh. Paper presented at XVth Annual Conference of SAPI and National Symposium held at Mumbai w.e.f. Jan 5-7, 2006.

D. Lead Papers: Lecture on " **Mineral Imbalances and Supplementation studies a tool to augment production and reproduction in Farm Animals"** delivered in Winter school on "Recent trends in utilization of plant biodiversity in the animal health care with special reference to Pharmacotheraputics, pharmacodynamics and safety assessment" held at CSKHPKV, Palampur w.e.f. Feb. 18 to March 10, 2006.

DEPARTMENT OF ANIMAL NUTITION

TEACHING ACTIVITIES :

The courses were offered to the under graduate and post graduate students of the college by the faculty members during the first and second semesters of 2005-2006.

Research:

Post Graduate Programme: During the year 2005-2006 two M.V.Sc. students enrolled for their Master's program, but one student joined state Animal Husbandry Department in January, 2006.

Comparative evaluation of hot and cold processing method of preparation of urea-molasses-bricks in crossbred calves.

- The shelf life (storage) of the UMMB prepared with cold process could be increased. For longer storage period the UMMB should be wrapped in the polythene bags particularly in the rainy season.
- The DMI of the calves with the conventional concentrate feeding is always higher and digestibility of nutrients and nutritive ratio of the diet supplemented with UMMB are higher.
- More mineral concentrations of blood plasma and nitrogen balances are available for animals for growth and other biochemical activities with the diets supplemented with the UMMB..
- The diets supplements with UMMB were cheaper and cost of weight gains were also more especially when UMMB, prepared with cold process method, were fed to the calves.

Development of Poultry Farming as Self Sustaining Units for Promotion of Rural Women Entrepreneurship

The women beneficiaries were selected and trained under the project for rearing of layer birds and ere given all the equipments and other inputs and layout of layer sheds with locally available materials was carried out at their sites. Finally layer units were established and all the managemental operations were performed by the beneficiaries in a well co-operative manner. The data regarding biological performance of layers from one week to 18 weeks of age were collected. The average gain in weight was 1010.13 g with FCR of 5.55 and mortality of 1.56 % observed at different sites. Perusal of laying data for six months of lay showed that on an average 20.50 eggs were laid with average egg weight of 48.94g, Average egg mass of 3236.81, Feed consumed per dozen egg of 1931.00g and 68.34% average percent hen day egg production at different sites. However, no mortality due to any disease was observed at any site. Overall an average profit of Rs. 4.66/ bird/ month was achieved during six month of lay at different sites. In general, 83% women were interested in broiler rearing, however, only 3% in layer rearing. This project was concluded in August, 2005.

Economical utilization of some available agro-industrial by-products in poultry feed

A surveillance was conducted at different sites for the seasonal availability of different agro-industrial by-products to be used for the study under the project. Kinnu and orange peels and pulp and rose-petal wastes were collected, oven dried, ground and analysed for their proximate compositions, minerals and energy. Nutrient evaluation of stored citrus by-products were carried out in order to find out their shelf life during storage period. Results revealed that all the by-products are good source of energy and poor source of protein thus can be substituted at a suitable level in poultry feed in place of energy providing ingredients and also can support protein in the feed upto some extent. The nutrient composition of stored by-products remained almost unchanged upto four months of their storage under normal conditions.

Research Publications

1. S.K.Pathak, N.K.Tripathi, V.K.Sharma and A.K.Mishra 2005. Fodder production and feeding pattern studies in livestock production system. Indian J. Anim. Res., 40(2):147-150.
2. N.K. Tripathi, Sunil Kumar Pathak and V.K. Sharma 2006. An on-farm evaluation of Urea-Molasses-Mineral Brick Feeding on the Milk Production of Cattle and Buffaloes Journal of Animal Nutrition and feed technology,6:251-255.
3. S.K.Pathak, N.K.Tripathi, V.K.Sharma and K.B.Sharma 2006. Macro and micro status of feeds and fodders in Bilaspur District of Himachal Pradesh. Journal of Animal Nutrition and Feed Technology, 6:265-269.

4. V.K. Sharma, Desy Wadhwa, J.S.Chauhan and S. Radotra 2005. Socio-economic aspects of conserving monsoon herbages in hill regions. Lead Paper in National seminar on conservation, processing and utilization of monsoon herbage for augmenting animal production held at CSWRI Bikaner on December 17th -18th ,2005. Compedium Publications:142-151
5. S.K.Pathak, N.K. Tripathi and V.K.Sharma (2005) Participation of women in live stock management practices in Bilaspur district of Himachal Pradesh. Progressive Agriculture (An International Journal) 5 (1&2) :94

Presentation in Conferences/Seminars/ specilised meetings :

1. Sharma V.K. (2005). 'Feeding value of Seabuckthorn to the animals- a review' Presented at International Seabuckthorn Association conference held at Beijing (China) w.e.f. 26 to 29th August, 2005.

2. Sharma V.K., Wadhwa, D., Chauhan, J. S., and Radotra, S. (2005). Socio-economic aspects of conserving monsoon herbages in hill regions, Lead paper presented at the National seminar organized by CSWRI, ARC, Bikaner w.e.f. 17-18th Dec. 2005.

3. Sharma V.K. (2005). Presentation of proposal under funds for improvement of S&T infrastructure in Universities and Higher Institutes (FIST) at Bagalore, w.e.f 2nd-3rd November, 2005.

Extension:

Popular articles:

1. ***Soor Palan avum unka poshan*** Nagender Kumar Tripathi, Sunil Pathak and Vijay Sharma (2005). Kheti Dunya, 18.6.2005, 2:10
2. ***Navjat bachhron kay rog va roktham*** Sunil Pathak, Nagender Kumar Tripathi, and V. K. Sharma (2005). Kheti Dunya, 10 (30):2
3. ***Pashuon mein pet kay keedon kee roktham*** Nagender Kumar Tripathi, Sunil Pathak and Vijay Sharma (2005). Kheti Dunya, 10 (30):2
4. ***Dudharu pashuon key rog va roktham*** Sunil Pathak, Nagender Kumar Tripathi, and V. K. Sharma (2005). Kheti Dunya,10 (31):2
5. ***Pashudhan utpadan mai probiotic ka mahatav*** Nagender Kumar Tripathi, Sunil Kumar Pathak and Vijay Sharma (2006) Parvateya Khetibadi ,1:13.
6. ***Pashu upchar ki gharelu vidhiyan*** Sunil Pathak, Nagender Tripathi and V.K.Sharma (2005) Parvateya Khetibadi ,1-2:21

DEPARTMENT OF ANIMAL BREEDING, GENETICS AND BIOSTATISTICS

Research projects:

Survey, evaluation , Characterization of Rampur Bushair sheep(Survey Unit)

The Rampur Bushair is a prominent sheep breed of north temperate region of the country, reputed for medium apparel/fine carpet wool production. The breeds has its home tract in southern region of Himachal Pradesh with distribution from high hills to low hills/valleys regions of the state as well as the adjoining hilly areas of Uttaranchal. The breed is highly suitable to the migratory sheep and goat production prevailing in the system.

The main breeding tract is distributed with in 30°22' to 33°12'N latitudes and 75°45' to 79°04'E longitudes. This comprises the entire revenue districts of Shimla, Kinnaur, Sirmour and parts of Kullu, Solan, Bilaspur, Mandi and Lahaul Spiti revenue districts of Himachal Pradesh. Previously, about three decades ago farmers in the entire districts like Solan, Bilaspur, were rearing this breed, but with time period most of them left the sheep rearing due to cheap and easy availability of synthetic wool with the fast development of hosieries using imported yarn in adjacent states like Punjab and Haryana, shrinking of grazing land and obnoxious growth of weeds like lantana in traditional pastures and lack of interest of due to economical reasons. The farmers in Spiti, Kinnaur, and Shimla are keeping sheep both migratory and stationary. In rest of the areas the flocks are mostly migratory. Though the breed is listed among the recognized sheep breeds of the country, yet comprehensive description of the breeds, in terms of morphological characteristics, performance parameters and demographic patterns of distribution was still lacking.

The current population of animals confirming to true breed type is still more than 90 thousands in the breeding tract. But the indiscriminate crossbreeding with exotic fine wool breeds like Rambouillet carried on in the breeding tract particularly among the large sized flocks with the objectives of improving the wool quality had lead to sharp decline in the breed population recently. As such breed conservation strongly is required to be taken up particularly in dense pockets of distribution so that the breed status can be improved.

The comprehensive description of the breed based on the observation record on animals of different age groups/ sexes under farmer's flocks has been carried on under the project. The Rampur-Bushair sheep is a medium sized animal with variable fleece colour (brown, black, white and admixture of different coloration) males invariably horned with thick, curved horns in different orientation, females are usually polled and the extremities of limbs and face devoid of wool, covering.The growth and body biometry of the animal has been recorded. The birth weight of the lamb was averaged around 2.31 Kgs with wide range 1-4.5 Kgs. The adult body weight was approx. 25-26 Kgs with

range between 16 to 46.5 Kgs. Males are slightly heavier than females. The body length is 28.98 cms with chest girth of 32.89 cms.

The production potential of the breed for reproductive and wool production and quality characteristics has been evaluated based on observations under farmer's flock conditions. The adult rams and ewes matured at the age two years. The fleece wt. was between 250-500gm per shearing and animal is sheared twice a year. The staple length of wool fiber ranged between 2.86 and 10.6 cms. The fiber diameter averaged 31.09 (µ) with range between 22µ-48µ .The high variability with the population suggests high scope for genetic improvement in wool production both as quantitatively as well as qualitatively.

A genetic improvement programme based on selective breeding within the existing population can bring further improvement in wool traits.

Characterization of Hill Cattle

The ICAR project was sanctioned in April, 2006 with budgetary provision of Rs. lakh. The project envisaged identification and characterization of Hill Cattle of three districts namely Kangra, Mandi and Chamba and its adjoining areas in Himachal Pradesh. It includes study of population status, morphological measurements, production potential and reproductive performance of Hill Cattle. The project envisaged conducting of scientific survey by following modern sampling designs and suitable formats, descriptor and questionnaire for collecting all possible relevant information for a particular breed inhabiting a defined eco-geographical region.

Characterization and Conservation of Red Jungle Fowl under Natural Environmental Conditions in H.P.

India, which gave the Red Jungle Fowl, the motherof all poultry to the rest of the world, is now importing poultry from outside and destroying its own indigenous species. Today these unique breeds are disappearing, partly because of neglect and partly because of crossbreeding. Most of the wild population has been contaminated with domestic or feral chicken. Certain rare breeds still exist and there is time to save and conserve them.

Keeping in view the danger of the Red Jungle Fowl to become extinct from its original home, a project proposal on the characterization and conservation of this important indigenous germplasm was submitted to the ICAR, which has been sectioned during last year. The project has following objectives.

1. To rear red jungle fowl in free range/ captivity so as to study their behavioral characteristics including stress during captivity/ free range rearing.
2. Morphological characterization of red Jungle Fowl.
3. To study production and reproduction system.
4. To explore the possibility of rearing under semi-intensive/ back yard poultry production

Progress of the project:

The project is a new project and the work various aspects could have been taken up after the release of funds by the ICAR during April 2006. The following is the accomplishments achieved so for:

- All the posts of different category of contractual staff have been filled up.
- The construction of the chain-linked enclosure has been completed.
- The process of purchase of equipments has been initiated and is in the final stage.
- The permission to catch the birds from different wild life areas has been sought from the Principal chief Conservator of forest (Wild life) and is likely to be received any time.
- Different pockets of the wild life areas in the state have been surveyed where the red jungle fowl are available.

Rampur Bushair sheep in alpine pastures

Research papers published during the year:

1. Katoch, S., Dogra, P.K.**,** Thakur. Y.P. and Gupta, K., (2005). Characterization of Spiti horses in its breeding tract – Reproductive parameters. Centaur. 21 (3):**46-48.**
2. Y.P.Thakur, S.Katoch and P.K.Dogra (2005)Production system and demographical status of chegu goats in their breeding tracts in Himachal Pradesh The Ind J of Small Ruminants 11(2) :**116-120**
3. R. Katoch; S. Katoch; R.K.Agnihotri; K.B. Sharma and Ajay Katoch (2006). Incidence of Gastrointestinal helminthes in Spiti Horses of Hiamchal Pradesh . Intas Polivet 7(1) **64-66**

4. Anshool Sood; K.Gupta; K.S.Risam; S.Katoch and O.P.Kaila (2005) Studies on genetic and phenotypic correlations between wool quantity and wool quality traits an Angora rabbits. Himachal J Agric. Res. 31(2)**160-62**
5. Verma, Anuradha, **Gupta, Kamlesh** and Katoch, S (2005). Factor affecting the incidence of abnormal calving in the organized herds. *Himachal Journal of Agricultural Research . Vol. 31(1):153-156.*7.
6. Kaila, O.P.; Gupta, K. (2005). Factor affecting wool production of sheep under migration in Himachal Pradesh. *Indian Journal of small ruminants. Vol. 11(1) April, 2005:28-30.*
7. Kaila, O.P. and **Gupta, K** (2005) Factors affecting reproduction traits of Migratory Sheep in Himachal Pradesh *Indian Journal of small ruminants. Vol. 11(2) October, 2005:205-207.*
8. **Gupta, K** , Kaila, O.P and Marwaha, C.L (2005) Growth Patterns Studies of Gaddi Goat in Cold Arid Zone of Himachal Pradesh *Indian Journal of small ruminants. Vol. 11(2) October, 2005:187-190.*

Papers presented:

1. Dogra, P.K.; Katoch, S; Thakur, Y.P. and **Gupta, K**. (2005) *"Traditional Breeding Practices of Spiti Horse Breeders in the Cold Desert of Himachal Pradesh"* presented at ***"National Symposium on Domestic Animal Diversity: Status, Opportunities and Challenges"*** held on 10th and 11th February, 2005 at National Bureau of Animal Genetic Resources, Karnal. In proceedings, pp 145; Ab. (DAD.139).
2. **Gupta, K**; Katoch, S; Thakur, Y.P. and Dogra, P.K. (2005) *"Growth Pattern studies of Gaddi Goat in Cold Arid Zone of Himachal Pradesh"* presented at ***"National Symposium on Domestic Animal Diversity: Status, Opportunities and Challenges"*** held on 10th and 11th February, 2005 at National Bureau of Animal Genetic Resources, Karnal. In proceedings, pp 148; Ab. (DAD.171).
3. Dogra, P.K., Katoch, S, Thakur, Y.P. and **Gupta, K**, (2005) ***"Traditional Breeding Practices of Spiti Horse Breeders in the Cold Desert of Himachal Pradesh"*** presented at *"National Symposium on Domestic Animal Diversity: Status, Opportunities and Challenges"* held on 10th and 11th February, 2005 at National Bureau of Animal Genetic Resources, Karnal. In proceedings, pp 145; Ab. (DAD.139).
4. **Gupta, K**, Katoch, S, Thakur, Y.P. and Dogra, P.K. (2005) ***"Growth Pattern studies of Gaddi Goat in Cold Arid Zone of Himachal Pradesh"*** presented at *"National Symposium on Domestic Animal Diversity: Status, Opportunities and Challenges"* held on 10th and 11th February, 2005 at National Bureau of Animal Genetic Resources, Karnal. In proceedings, pp 148; Ab. (DAD.171).
5. **Gupta, K**; Marwaha, C.L and Kaila O.P (2005) *"Studies on Reproductive Traits and Physiological Parameters of Gaddi Sheep of Cold Arid Zone of Himachal Pradesh"* presented at ***"National Symposium on Domestic Animal Diversity: Status, Opportunities and Challenges"*** held on 10th and 11th February, 2005 at National Bureau of Animal Genetic Resources, Karnal. In proceedings, pp 14; Ab. (DAD.184).
6. Thakur, Y.P, Katoch, S, **Gupta, K**, and Dogra, P.K. (2005) *"Opportunities for Improvement of Pashmina Goat Production in Cold Arid Region of Western Himalayas"* presented at ***"National Symposium on Domestic Animal Diversity: Status, Opportunities and Challenges"*** held on 10th and 11th February, 2005 at National Bureau of Animal Genetic Resources, Karnal. In proceedings, pp 166; Ab. (DAD.103).
7. K Gupta;S.Katoch; O.P.Kaila and Simarjeet Kaur (2006) "*Animal Biodiversity and its conservation in North West Himalayas"* presented at Biodiversity awareness workshop on animal genetic resources conservation at NBAGR, Karnal held on 22-23rd April 2006. 35-42

Extension Activities: Thirteen lectured were delivered to the farmers/ trainees under various programmes by the faculty members.

DEPARTMENT OF VETERINARY MICROBIOLOGY

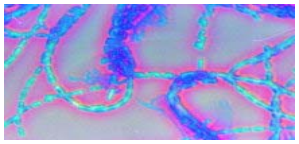
A. TEACHING ACTIVITIES:

The courses were offered to the under graduate and post graduate students of the college by the faculty members during the first and second semesters of 2005-2006.

B.RESEARCH ACTIVITIES:

I. Establishment of disease research laboratory at HPKV, Palampur-P-5(Vety.):

This is a state financed research scheme operating in the department since 29-04-1988. The following research work was carried out in this scheme in the year under report: During the year starting from July, 2005 to June, 2006, a total of **956** samples from different species of animals were microbiologically processed. The samples comprised of milk, pus, faecal swabs, blood, cervical discharge, sputum, nasal swabs, vaginal swabs from aborted animals, ear swabs, skin scrapings, eye swabs and urine etc. The microbes that accrued from the samples were identified, confirmed biochemically and the drug sensitivity results were conveyed to the concerned quarters. Besides the animal samples, **226** samples from humans were also processed.



Livestock species-wise morbid materials processed for Microbiological investigations:

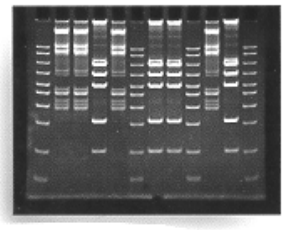
Months	Cattle	Buffaloes	Equine	Ovine /Caprine	Canine	Poultry/ Rabbit	Other	Total	Human sample
July 05	135	22	1	10/10	12	5/1	-	**196**	**17**
Aug. 05	71	34	3	6/13	4	3/6	-	**140**	**22**
Sept .05	19	2	-	-/-	2	-/-	-	**23**	**19**
Oct. 05	10	1	1	9/-	10	3/5	-	**39**	**20**
Nov. 05	15	1	-	-/-	5	-/-	-	**21**	**15**
Dec. 05	78	11	-	23/9	10	2/-	1	**134**	**15**
Jan. 06	5	2	-	-/2	1	-/-	4	**14**	**14**
Feb. 06	83	-	-	-/2	5	5/-	4	**99**	**23**
March 06	56	24	1	29/1	10	2/	1	**124**	**24**
April 06	23	1	-	-/12	7	1/-	4	**48**	**13**
May 06	21	18	1	-/6	10	-/-	-	**56**	**24**
June 06	20	-	1	4/18	19	-/-	-	**62**	**20**
Total	**536**	**116**	**8**	**81/73**	**95**	**21/12**	**14**	**956**	**226**

Important findings or microbial isolations

- Samples of lungs, liver, trachea, kidney tissue were received from **19** outbreaks suspected for Pasteurellosis among cattle and buffaloes in the state. *Pasteurella multocida* was recovered from **6** outbreak samples.
- *Salmonella gallinarum* was isolated from poultry samples submitted from the Department of Veterinary Pathology.
- *Pseudomonas aeruginosa*, *E. coli*, *Proteus* spp., *Klebsiella pneumoniae* and *Candid*a spp. were isolated from mastitic milk samples.
- *Klebsiella spp.* was recovered from eye swab and faecal swab from a dog.
- *Enterobacter taylorae* was isolated from the yolk sac of poultry.
- *Corynebacterium* spp. was recovered from uterine discharge and also from a case of conjunctivitis in cow.
- *Pseudomonas aeruginosa* was isolated and identified from a nasal swab of a buffalo.
- *Candida* spp. was isolated from intestine of poultry and also from uterine discharge of a cow.
- An unusual bacterium- *Escherichia adecarboxylata* was isolated and identified from gastroenteritis case of canine.
- The tissue samples from dying Mahasheer (*Tor putitora*) fish revealed the presence of *Flavobacterium* spp.
- The pus sample of a cow suffering from osteomyelitis of jaw revealed *Actinomyces* spp.
- A total of **290** serum samples were tested serologically for Chlamydial and *Brucella* antibodies. Out of 290 serum samples, 25 samples were found to be positive for Chlamydial antibodies and 5 samples for *Brucella* antibodies.
- Semen samples from bulls (a total of 33) were processed for microbial contamination. Only 3 samples were found to harbor bacteria

QUICK DETECTION OF CHLAMYDIALES AND CHLAMYDIACEAE EMPLOYING TWO PCR TESTS

The study covered two simple and rapid PCR techniques on fresh field specimens of pneumonia, conjunctivitis; diarrhea, abortion, metritis, pooled visceral organs as well a stored chlamydiae infected lyophilized yolk sac membranes for fast detection of different members of *Chlamydiales* and *Chlamydiaceae*. The field samples belonged to different species of livestock, wild/ zoo mammals and birds. Overall, 453 samples comprising of 363 fresh and 90 lyophilized were processed for detection of chlamydiae through isolation, DNA extraction and later employing PCR tests. The two PCR tests carried provided superb sensitivity as well as easy recognition to chlamydial



infections as compared to labour intensive isolation procedures and indirect micro-immunofluorescence test.

A FIELD INVESTIGATION OF BACTERIAL ETIOLOGY OF ABORTIONS AMONG MIGRATORY SHEEP AND GOATS IN NORTH-WEST HILL STATES

A field study on the bacterial etiology of abortions among sheep and goats having migratory practices in the northwest hilly states of India was carried out. A total of 203 flocks were investigated. Abortion outbreaks occurred in 51 flocks and sporadic abortions occurred in 114 flocks. Vaginal swabs from aborted sheep and goats were collected and processed for isolation of bacterial agents from 37 flocks with abortion outbreaks and 56 flocks with sporadic abortions. Bacteria known to cause abortions were identified in 30 flocks with abortion outbreaks including *Chlamydia psittaci* (17 flocks), *Brucella melitensis* (4 flocks), *Listeria monocytogenes* (8 flocks), and one *Salmonella dublin. L. ivonovii* was also isolated from sheep in one of the flocks with *L. monocytogenes*. No specific causes of abortion were identified in flocks having sporadic abortions. The results also show that chlamydial abortions are more likely to occur in goats than in sheep and that *Brucella* abortions occur more often in sheep.

All India Net work programme on Haemorrhagic Septicaemia:

This is an ICAR financed research scheme operating in the department. The following research work was carried out in this scheme in the year under report:

Mandates: The Haemorrhagic Septicaemia (H.S.) is one of the most important bacterial diseases of cattle and buffaloes. The disease is caused by several serotypes of *Pasteurella multocida (P. multocida)* especially B: 2 or 6: B. Because *P. multocida* is so widespread among varieties of both terrestrial and aquatic species of mammals and birds, it would probably be unsafe to rule out any of these species as possible hosts. The organism must be considered as an opportunistic pathogen in humans, although it has some invasive properties. Infection in humans is transmitted through animal bites and scratches and sometimes by licking of wounds or by mucous membranes. The serotyping facilities of *Pasteurella* isolates were lacking in our country which is essential to have complete information on the epidemiology of the disease as well as to develop or modify a suitable conventional as well as a live vaccine with durable immunity. Invariably, there is delay in collection and dispatch of morbid materials from field cases. Thus, the diagnostic laboratory results may be inaccurate due to faulty reporting/ diagnosis. Also the prevailing diagnostic methods are very laborious and time consuming. To minimize the time required for quick diagnosis, the molecular biological techniques are the most suitable and reliable. In this context, polymerase chain reaction (PCR) is a standard assay by which the organism can be detected within a very short time, employing the species-specific PCR (PM-PCR). The recent development of PM-PCR provided a rapid presumptive identificationof *Pasteurella multocida* strains for capsular serogroup A, B, D, E and F.

The control of pasteurellosis depends on minimizing the effects of risk factors, timely diagnosis and enhancing immunity by the judicious use of vaccines, mass medication, and vaccinating animals at strategic places and times, constant surveillance, isolation and treating clinically sick animals. Presently, oil adjuvant vaccine is being used to combat the disease. The vaccine has the major problem of large-scale production, administration, tissue reaction i.e. inflammatory response. The multiple emulsion oil adjuvant vaccine (MEO) is adjudged to confer comparable immunity in rabbits, cow and buffalo calves *vis* a *vis* conventional oil adjuvant vaccines. The OMP from serotype B: 2 (B: 5, B: 2 strain) in paraffin oil has been protective in buffalo calves for three months duration only. The live intranasal vaccine of B: 3, B: 4 serotype of *P. multocida* may prove a major breakthrough for controlling H.S. in India. The truth remains that till date we are not sure about the serotypes involved in different species in different regions and as such no successful vaccine can be developed.

A total of 1137 samples from different places and from different animal species were collected and processed bacteriologically for isolation of *Pasteurella* species. The materials comprised of nasal swabs, various visceral organs and blood from apparently healthy animals as well as from suspected hemorrhagic septicemia and pneumonic pasteurellosis cases. A total of 204 samples from cattle, 109 from buffaloes, 172 from sheep, 343 from goats, 291 from rabbits, 14 from pigs and 2 each from horses and Neelgai were processed.

Establishment of small laboratory animal house:

The department is continuing to maintain a small laboratory animal house. Rabbits, guinea pigs, hamsters, mice, rats, sheep and poultry are being reared for teaching purpose as well as for performing experimental studies. If required, these animals are sold to other departments as well, for the said purpose.

EXTENSION ACTIVITIES:

Expert lectures delivered by the teachers of the department:

During the period under report, several specialist lectures were delivered by the faculty members of the department to Vets, Para-Vets, Ex-Servicemen, progressive farmers, women and Unemployed youth, on different aspects of infectious diseases from time to time in different trainings /workshops organized by CSK H.P.K.V. Directorate of Extension Education / COVAS. The talks emphasized on infectious diseases of live stock, their simple diagnosis, prevention and control measures.

RESEARCH PUBLICATIONS:

1. Vipasha Kapoor and **Mandeep Sharma** (2005). Isolation of *Pasteurella multocida* A: 1 from typical cases of Haemorrhagic Septicaemia in buffaloes in Himachal Pradesh. *The Royal veterinary Journal of India* **1** (2): 62-64.

2. Sandeep Rattan; R.C. Katoch; **Mandeep Sharma**; Madhumeet Singh and Prasenjit Dhar (2005). Evidence of *Chlamydophilla psittaci* in Monal (*Lophophorus impejanus*) - state bird of Himachal Pradesh. *Indian J. Poult. Sci.* **40** (2): 209-210.

3. Vinod Sharma; R.C. Katoch; **Mandeep Sharma**; Subhash Verma; Rajesh Chahota; S. K. Jand and Prasenjit Dhar (2005). Isolation of a few fungal pathogens from carps. *Indian Vet. J.* **82** (12): 1252-1254.

4. S. Deshmukh; R.K. Asrani; D.R. Ledoux; N. Jindal; A. J. Bermudez; G.E. Rottinghaus; **Mandeep Sharma** and S.P. Singh (2005). Individual and Combined Effects of *Fusarium moniliforme* Culture material, Containing Known levels of Fumonisin B1, and *Salmonella* Gallinarum infection of Liver of Japanese Quail. *Avian Diseases* **49**:592-600.

5. Mandeep Sharma; R.C. Katoch; Charanjeet and Prasenjit Dhar (2006). Seroprevalence of IBR among cattle in Himachal Pradesh. *Indian Vet. J.* **83** (01): 01-03.

6. Vinay Sharma; **Mandeep Sharma**; R.C. Katoch; Vipin katoch and Prasenjit Dhar (2006). Bacterial isolates recovered from pneumonic and apparently healthy calves in Himachal Pradesh. *The Royal veterinary Journal of India* **2** (1): 46-50.

7. R.C. Katoch; **Mandeep Sharma**; R.S. Kisthwaria; Subhash Verma and Rajinder Kumar (2006). Confirmation of pulmonary tuberculosis by isolation and by PCR-RFLP in a crossbred cow. *Indian Vet. J.* **83** (03): 338-339.

8. Vinod Sharma; R.C. Katoch, **Mandeep Sharma**; Prasenjit Dhar and S.K. Jand (2006). Fungi associated with trouts in Himachal Pradesh. *Indian Vet. J.* **83** (03): 347- 348.

9. Charanjeet; **Mandeep Sharma**; R.C. Katoch; Prasenjit Dhar and Rajinder Kumar (2004). Application of RBPT, SAT and Avidin-boitin serum ELISA for detecting brucellosis among livestock in Himachal Pradesh. *Indian J. Comp. Microbiol. Immunol. Infect. Dis.* **25** (1- Jan.-June): 15-18.

10. R.C. Katoch and **Mandeep Sharma** (2006). Significant diseases of equine reported in Himachal Pradesh. *Intas Polivet.* **7**(1):69-71.

DEPATMENT OF VETERIANRY PATHOLOGY

TEACHING ACTIVITIES

The courses were offered to the under graduate and post graduate students of the college by the faculty members during the first and second semesters of 2005-2006

PG Programme:

A total of four MVSc students were there during the year. One student completed M.V.Sc. while other submitted the thesis and two are continuing.

International Educational Project:

Department has bagged an International Educational Project in the form of 'INDEPENDENT STUDY CENTRE' of Charles Louis Davis DVM Foundation of USA. The Foundation is a donative publicly supported charity of USA for the International Advancement of Education in Veterinary and Comparative Pathology. The foundation has given the responsibility of Director of the Study Centre to Dr V. K. Gupta and made him its Officer & Representative in India. This is the seventh Center our side USA.

The Foundation will stock over 300 hours illustrated lectures on (over150 number) DVDs/CDs free of cost on pathology of diseases of diverse species of animals for exposure to trainee students, faculty and scientists.

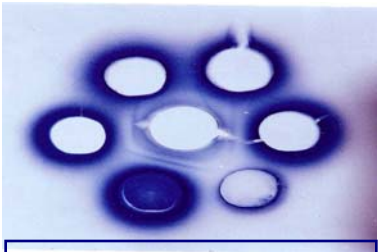
RESEARCH ACTIVITIES

A total of 433 necropsies were conducted on livestock, poultry and fish

Cattle: Some of the important conditions diagnosed were, chronic worm infestation, babesiasis, colibacillosis, calf scours, abomasums impacted with hair, septicaemia/ toxiaemia, ruminal impaction, hydrothorax, hypostatic pneumonia, chronic enteritis, ascites, Pulmonary Tuberculosis, mammary Tuberculosis, catarrhal enteritis, malnutrition, theileriasis as some of the major conditions

Equine: Respiratory Distress syndrome

Sheep & goats: Verminous pneumonia & enteritis



Avian adenovirus-4 AGPT

Poultry: Omphalitis, salmonellosis infection, Infectious Bursal Disease, fowl typhoid, colibacillosis, coccidiosis and round worm infection, bacterial enteritis, obstruction of gizzard with wooden piece leading to emaciation, Suspected for CRD, Necrotic enteritis, Asperigillosis, yalk sac disease and pneumonia, colibacaillosis / colisepticaemia, Ascariasis, Pneumonia, Egg peritonitis and salpingitis, mycotoxicosis, Ascites/ Gout.

- In Dog: Failing heart associated with pulmonary & renal failure associated with enteritis.
- In buffalo: Ruminal impaction with respiratory distress.
- In Pig: Acute verminous pneumonia
- In Lab animal: Acute drug toxicity

Attending to Disease Outbreaks/ Morbid Materials:

Specialists of department made active contribution in attending to disease outbreaks in the state by laeding / participation in the Disease Investigation team and/or providing histopathology support for final diagnosis on necropsy material & final diagnosis on biopsy material.

Studies on pathology of naturally occurring infectious bursal disease in poultry and its experimental observations in broilers.

An outbreak of infectious bursal disease among layer birds of age 7-8 weeks in an organized poultry farm at Palampur was thoroughly investigated in relation to clinical signs, mortality, gross and Histopathological changes. The disease was experimentally reproduced in 4 weeks old broilers. Agar gel precipitation test was done to identify viral antigen from bursa of Fabricius of infected birds. In natural cases, the gross lesions in bursae included initial enlargement, hemorrhages and later atrophy besides haemorrhages were noticed at proventriculus-gizzard junction and skeletal muscles. Liver was pale while kidneys were swollen and dark red to pale. Microscopic lesions in bursae consisted of congestion, haemorrhages, lymphoid depletion, necrosis, reticuloendothelial cell hyperplasia, atrophic bursal follicles, hetrophilic and mononuclear cells infiltration, cystic spaces in bursal follicles as well as in plical epithelium and hyperplastic plical epithelium. Thymus revealed mild lymploid depletion while spleen showed mild lymploid depletion and reticuloendothelial cell hyperplasia. Liver showed vacuolar degeneration. Extensive areas of haemorrhages wereobserved in mucosa at the proventriculus-gizzard junction. Kidneys revealed nephrosis and occasional instances of haemorrhages and lymphocytic glomerultis while duodenum revealed haemorrhages and coccidial stages in its epithelium. In experimental study, gross lesions in bursae were initial enlargement and subsequent atrophy from day six post-infection onwards while spleen appeared enlarged from day six post-infection onwards. Microscopic changes in the bursae and spleen were more or less similar to natural cases while liver revealed perivascular mononuclear cells infiltration on days 4 and 10 post-infection. Kidneys showed nephrosis consistently, whereas on day 8 and 10 post-infection lymphoid aggregates were also observed in the interstitium. IBD virus antigen in bursa of Fabricius was detectable up to day four post-infection by AGPT. Haemorrhagic lesions in bursae, skeletal muscles and proventriculus-gizzard junction were not pronounced as in natural cases.

Studies on the pathology of hydropericardium syndrome in caged broilers and comparative experimental observations in broilers, Japanese quail and pigeons

In the present study, sequential pathological changes were studied in a naturally occurring outbreak of hydropericardium syndrome in caged broilers and an experimental study was conducted to know the comparative susceptibility of broilers, Japanese quail pigeons and ducklings to hydropericardium syndrome. The affected birds in natural outbreak exhibited the clinical signs of dullness, depression, resting of beak and chest on the cage floor. Grossly, hydropericardium was observed throughout the course of outbreak. The lesions in liver comprised congestion, haemorrhages, pale discolouration and enlargement. Milder form of ascites was also observed in few birds. Lungs were congested and oedematous. Kidneys were swollen with prominent tubular pattern. The histopathological lesions in heart were mild to moderate thickening of pericardium, disruption of myocardial muscle fibers, congestion and haemorrhages, loss of cross striations and occasional scattered infiltration with heterophils. The histopathological changes in liver, in general, were marked congestion, haemorrhages and vacuolar changes. Hyperchromatic nuclei and basophilic intranuclear inclusion bodies were revealed in the hepatocytes. In lungs, there was marked thickening of interlobular septae due to oedema. In kidneys, histopathological changes comprised mild to moderate interstitial congestion, tubular degeneration and proliferative changes in glomerular cellular tuft. In the spleen there was reticuloendothelial cell hyperplasia. None of the liver samples revealed any bacteria at any stage of the outbreak. Analysis of feed samples collected during the outbreak revealed mycotoxins in the safe permissible limits. AGPT revealed positive precipitation line (s) between FAV-4 reference antiserum and test antigen wells in majority of samples. In the experimental studies on comparative susceptibility to HpS, the disease was induced using both 20 per cent (w/v) and 30 per cent (w/v) HpS positive liver homogenate suspension to broiler chicks, Japanese quail and pigeons. In the ducklings the supernatant from only 30 per cent (w/v) HpS positive liver homogenate suspension was given. In the broilers of both groups, 100 per cent mortality was recorded. A mortality of 10 per cent and 50 per cent was recorded among Japanese quail given 20 per cent and 30 per cent HpS inoculum, respectively. Pigeons and ducklings in either of the groups showed no clinical signs. No mortality was recorded in ducklings. The gross and histopathological lesions noticed in the experimental study were typical of HpS in broilers and Japanese quail. In another experiment, in which broilers were injected with liver inoculums collected from HpS infected Japanese quail, showed clinical signs, gross lesions and histopathological lesions typical of hydropericardium syndrome. HpS could not be induced in broilers from the liver samples collected from HpS infected pigeons and ducklings. It is concluded that broilers are highly susceptible to HpS followed by Japanese quail, whereas pigeons and ducklings are resistant to HpS infection.

EXTENSION ACTIVITIES:

Farmers visiting the Department for disease investigation and consultation were educated for preventions and control of diseases in livestock and poultry. A number of extension publications farmers visiting the Kisan Melas were demonstrated prepared the diseases of animals and advised about improved managemental practices for prevention and control of diseases. Radio Talks are also delivered for the purpose.

FACULTY & STAFF IMPROVEMENT:

Dr V.K. Gupta, attended three days National Symposium on 'Newer concepts in Animal & Avian Disease Diagnosis – A farmer, Industry & Institutional Dialogue' and 'A satellite Seminar on Principles of Histological Basis of Gross Pathology' and XXII Annual Conference of IAVP held at Maharashtra Animal & Fishery Sciences University, held at Pune, form November 25-27, 2005. Dr V.K. Gupta presented a Lead Paper and conducted the Satellite Seminar of CL Davis DVM Foundation.

PUBLICATIONS

Lead /Invited papers Published:

1. GUPTA, V. K. (2005) 'Pathology of naturally occurring rabbit diseases in Himachal Pradesh' A Lead Paper. Proceedings of XXII Annual Convention of Indian Association of Veterinary Pathologists held at Pune, from November 25-27, 2005. pp.193-204

Research Papers Published

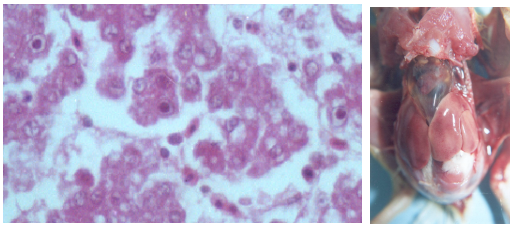
1. Deshmukh, S., R. K. Asrani, D. R. Ledoux, N. Jindal, G E. Rottinghaus, Mandeep Sharma and S. P. Singh. (2005). Individual and Combined Effects of Fusarium moniliiforme Culture Material, Containing Known Levels of Fumonisin B1 and Salmonella Gallinarum Infection on Liver of Japanese Quail. Avian Diseases 49: 592-600.
2. Gupta Neeraj, Mittal Anupam and Gupta V. K. (2005). Squamous cell carcinoma in inter-mandibular region of a dog- A case Report. The Journal of Remount and Veterinary Corps 44(2) 79-81.
3. Gupta Neeraj and Gupta V.K. (2005). Gingival fibroma duram in a bullock - A case Report. The Journal of Remount and Veterinary Corps 44(4) 193-195.
4. Sharma Rinku and GUPTA, V. K. (2005) Aetiopathology of naturally occurring upper respiratory tract infections of rabbits in Himachal Pradesh. Indian J. Vet. Pathol. , 29(1): 10-12.
5. GUPTA, V. K. (2005) 'Pathology of naturally occurring rabbit diseases in Himachal Pradesh' A Lead Paper. Proceedings of XXII Annual Convention of Indian Association of Veterinary Pathologists held at Pune, form November 25-27, 2005. pp.193-204
6. Bhardwaj, R.L., Rajput Rajesh, GUPTA, V.K., Kanwar, M.S. and Pathak, V. (2006) Unusual tesicular degeneration in Spiti horse – A case report. Centaur XXII (3): 47-48. **Abstract of research work published and presented in the Conferences:**

International Conferences:

1. Sidharath Deshmukh, R K Asrani, Naresh Jindal, David R Ledoux, George E Rottinghaus and Mandeep Sharma. 2005. Gross and histological observations on extra-hepatic organs of Japanese quail fed FB1 and infected with Salmonella Gallinarum. In Proceedings 14th World Veterinary Poultry Congress held at Istanbul, Turkey. 22-26 August. p 410.
2. Subhash Sharma, R K Asrani, R C Katoch, Mandeep Sharma and S P Singh. Experimental studies on hydropericardium syndrome in broiler chickens, Japanese quail, pigeons and ducklings. In Proceedings 14th World Veterinary Poultry Congress held at Istanbul, Turkey. 22-26 August. p 443.

National Conferences:

1. Vikram S Vashist, V K Gupta, R K Asrani and S. P. Singh. 2005. Efficacy of Salmonella Gallinarum 9R vaccine against experimental fowl typhoid in Japanese quail. In Proceedings 22nd Annual convention of Indian Association of Veterinary Pathologists held at Shirval, Maharashtra. 25-27 November. pp. 45-46.
2. S. Malik, K K Jakhar, N Jindal and R K Asrani. 2005. Effect of formalin killed and oil immersion vaccines on certain immunological parameters in hydropericardium syndrome in broiler chickens. In Proceedings 22nd Annual convention of Indian Association of Veterinary Pathologists held at Shirval, Maharashtra. 25-27 November. pp. 41-42.
3. S. Malik, K K Jakhar, N Jindal, S K Mishra and R K Asrani. 2005. Effect of oil emulsion and formalin killed vaccines on clinical signs and growth response in hydropericardium syndrome in broiler chickens. In Proceedings 22nd Annual convention of Indian Association of Veterinary Pathologists held at Shirval, Maharashtra. 25-27 November. pp. 40-41.



Hydropericardium syndrome of poultry (Fowl adenovirus-4)

DEPARTMENT OF VETERINARY SURGERY & RADIOLOGY

TEACHING:

The courses were offered during the session 2005 – 2006 to the undergraduate and postgraduate students of the college:

POSTGRADUATE:

During the session under report 2 students (one left and joined the service) were admitted to the postgraduate programme of the department and 4 (1 MVSc. and 3 PhD) students completed their post graduate degrees.

RESEARCH:

STUDIES ON CERTAIN ANAESTHETIC TECHNIQUES IN DOGS WITH SPECIAL REFERENCE TO PROPOFOL

The present study was conducted on 31 clinically healthy adult mongrel dogs of either sex weighing 12 to 35 kg, to evaluate propofol alone or propofol-thiopental mixture in combination with detomidine/medetomidine for induction of surgical anaesthesia. Six dogs were utilized for standardization of doses of detomidine and medetomidine hydrochloride. The remaining 25 animals were equally divided into five groups i.e. Group I propofol only, group II: detomidine (30µg/Kg) + propofol, Group III: medetomidine (20 µg/Kg) + propofol, Group IV: detomidine (30µg/Kg) + propofol-thiopental mixture (1:1 v/v), Group V: medetomidine (20 µg/Kg) + propofol- thiopental mixture. All the animals were atropinized 10 min before the administration of anaesthetic drugs. Propofol/propofol-thiopental was given intravenously "to effect" to achieve surgical anaesthesia. Various analgo-clinical, haematological and biochemical parameters, ECG and EEG were recorded at 0 hr, 15 min after detomidine/medetomidine administration, 5,15,30,45 and 60 min after induction of anaesthesia with propofol/propofol-thiopental mixture. The average dose of propofol required to achieve surgical anaesthesia was 7.96 mg, 3.143 mg, 3.164 mg, 1.81 mg and 2.0 mg /kg and the average duration of surgical anaesthesia was 9 min, 27.4 min, 33.0 min, 25.4 min and 39.5 min in group one to five, respectively. Detomidine produced mild loss of reflexes, mild to moderate relaxation of muscles and moderate analgesia, while, medetomidine produced mild to moderate loss of reflexes and relaxation of muscles and moderate analgesia. Complete loss of ocular reflexes, complete analgesia and muscle relaxation were observed during surgical anaesthesia in all the groups. Transient apnea was observed in all the groups during induction of anaesthesia. There was increase in heart rate during anaesthesia in all the groups but tachycardia persisted for a longer period in propofol alone and detomidine-propofol–thiopental group while, in medetomidine propofol group tachycardia remained upto 5 min interval. Oligopnea was noticed in all the groups following anaesthetic drugs. The respiratory depression was throughout the study period in detomidine/medetomidine-propofol-thiopental groups and was only upto 5 min interval in medetomidine-propofol group. A significant hypothermia towards the terminal stages of study was observed in group IV and V. A significant decrease in TEC and a highly significant increase in TLC towards the end of study period were observed in group I. Significant to highly significant hyperglycemia was recorded in groups III, IV and V during the study period. Detomidine administration prior to propofol or propofol-thiopental produced various heart blocks like first degree AV block, Mobitz I and II, 2nd degree AV block and supra ventricular tachycardia. Biphasic T wave before and after anaesthesia and ST-segment elevation during propofol/propofol-thiopental anaesthesia was a common feature in all the groups. EEG revealed burst suppressions during surgical anaesthesia in all the groups. The present study indicated that medetomidine propofol combination proved to be excellent for the induction of surgical anaesthesia in atropinized dogs. It produced anaesthesia of considerable duration with minimum cardio respiratory side effects and was least expensive.

STUDIES ON THE EFFICACY OF SEABUCKTHORN (*Hippophae sp.*) OIL IN THE HEALING OF GASTRIC ULCERS IN DOGS

The present study was conducted on 32 healthy adult mongrel dogs. In first stage, 16 dogs were divided in to 4 equal groups and used to establish a suitable model of gastric ulcerations and erosions (GUE). The dogs of group A, B, C and D were administered acetylsalicylic acid @ 50 mg/kg p.o., b.i.d., Inj. piroxicam @ 1mg/kg I/M, s.i.d., Inj. dexamethasone @ 1 mg/kg I/M or I/V, s.i.d. along with acetylsalicylic acid @ 50 mg/kg p.o. b.i.d. and Inj. dexamethasone @ 1 mg/kg I/M or I/V s.i.d. respectively for different time period. The development of gastric lesions and their spontaneous healing in these animals were evaluated by clinical, haematological and gastro-endoscopic examinations at regular intervals. Administration of Inj. dexamethasone @ 1mg/kg I/M s.i.d. alone for 16 days in group D resulted in development of GUE in a gradual manner in most animals with least individual variations among the groups and therefore, this technique was used to induce GUE for further studies. In second stage, 16 dogs were divided in to 4 equal groups and subjected to experimental induction of GUE. The first three groups were subjected to differential therapeutic regimens after 16th day. No treatment was given in group I, whereas, 'omeprazole' @ 0.7 mg/kg p.o., s.i.d. and seabuckthorn (SBT) seed oil @ 5 ml/dog p.o., b.i.d. were administered in group II and III respectively till complete healing of GUE. In group IV, SBT seed oil was started in the above-mentioned doses from 0 day itself. The development of GUE and their healing progress were evaluated by clinical, haematological, biochemical, contrast radiographical, gastric content pH, gastro-endoscopic and histopathological examinations at different time intervals up to 25th day.

Clinically the animals of group IV exhibited delayed onset and lesser severity of melena in the initial period. A non-group-specific general reduction in

animal's body weight, variable anorexia and dullness were observed in most animals. A significant decrease in Hb, PCV and TEC was observed in all the groups with their peak values generally within 13th to 19th days. The reduction in Hb and PCV was lesser in group IV in the initial period but comparable with other groups thereafter. A typical 'stress leukogram' was observed in all the groups with no inter-group significance. Increase in AST, ALT, ALKP and Glc levels in the initial period and a decrease later, were observed with no significant inter-group variation. No significant changes were recorded in BUN, Cr, TP, ACP and gastric pH. Though a generalized delayed gastric emptying of barium-sulfate suspension was observed in all the groups, no case of GUE could be diagnosed with positive contrast radiography of stomachs of dogs at any stage of study. Endoscopic examinations revealed significantly lesser GUE scores in group IV till 10th day. After 16th day, the GUE score decreased fastest in group II till 22nd day and remained substantially lower than group I and III and comparable to group IV on 25th day. The GUE scores in group IV after 16th day was more than group II, lesser than group I and comparable to group III on 19th day, second lowest (after group II) on day 22nd and lowest on 25th day. The GUE score in group III were lesser than group I on 19th and 22nd day and comparable on 25th day. Histopathology of gastric tissue biopsy obtained on 25th day of study revealed best healing of gastric lesions in group IV followed by group III, II and I.

Fracture in cow

Endoscopy in progress

It is therefore, concluded that seabuckthorn seed oil has prophylactic efficacy against development of dexamethasone-induced GUE in dogs to a certain extent in the initial periods and it also has therapeutic efficacy in the healing of GUE in dogs as it helps in faster regeneration of damaged gastric mucosa.

DIAGNOSTIC AND THERAPEUTIC STUDIES IN INTESTINAL OBSTRUCTION IN BOVINE CALVES:

Simple and strangulated obstructions of cranial jejunum were created in 24 calves, which were randomly divided into six groups of four animals each. The animals of group I in both type of obstructions served as untreated control. The animals of group II and III of either type of obstructions were treated with conservative therapy and surgical intervention at 24th post obstruction hour in strangulated and 3rd day in simple intestinal obstruction respectively. The blood, peritoneal and ruminal fluid samples were collected at 0, 24, 48, 72 and 96 post obstruction hours (Strangulated obstruction) and at 0, 2, 3, 4, 6 and 8th post obstruction day (Simple obstruction). Clinical, physical, cytological, haematological and biochemical alterations in different body fluids were studied before and after induction of simple and strangulated intestinal obstruction and following its treatment. Following creation of simple intestinal obstruction, mild signs of abdominal colic and scant mucoid faeces were recorded. Muscular debility, atony of rumen alongwith the sluggish protozoal motility was observed. Intestinal borborygmi were present upto 4th post obstruction day. The abdomen was bilaterally distended with signs of dehydration. Increased haematocrit (38.33±0.88 per cent), total leukocytic count (11062.5±319.69 cells/il) with absolute neutrophilia, hypochloraemia (75.12±2.05 mEq/L), hypokalemia (3.8±0.13 mEq/L), azotemia (BUN: 22.83±2.78 mg/dl and Creatinine: 2.17±0.27 mg/dl), hyperproteinemia (8.04±0.21 mg/dl) and increased level of alkaline phosphatase (112.58±2.08 IU/L) and amylase (28.17±1.28 IU/L) were observed. High yellow colour discoloration of peritoneal fluid with increased levels of total protein concentration (3.8±0.14 mg/dl), and nucleated cell count (3412.5±91.93 cells/il) were recorded. The increase in ruminal fluid chloride (53.49±1.19 mEq/L) concentration was a prominent finding. Following creation of strangulated intestinal obstruction signs of acute abdominal colic were observed. Defecation became scanty and contained the mucosal and diphtheric shreds. Muscular weakness, ruminal atony with signs of dehydration like the recession of eye ball and increased skin tent (7-8 seconds) after 48 hours were observed. With in 24 hours of creation, haemoconcentration (40.58±0.91 per cent), leucocytosis (7879.17±281.73 cells/il) with neutrophilia was seen. The striking characteristics were hyperproteinenmia (9.07±0.13 mg/dl), azotemia (BUN: 19.44±1.82 mg/dl and Creatinine: 1.23±0.02 mg/dl), hypochloremia (68.17±1.64 mEq/L), hypokalemia (3.45±0.04 mEq/L) with raised levels of alkaline phosphatase (131.17±1.75 IU/L) and amylase (27.67±1.394 IU/L). The peritoneal fluid colour exhibited high yellowish colored tinge in the post obstruction period. A highly significant increase in the total proteins (4.45±0.13 mg/dl) and nucleated cell count (3666.67±127.38 cells/il) in peritoneal fluid was observed at 24 hours. The ruminal fluid chloride concentration significantly rose to 42.12±0.86 mEq/L.In either type of obstructions the treatments were instituted when plasma chloride has not fallen below 75 mEq/L, plasma potassium has not declined below 3.5 mEq/L and haematocrit has not risen above 40 per cent. During treatments, efforts were being made to maintain the concentrations at above mentioned optimal levels. Ringer's solution and potassium chloride were being given to maintain the optimal concentration of chloride and potassium as mentioned *ut supra*. When the electrolyte levels were restored, the normal saline, dextrose normal saline (5 per cent) and calcium borogluconate were administered to cater the fluid deficit due to dehydration. The surgical treatment comprised of right flank laparotomy, resection of non viable intestine and enteroanastomosis. Post operative supportive therapy

comprising of antibiotics, anti-inflammatory drugs, ruminal motility rejuvenators, and transfaunation aided in improving the prognosis in both types intestinal obstruction. The conservative treatment given to the animals of group II decreased the pace of deterioration of the pathophysiology and increased the life span of the animals as compared to control group. The diagnostic and therapeutic strategy which was applied in 15 clinical cases, out of which 6 animals survived and 9 animals died since they were presented late with dehydration (PCV >45 per cent), hypochloraemia (<78 mEq/L) and Hypokalemia (< 3.5 mEq/L). Three animals were pregnant (more than 5 months) and three had rupture and peritonitis. The histopathological changes in the strangulated intestine revealed autolytic changes whereas in simple obstruction necrotic changes were evident.

Therapeutic efficacy of SkinHeal Spray in cutaneous wounds in animals:

A total of 30 clinical cases in bovine (15), equine (5) and canine (10) having various types of wounds presented in Veterinary Teaching Clinical Complex, College of Veterinary and Animal Sciences, CSKHPKV , Palampur over a period of one year formed the basis of this study. The wounds were inflicted around the neck, thorax, abdomen, udder, fore and hind limbs. These wounds were categorized as aseptic, infected, superficial, and deep and maggot infested. The duration of injury varied from 2-96 hours in cases of cutaneous wounds.

All the wounds were treated by topical application of SkinHeal Spray after cleaning with antiseptic solution, twice daily till the wounds healed completely. Keeping in view the therapeutic efficacy of the SkinHeal Spray, the healing score of very good, good, fair and poor was assigned. The species wise therapeutic evaluation of SkinHeal Spray is discussed below:

Canine:

The therapeutic efficacy of SkinHeal Spray was observed very good in postoperative period in case of canine aseptic laparotomy wounds (6). The indications for mid ventral laparotomy were ovariohysterectomy, hysterectomy, cystotomy, gastrotomy and enterotomy. The size of surgical wound varied from 4 to 10 cm in length. The healing was excellent and characterized by minimal inflammatory signs and uncomplicated recovery in all the cases by 6-7th post operative day.

In case of superficial infected (2) and maggot wounds (2) confined to thorax, neck, ventral abdomen and forelimb, the healing was fair to good and characterized by early granulation tissue and scab formation. These wounds healed in 12-15 days without further aggravation.

Bovine:

In case of bovine, the wounds (15) were mostly infected in nature and were restricted to abdomen, neck, udder, fore and hind limbs. The healing score in these wounds remained fair to good which was assessed by early filling of the wound gap, wound contraction and epithelialization. The complete healing of these wounds took place in 14-21 days.

Equine:

In case of equines, the wounds (5) were inflicted around the abdomen and over the limbs. Clinical examination revealed that wounds were contaminated and lacerated in nature and their size varied from 2-6 cm in length. The healing of these wounds was fair and characterized by early filling of tissue gap and shedding of scab but all wounds showed excessive granulation tissue formation and greater scar formation. The healing period varied from 14-26 days.

On the basis of the above studies carried in bovine, equine and canine it is therefore concluded that SkinHeal Spray (a drug of Indian Herbs Research and Supply Co. Ltd., Saharanpur) is safe for topical application over wounds and has good therapeutic efficacy in the treatment of aseptic, infected and maggot-infested cutaneous wounds in different species of animals.

Studies on the therapeutic potential of seabuckthorn (*Hippophae* sp.) seed and pulp oil in the healing of aseptic excisional cutaneous wounds in calves:

In this study 12 male calves were divided into four groups for the evaluation of therapeutic potential of seabuckthorn (*Hippophae* sp.) seed and pulp oil in the healing of aseptic excisional cutaneous wounds. In each animal, six equi-dimensional full thickness excisional cutaneous wounds measuring 3cm x 3cm were created at their thoracolumbar region under local analgesia. Their wounds were regularly dressed with liquid paraffin in group-I, 5% povidone-iodine ointment in group-II, seabuckthorn-seed oil in group-III and seabuckthorn pulp oil in group-IV. Wound healing efficacy was compared on the basis of clinical, haematological and histopathological parameters at 0, 3rd, 7th, 10th, 14th, 21st and 28th postoperative days. The clinical and haematological parameters remained with in normal physiological limits in all the animals throughout the period of study. The signs of inflammation were found to be more pronounced in Group I and were least in Group IV in the initial stages. The wounds of Group III and Group IV remained relatively drier than other groups and were characterized by early formation of firm scab and its early shedding. Wound contraction was highest in Group IV animals followed by Group III. Histopathologically, the leucocytic infiltration was also lesser in Group III and IV. The wounds in these groups also showed early and better re-epithelization and fibroblast proliferation. Similarly the collagen fibres appeared earlier and were in abundance in group IV as compared to the other groups. Later collagen fibres were more organized in Groups III and IV. It was concluded that wound healing progresses faster under seabuckthorn seed and pulp oil than liquid paraffin and 5% povidone-iodine. Between each other, pulp oil was slightly superior than seed oil as a wound dressing agent.

LIST OF PUBLICATIONS

Research and clinical papers:

1. Varshney, A.C., Kanwar, M.S., Tyagi, S.P., Kumar, A. and Sharma, S.K. 2005. Therapeutic efficacy of skinheal spray in cutaneous wounds in animals. *Livestock International* 9(10): 11.
2. Gupta, M., Singh, M., Varshney, A.C., Tyagi, S.P., and Kumar, Amit 2005. Efficacy of Seabuckthorn (*Hippophae rhamnoides*) in the healing of cutaneous wounds in dogs. *Ind. J. Vet. Surg*. 26(2):105-106.
3. Tyagi, S.P., Kumar, Amit and Varshney, A.C. 2005. Surgical management of explosive injuries of face and oral cavity in dogs. *Ind. J. Vet. Surg.* 26(1):67.
4. Mahajan, A., Sharma, S.K., Asrani, R.K., Varshney, A.C., Tyagi, S.P. and Kumar, A. 2005. Treatment of infected cutaneous wounds with seabuckthorn (*Hippophae* sp.) in bovines: A histopathological study. *Ind. J. Vet. Surg.* 26(1): 31-33.
5. Sharma, S.K, Misra, S.S., Adarsh Kumar, Varshney, A.C. and Amit Kumar. 2006. Sedative, haemato biochemical and electrocardiographic studies following xylazine administration in neonate calves. Indian J. Vet. Surg. 27 (1): 49-50.
6. Sharma, S.K, Misra, S.S., Adarsh Kumar, Varshney, A.C. and Amit Kumar. 2006. Chloral-mag thiopental anaesthesia in neonate calves: sedative, Haemato-biochemical and electrocardiographic studies. Indian J. Anim. Sci 76(3): 196-198.

Papers presented in the conferences:

International Conferences

1. Varshney A.C. and Tyagi S.P. 2005. Seabuckthorn, a resource for soft tissue repair in animals. 2nd International Seabuckthorn Association Conference *w.e.f.* 26-29 Aug 2005 at Beijing, China.
2. Tyagi, S.P., Varshney, A.C., Kumar, Amit and Singh, V. 2005. Therapeutic and prophylactic efficacies of Seabuckthorn in gastric erosions and ulcerations in dogs. 2nd International Seabuckthorn Association Conference *w.e.f.* 26-29 Aug 2005 at Beijing, China.
3. Varshney A.C., Tyagi S.P. and Rana, R. 2005. Therapeutic efficacy of Seabuckthorn and Dermanol in the healing of cutaneous wounds in bovine. 2nd International Seabuckthorn Association Conference *w.e.f.* 26-29 Aug 2005 at Beijing, China.
4. Sharma, SK and Varshney, AC. 2005. Evaluation of diazepam and triflupromazine in neonatal calves. 24-28. Proceedings, 14th Asian Commonwealth Veterinary Association Conference, Lahore, Pakistan, Sept. 21-23, 2005.
5. Varshney, A.C. 2005. Surgical affections of animals in himalayan region: An overview. 14th Asian Commonwealth Veterinary Association Conference, Lahore, 21-23 Sept., 2005. In proceedings pp.7-8.
6. Kanwar, M.S. 2006. Status of camel anaesthesia and Surgery in India. International Scientific Conference on Camel" *w.e.f.* 9-11 May 2006, Qassim, Saudi Arabia.

National Conferences

Following papers were presented in the 29th congress of Indian Society for Veterinary Surgery and National symposium on "Alternative teaching and research methods to animal experimentation in Veterinary Surgery" held at Division of Surgery, IVRI, Izatnagar *w.e.f.* 9-11 Nov.2005-

1. Kumar, A., Tyagi, S.P., Sharma, S.K., Kanwar, M.S. and Varshney, A. C. (2005). Computer-assisted Interactive Radiology Courseware for undergraduate students.
2. Tyagi, S.P., Sharma, S.K. and Varshney, A.C. (2005). Successful surgical management of patent urachus with urethral agenesis in a female calf.
3. Kanwar, M.S. and Katoch, R. C. (2005). Animal experimentations in teaching and research-Alternatives and guidelines.

EXTENSION ACTIVITIES:

1. **Participation in clinical camps:** Faculty members of the department participated in 22 clinical camps in various parts of Himachal Pradesh. These camps were mainly organized in collaboration with State animal husbandry department. A total of 127 surgical cases were treated at the camp site itself. Besides, consultancy services were provided to a number of other animal owners. A few interactive lectures were also delivered in these camps to educate the owners of the animals with the modern practices of the Veterinary Surgery.

2. **Radio-Talks:** Dr. A. C. Varshney and Dr. S. P. Tyagi delivered four radio-talks on various topics of Veterinary Surgery at AIR Dharmshala.

3. **Newspaper:** Dr. Adarsh Kumar remained actively involved in spreading awareness in the farmers of state about various practices of Veterinary sciences through its weekly "Pashudhan-Helpline" in the leading news paper of Himachal "Divya Himachal".

Delivery of expert lectures: Dr. M. S. Kanwar delivered two lectures on the subject "First Aid and Surgery in Animals" to visiting farmers on their trainings organized by Directorate of Extension Education, CSKHPKV, Palampur in the months of July 2005 and May 200

DEPARTMENT OF LIVESTOCK PRODUCTS TECHNOLOGY

The department was created under Veterinary Council of India Act in 1996 but it started independent functioning since 1998, when the faculty members joined this department. Efforts are afoot to strengthen the basic infrastructural requirements for undergraduate programme as per VCI norms.

TEACHING ACTIVITIES

The department offered three courses to veterinary undergraduates as per VCI regulations. Internship Training to interns of College of Veterinary and Animal Sciences is imparted in the field of animal products (milk, meat, egg and wool) processing, preservation and quality evaluation. The interns are also trained in slaughterhouse practices, carcass grading and evaluation.

RESEARCH

Monitoring of composition and quality of milk of CSKHPKV Livestock Farm

Milk samples were randomly collected from the Livestock farm, of CSKHPKV-Palampur and analyzed for specific gravity, milk fat, solids not fat and total solids for purposes of quality evaluation and quality control.

EFFECTS OF DIFFERENT COAGULANTS ON THE COMPOSITION AND ACCEPTABILITY OF PANEER

The standardized milk (Fat-4.5% and S.N.F.-8.5%) was used for the study. The milk was boiled for 5 minutes over a gas stove while continuous stirring. The milk was then taken off the gas stove and filtered through a muslin cloth. The temperature of milk was then allowed to lower to 85^{0}C. The acidulant (3% solution) was added at the temperature of 70^{0}C till the complete coagulation was

achieved (as evidenced from the colour of the whey). Milk was then left undisturbed for 2 minutes for complete coagulation followed by filtration through a muslin cloth to drain off the whey. The paneer was then tightly packed in the muslin cloth and was pressed by a suitable weight for 30 minutes. The paneer was then removed and placed in cold water for 2 hours followed by draining to remove excess of water. Paneer was then packed in polythene bags and kept in refrigerator (4±1^{0}C) for further analysis.

Three different coagulants were used for the study i.e. citric acid, lactic acid and tartaric acid)

Conclusion:

The paneer prepared from citric acid is best. The yield is higher than others. Organoleptic evaluations also reveal that paneer obtained from lactic acid has better texture, appearance and flavour. However, paneer obtained from Tartaric acid has no texture. So, citric acid is the best coagulant among the three.

TABLE SHOWING AMOUNT OF COAGULANT USED AND YIELD OF PANEER

	CITRIC ACID	LACTIC AC	TARTARIC ACID
AMOUNT OF COAGULANT USED(ML)	100	64	190
YIELD(GM)	175	170	167

TABLE SHOWING PROXIMATE ANALYSIS OF PANEER USING DIFFERENT COAGULANTS

%	CITRIC ACID	LACTIC ACID	TARTARIC ACID
MOISTURE	50.0	50.0	52.0
MILK FAT	43.0	42	39.5
PROTEIN	37.35	36.53	30.0
ASH	2.67	2.32	2.57

Extension Activities

The department was actively involved in extension activities and delivered 2**5 extension lectures/ practical demonstrations** to the unemployed youth and women farmers under trainings organized by Directorate of Extension Education, CSKHPKV Palampur.

Papers/abstracts published / presented in Conferences/ Symposiums:

- **S. K. Khurana** (2006) Salmonella infection in Poultry and its Public health Significance, **Poultry Line** (June 2006) 25-27

DEPARTMENT OF ANIMAL REPRODUCTION, GYNAECOLOGY & OBSTETRICS

TEACHING

The courses were offered to the under graduate and post graduate students of the college by the faculty members during the first and second semesters of 2005-2006

Internship Programme:

The teaching faculty of the department is also involved in imparting practical training to the undergraduate students in the final semester undergoing a compulsory six months internship.

RESEARCH:

Studies on clinical efficacy of some therapeutic regimen (s) based on microbiological investigation for management of endometritis in dairy animals of H.P revealed:

Ciprofloxacin, Gentamycin & Enrofloxin had high sensitivity in vitro against microbes isolated from uterine discharges of endometritic cows. In addition to above antibiotics streptopencillin also demonstrated good inhibition zones in discharges collected from buffaloes.

Ciprofloxacin & Gentamycin at therapeutic dose were effective for treatment of endometritis in cows.

Some fungal isolates were also recovered from genital discharge which have been rarely reported earlier. Lugol's Iodine given 30ml intrauterine for these days was effective against these fungi.

PGF_2á given alone during mid luteal phase was not effective in endometritic cows.

Uterine biopsy gave more conclusive information regarding endometritis than uterine discharge.

Seminar/ Symposiums attended:

Dr. Navneet Kumar & Dr. M.M Singh & P.G students attended National symposium on "Recent trends and innovations in animal reproduction" w.e.f Nov.23-25, 2005. Indian Society for Study of Animal Reproduction held at Jammu.

Publications

1. Katoch,R., Singh M.M., Agnihotri, R.K. and Mitra,S. (2005). Increasing incidence of hypodermosis in Kangra valley of Himachal Pradesh. Journal of Veterinary Parasitology. 19: 67-68
2. Rattan,S., Katoch,R.C., Sharma,M., Madhumeet Singh and Dhar,P. (2005). Evidence of *Chlamydophila psittaci* in Monal (*Lophophorus impejanus*) - state bird of Himachal Pradesh. Indian Journal of Poultry Science. 40: 209-210.
3. Thakur, Y. P., Madhumeet Singh and Jasial, S. (2005). Semen Production Traits / Seminal attributes and Freezability of Chegu Buck Spermatozoa. Indian J. Anim. Sci. 75 : 1165-1167.
4. Amit.Sharma, Madhumeet Singh and N.K. Vasishta (2006). Effect of gonadotrophin releasing hormone administration on conception rate following artificial insemination in repeat breeder cattle. Indian J. Anim. Sci. 76: 330-332.
5. Amit.Sharma, Madhumeet Singh, Vasishta, N.K. and Gandotra V.K. (2006). Effect of GnRH administration on plasma progesterone profile of normal cyclic cows. Indian J. Anim. Sci. 76: 377-379.

Presentations

1. Satish Kumar, Madhumeet Singh and N.K.Vasishta (2005). Studies on the effect of certain additives on fertility of cryopreserved semen of Jersey bulls maintained under sub-temperate climate. Proc. XXI Annual convention and National Symposium on recent trends and innovations in Animal Reproduction, Jammu, November 23 – 25, 2005, pp 24.
2. Sandeep Mishra, Navneet Kumar and Madhumeet Singh (2005). Comparative efficacy of different media additives on *in vitro* maturation and fertilization of ovine oocytes. Proc. XXI Annual convention and National Symposium on recent trends and innovations in Animal Reproduction, Jammu, November 23 – 25, 2005, pp 59.

Mummified foetus removed from a cow presented in the department of veterinary gynaecology

3. Pravesh Kumar, Madhumeet Singh, Nand Kishore and N.K.Vasishta (2005). Effect of progesterone administration on conception in normal cyclic cows. Proc. XXI Annual convention and National Symposium on recent trends and innovations in Animal Reproduction, Jammu, November 23 – 25, 2005, pp 80.
4. Madhumeet Singh, Y. P. Thakur and N.K.Vasishta (2005). Study on abnormalities of Chegu Buck Spermatozoa. Proc. XXI Annual convention and National Symposium on recent trends and innovations in Animal Reproduction, Jammu, November 23 – 25, 2005, pp 86.
5. Nand Kishore, Madhumeet Singh, Pravesh Kumar and N.K.Vasishta (2005). Effect of progesterone administration on conception rate in cattle showing metoestrual bleeding. Proc. XXI Annual convention and National Symposium on recent trends and innovations in Animal Reproduction, Jammu, November 23 – 25, 2005, pp 112.
6. Shweta Sharma, Madhumeet Singh, N.K.Vasishta and Pankaj Sood (2005). Clinical efficacy of some therapeutic regimens for the management of endometritis in cows. Proc. XXI Annual convention and National Symposium on recent trends and innovations in Animal Reproduction, Jammu, November 23 – 25, 2005, pp 115.
7. Amit Kumar, Madhumeet Singh and N.K.Vasishta. Effect of GnRH (2005). Administration during different lactations on conception rate in normal Jersey and crossbred cattle. Proc. XXI Annual convention and National Symposium on recent trends and innovations in Animal Reproduction, Jammu, November 23 – 25, 2005, pp 199.
8. Sandeep Mishra, Madhumeet Singh and N.K.Vasishta (2005). Clinical analysis of dystocia on the basis of it's occurrence in field conditions. Proc. XXI Annual convention and National Symposium on recent trends and innovations in Animal Reproduction, Jammu, November 23 – 25, 2005, pp 231.
9. Kanwar, M.S., Madhumeet Singh and Varshney,A.C. (2005). Canine pyometra complex and its management – Review of 12 cases. Proc. International congress on canine practice and symposium on "Emerging challenges in canine practice" and 2nd annual convention of Indian Society for Advancement of Canine Practice, New Delhi, India, February 9-11,2005.

Department of Veterinary Biochemistry

Biochemistry is fundamental to an understanding of modern life science and all students need to study this subject as a major subsidiary to their main disciplines of Veterinary and Animal Science. Students enter Veterinary profession with a substantial knowledge base from their previous education. The objective of teaching Biochemistry is to broaden that knowledge base of students to the point where students who have completed a year of professional training in Veterinary and Animal Sciences can read and understand their professional literature and continue educating themselves. Besides, a veterinarian also needs a sound knowledge of biochemistry to confront the central concerns of health sciences in practice and research.

Teaching Activities: The courses were offered to the under graduate and post graduate students of the college by the faculty members during the first and second semesters of 2005-2006

Research Publications:

1. Naresh Kumar (2006). Use of Plant based medicaments in treatment of metabolic disorders: Diabetes mellitus. Compendium of ICAR sponsored winter school on "Recent trends in utilization of plant biodiversity in Animal Health Care with special reference to Pharmacotherapeutics, Pharmacodynamics and safety assessment" Feb.18 - Mar.10, 2006. Department of Pharmacology & Toxicology, Dr. G C Negi College of Vety. & Animal Sciences, CSK HPKV, Palampur, pp. 128-139.
2. Vineeta Almadi and Naresh Kumar (2006). The Plasma Biochemical Profile Of Diarrheic Calves Treated With An Oral Rehydration Solution**.** Abstracts published in proceedings of Annual conference of SAPI at Parel, Mumbai, January 5-7, 2006.
3. Naresh Kumar (2006). Estrus Synchronization In Buffaloes And Its Effect On Plasma Hormones And Trace Elements. Paper presented in the annual convention of ISBD at Mumbai, May 27-30, 2006.

Books/Manuals published:

"Practical Manual cum work-book" for the course **General Veterinary Biochemistry (VBC-111)** was compiled by Dr. Naresh Kumar and Dr. K.K. Dogra**.** The manual was released by Hon'ble Vice-Chancellor on 19/09/2005 onthe occasion of Oath taking ceremony of Outgoing B.V.Sc. & A.H. Graduates.

Conferences/Symposia/Trainings attended by faculty/ staff

i) Dr. Naresh Kumar, Assoc. Prof. attended a 21 days Winter School on "Recent trends in utilization of plant biodiversity in Animal Health Care with special reference to Pharmacotherapeutics, Pharmacodynamics and safety assessment" from Feb. 18 to March 10, 2006 organized by Deptt. of Vety. Pharmacology and Toxicology.

ii) Dr. Naresh Kumar, Assoc. Prof. attended the **National Symposium on "Buffalo for Rural Upliftment"** and presented a research paper in the annual convention of ISBD at Mumbai, May 27-30, 2006.

DEPARTMENT OF VETERINARY EPIDEMEOLOGY & PREVENTIVE MEDICINE

The department of Veterinary Epidemiology & Preventive Medicine was created in April 1996 as per the Veterinary Council of India (VCI) minimum standard of Veterinary Education, regulation, 1993. The first faculty member an Assistant professor joined this department in October 1998 and subsequently one Associate Professor was transferred from the department of Veterinary Microbiology in March 2000.

Teaching Activities:

Courses were taught to B.V.Sc. A.H. students during academic In addition to the courses, the staff member of this department were also engaged in imparting training to interns under compulsory rotational 6 months Internship programme.

Emergency Services:

The faculty of the department also provided emergency services on Sundays & holidays in the College Clinical complex.

Research Activities:

Continuous efforts are being made to create infrastructure for research in the department. Since the department is infancy, needs special attention to fill up sanctioned posts of scientists as well as one time special grants to create ware minimum facility for research.

Besides routine instruments and equipments, two binocular microscopes, one -20ºC deep freeze, one biological oxygen derived incubator and one digital camera have been procured from Central Development Assistance provided by ICAR, New Delhi.

Extension Activities:

Animal Disease outbreaks:

A total of two Animal Disease Outbreaks were attended at the farmers door-steps during the period under report. Local Veterinarians were apprised of confirmed diagnosis and line of treatment. Farmers were educated about the various measures to be adopted for the control and prevention of these infectious diseases in future.

Publications:

1. Nagal, K B, V B Joshi, R C Katoch and N P Kurade (2005). Goat pox: An emerging disease in Himachal Pradesh–India. In proceedings of *14th Asian Commonwealth Veterinary Association Conference* held on September 21-23, 2005 at Lahore Pakistan. pp. 15- 18. Edited by Abdul Karim, Nasim Ahmad and Saadia Hanif.

2. **Nagal, K. B.,** R. K. Mandial, R. C. Katoch and R. Chahota. (2006). Occurrence of *Salmonella enterica* subspecies *enterica* serovar Berta (*Salmonella* Berta) in Bovine Calves, in Himachal Pradesh, India. *Veerinarski. Arhiv* **76** (2): 153-157.

DEPARTMENT OF VETERINARY CLINICAL MEDICINE, ETHICS AND JURISPRUDENCE

TEACHING: Courses were taught to B.V.Sc. A.H. students during academic In addition to the courses, the staff member of this department were also engaged in imparting training to interns under compulsory rotational 6 months Internship programme.

RESEARCH:

Studies on the patterns and practices endoparasitism in dogs of Palam Valley.

During the present study an overall incidence of gastrointestinal helminthiasis was 27.77 % in the dogs of Palam Valley. *Dipylidium* sp. Was most prevalent (11.11%) whereas *Spirometra, Anchylostoma* and *Toxocara* sp. each accounted for 5.55 % incidence. The incidence was highest in winter season (44 %). Anchylostomiasis and Toxocariasis were predominant in young male dogs, whereas, *Dipylidium caninum* was predominant in adult male dogs. Microcytic hypochromic anaemia was characteristic in parasitized dogs. The recovery rate was recorded to be 100 % in all the parasitized dogs with triworm (Praziquatel + Pyrentel Pamoate + Fenbendazole) against Dypilidium and Spirometra sp. and albendazole and fenbendazole against toxicariasis and anchylostomiasis.

Technical papers

Research Publications:

1. Wadhwa, D.R., Prasad, B. and Sharma, A.(2005). Man agement of insulin dependent diabetes mellitus in dog- A case report. Indian Vety. J. **82:** 1311-312.

2. Wadhwa, D.R. Prasad, B and Katoch, R.C (2005). Oc currence of hypodermosis in Changar area of Himachal Pradesh. Intas Polivet. **6 (2):** 366-367

3. Wadhwa, D.R. Prasad, B and Pathak, D. (2006). Snake envenomation in canines and its management. Intas Polivet. Intas Polivet **7 (1):** 92-93.

4. Wadhwa, D., Wadhwa, D.R., Meena Kumari and Katoch, B.S. (2006). Therapeutic efficacy of Enrofloxacin (Quin Intas) in neonatal calf diarrhoea. Intas Polivet **7(1):** 45-46.

5. Wadhwa, D., Wadhwa, D.R., Meena Kumari and Katoch, B.S. (2006). Therapeutic efficacy of Enrofloxacin (Quin Intas) in neonatal calf Pneomonia. Intas Polivet **7(1):** 54 55.

6. Nagal, K. B., Mandial R. K., Katoch, R. C. and Chahota, R. (2006). Occurrence of Salmonella enterica subspecies enterica, serovar Berta (Salmonell Berta) in bovine calves, in Himachal

Pradesh, India. Veterinarski Arhiv 76(2):153-157

Paper Presented in Conferences::

1. Wadhwa,D.R., Prasad,B., Asrani, R.K. and Telang, R.S. (2006). Occurrence of nutritional haemoglobinurea in buffaloes in Changar area of Himachal Pradesh. Paper presented at 24th annual conference of ISVM held at Banglore w.e.f. Feb. 22-24,2006.
2. Sharma, J. and Wadhwa, D.R. (2006). Clino-biochemical and therapeutic studies on Lantana toxicosis in cattle. Paper presented at 24th annual conference of ISVM held at Banglore w.e.f. Feb. 22-24,2006.

C. Conference/Symposia/ Workshop/ Training attended:

Dr. B. Pal attended an ICAR winter school on "recent trends in utilization of plant bioderversity in the animal health care with special reference to pharmacotherapeutics, pharmacodynamics and safety assessment" organized by dept. of Vet. Pharma. & Toxicology. COVAS, Palampur, wef Feb., 2nd 2006 to March, 3rd , 2006.

EXTENSION ACTIVITIES.

Diagnosis and treatment of clinical cases at college clinics: A total of 2640 clinical cases relating to Medicine discipline, in different species of animals were diagnosed and treated.

Examination of clinical samples: A total of 1045 clinical samples (Faecal, blood, urine, milk and skin scrapings) obtained from sick animals were examined to provide confirmatory diagnosis.

Clinical Camps: Staff members of the department participated in 14 clinical/ animal health camps where a total of 341 clinical cases pertaining to medicine discipline were diagnosed and treated.

Disease outbreak and emergency services: Department also provided services to attend disease outbreaks among the livestock, in addition to emergency and urgent services at the door step of the farmers of the state. One disease outbreak was attended where combined toxicity of lantana & Ageratum was diagnosed and managed.

Extension lectures: A total of 20 extension lectures were delivered by the staff members of the department to the farmers of the state during various short term extension trainings (dairy, poultry, rabbitory etc.) organised by the Directorate of Extension Education.

Refresher trainings: A total of 14 lectures were delivered in various refresher trainings organized by the Directorate of Ext. Education.

Consultancy and Emergency services: These services were provided to the farmers either in the clinics or at the door step as & when required.

Services to livestock farm: Services were provided to CSK HPKV Livestock farm as & when required.

DEPARTMENT OF VETERINARY & ANIMAL HUSBANDRY EXTENSION

The Department of Veterinary and Animal Husbandry Extension was created in 1999 to fulfill the minimum requirements of Veterinary Education as prescribed in the Indian Veterinary Council Act 1984. The Department aims to educate the Veterinary graduates for applying technical concepts of behavioral sciences for the transfer / dissemination of available technology in the field of Veterinary Science and Animal Husbandry. This is very significant in view of the fact that the extension approaches for the Veterinary Science and Animal Husbandry are significantly different from those of allied sciences like Agriculture, Horticulture and Home Sciences, in having less operability at the users' level and low communicability to the users.

TEACHING ACTIVITIES

With a view to achieve the above objectives, efforts were initiated for strengthening the teaching activities in Veterinary and Animal Husbandry Extension.

Efforts to develop a well-equipped Audio-Visual Technology Lab for a systematic Extension Teaching in communication technology to the graduate students continued. Digital Photography practical lessons are being imparted to the graduate students with the help of Digital Camera.

RESEARCH ACTIVITIES

Veterinary extension research: Departmental initiatives: The Department worked on the following surveys, research projects – (non funded): Schedules were prepared and interviews were conducted in different parts of the state on the topics mentioned below. The data so obtained is under compilation.

An exhibition stall of the department of veterinary & animal husbandry extension during Kisan mela of the university

Cyber (Web based) teaching under taken during the last year successfully continued and a new web portal of the department www.vahe.himvet.com giving exhaustive information on education, teaching & research launched for all the courses being offered by the Department.

Prepared interactive learning based Practical manuals were modified for Course No. AHE-111 & AHE-411.

Multi media teaching introduced.

1 Awareness amongst farmers regarding cattle feed & feed additives in and around palampur region.

2 Livestock Resources and Animal Husbandry practices for the following species, in different parts of H.P :

Cattle; Sheep; Goats; Poultry

EXTENSION ACTIVITIES:

The department provided its exclusive facility of Digital Photography to other departments of the College/ University for preparing teaching material, recording research observations, and during scientific meetings / conferences/seminars etc.

Apart from this the Digital camera, Multi Media projector was provided to other departments for research and seminar purpose.

Physical facilities available

- A well equipped exhibition hall for the visiting farmers depicting the various activities related to veterinary & animal husbandry
- Audio visual equipments namely Multi media projector, computerized video editing unit, slide projector, over head projector, digital camera, TV, VCR, Philips wireless audio unit.
- Multi media based Seminar room fully conditioned having all the facilities for audio visual presentation.

Veterinary extension museum :

An updated visual-based display of the developments and the current activities of the College has been prepared and installed in the University Museum for the benefit of the visiting farmers, trainees and dignitaries. The visual based exhibition of the college activities was also prepared and installed in the Exhibition Room maintained by the department. An Illuminated Display Case depicting actual specimens and R&D products prepared by the College has been installed at the entry to the Museum Hall for the benefit of the farmers, visitors and trainees under different training programmes conducted by the University / other develop ment agencies.

Extension lectures delivered:

Extension Talks and Interactive Sessions with Livestock Farmers / Para-Vets :

Other Extension Related Activities:

- Counseling and consultancy support was provided on different aspects of Veterinary Health and Animal Husbandry to the NGO and State Department of Animal Husbandry (HP)
- Extension literature support on different aspects of Veterinary Health and Animal Husbandry was provided to the following agencies:

1. HP Wool federation- Shimla
2. SSB : To Para vets
3. District Rural Development Agency, Solan.
4. District Rural Development Agency, Mandi.
5. NATP cell- Shimla

PARTICIPATION IN WORKSHOPS / SEMINAR / SYMPOSIA

PUBLICATIONS

Research

- K.S.Sharma, Desy Rani, Shivani Katoch, Arun Sharma & Meena Kumari. Evaluation and improving locally available feed resources and developing feeding systems for improved livestock production. Pp 105-110. Compendium of 14th Asian Commonwealth Veterinary Association Conference w.e.f 21 to 23 September, 2005 held at Pearl Continental Hotel, Lahore, Pakistan.

S.NO	TYPE	TITLE	PUBLISHER	RESOURCE PERSON
1	Pamphlet	Care of pregnant cow (Hindi)	Deptt. Of Veterinary & AH Extension,	Dr. Shivani Katoch
2	Pamphlet	Prevention and control of mastitis in dairy animals (Hindi)	Deptt. Of Veterinary & AH Extension,	Dr. Shivani Katoch

DEPARTMENT OF VETERINARY ANATOMY & HISTOLOGY

Teaching Activities:

Courses were taught to B.V.Sc. A.H. students during academic In addition to the courses, the staff member of this department were also engaged in imparting training to interns under compulsory rotational 6 months Internship programme.

Research Activities

Effect of the Season on the Histology and Histochemistry of the Male Genital System & the Pineal Gland of the Gaddi Goat and Gaddi Sheep.

All the Histochemical parameters like glycogen and cholesterol in the male genital organs and protein in the pineal gland of Gaddi goat and Gaddi sheep were studied and recorded. The histochemical parameters were more or less similar in both the species of the animals. In the testis, the glycogen was observed in the spermatoxoa and in the cytoplasm of the Leydig cells. In the epididymis, the glycogen was observed in the supranuclear zone and the apical border of the epithelium. In the vas deferens also the glycogen reaction was similar to that observed in the epididymis. In the accessory genital glands, glycogen was not observed. In the testis. In the testis cholesterol was observed in the intestinal tissue (in the Leydig cells). All these reactions, in general, were showing maximum intensity in autumn season and minimum in summer.

The reaction for protein was observed in the cytoplasm of the pinealocytes in all the seasons but the intensity was more in summer than in other seasons.

As per the micrometrical observations on all the organs of the male genital system, the epithelial height was maximum in autumn season and minimum in summer season indicating all the organs were more active in autumn. In the pineal gland, the density of pineal cytes was maximum in summer indicating the gland was more active in that season. The cellular density of pinealocytes was in reducing order in sprng, winter and autumn respectively. The cytoplasm of the pinealocytesa showed strong reaction for protein which might be indicative of the enzyme (HIOMT) present in the gland.

Faculty and Staff Improvement

A. Participation in Workshop/Conferences:

Dr.Virender Pathak attended XX IAVA convention of Indian Association of Veterinary Anatomists and National Symposium. held on 27-29, January 2006, Jabalpur.

B. Summer/ Winter School / Trainings attended:

Dr. Rajesh Rajput attended Winter School on "Recent trends in utilization of plant diversity in the animal health care with special reference to pharmacotherapeutics, pharmaco dynamics and safety assessment" held at Department of Pharmacology and Toxicology, College of Veterinary and Animal Sciences, CSK HPKV, Palampur on 18, Feb.,– 10 Mar., 2006.

Publications:-

List of Papers Published

1. Bhardwaj, R.L and Roy, KS. 2006. Follicular dynamics in the ovary of pregnant Indian buffalo. *Indian journal of Animal Sciences*. 76(6): 41.
2. Bhardwaj, R.L and Roy, KS. 2005. Histomorphological studies on the ovary of prepubertal Indian buffalo .*Indian journal of Animal Sciences*. 75(5):499-502.
3. Bhardwaj, R.L and Roy, KS. 2006. Histomorphological study on the ovary of cyclic Indian buffalo .*Indian journal of Animal Sciences*. 76(6): 31-34
4. Bhardwaj, R.L Rajput, Rajesh; Pathak. V; and Thakur, K (2006) Comparative Anatomy of the Thyroid Gland of Small Ruminants. *Indian journal of Animal Sciences*. 76(5):46-47
5. Bhardwaj, R.L. and K.S.Roy. 2006 Study on the follicular development in the ovary of cyclic Indian buffalo .*Indian journal of animal sciences*. 76(6): 27-30
6. Bhardwaj, R.L., Rajput, Rajesh, Gupta, V.K., Kanwar, M.S. and Pathak, V.2006.Unusual Testicular Degeneration in Spiti horse -A Case Report *Centaur*. 22(3): 47-48.
7. Bhardwaj, R.L.; Kumar, R.; Sharma, K.B.; Rajput, Rajesh and Sharma, Sonia.2005. Macro and micro mineral concentration in genital tissues of Gaddi goat. *Indian Journal of Veterinary Physiology*. 1(1):33-34.
8. Bhardwaj, R.L.; Rajput, Rajesh; Pathak, V. and Thakur, Kailash. 2006. Comparative Anatomy of the Thyroid Gland of Small Ruminants. *Indian Journal of Animal Sciences*. 76(1): 46-47.
9. Pathak. V and Bhardwaj R L.2005. Seasonal variations on the anatomical studies of the Gonadotrophs of Gaddi goats. *Indian journal of Veterinary Anatomy*. 17 (I&II):40-43
10. Pathak. V and Bhardwaj R L.2005.Histological and histochemical studies on the preoptic, paraventricular and supraoptic nuclei of the hypothalamus in Gaddi goat. *The Royal Veterinary Journal of India.*1 (2):65-68.
11. Rajput, Rajesh; Shalini and Sharma, D.N. 2005. Hilar cells in ovary of Gaddi sheep and Gaddi goats. *Indian Journal of Animal Sciences*. 75 (12): 1401-02.
12. Sudhakar, L S. 2005. Histomorphology of the

slavary glands of Yak- A preliminary study. *Indian journal of animal sciences*. 76: 50-51

List of Papers presented in the Conferences.

- Pathak, V; Bhardwaj, R.L. 2006. Seasonal variations on the hypothalamo-hypophysio-gonadal axis to evaluate the breeding pattern of gaddi goat- A histomorphological study. Presented in the XX IAVA convention of Indian Association of Veterinary Anatomists and National symposium. held on 27-29 January, 2006, Jabalpur.

DEPARTMENT OF VETERINARY PARASITOLOGY

TEACHING ACTIVITIES :

Courses were taught to B.V.Sc. A.H. students during academic In addition to the courses, the staff member of this department were also engaged in imparting training to interns under compulsory rotational 6 months Internship programme.

RESEARCH ACTIVITIES

Forecast &surveillance Lab. for parasitic diseases in H.P.

Samples screened from in and around Palampur:

71 samples suspected for different parasitic diseases were examined in the department of Parasitology during the year under report. These samples belonged to Palampur and to surrounding areas. The representative animal species were cattle, buffalo, goat, dog, and human beings. During the period overall parasitism in this area was found to be 33.8%.In cattle predominant parasites observed were amphistomes followed by strongyles and In case of calves coccidian parasites were found.

Publications

1.Sharma,D., Katoch, R., Mittra S and Agnihotri, RK (2005) Prevalence of *Ostertagia circumcinata* in Gaddi sheep of North Western Himalayan region of Himachal Pradesh.. *Journal ofField Veterinarians* 1(1):54-55.

2.Katoch,R.; Katoch,S.; Agnihotri,R.K.;Sharma,K.B.and Katoch,Ajay. 2006.Incidence of gastrointestinal helminthes in spiti horses of Himachal Pradesh.Intas Polivet.7(1):64-66.

3. Agnihotri,R.K.2006.Helminthic infection of livestock and their eco-friendly management. In compendium of winter school on Recent trends in utilization of plant biodiversity in the animal health care with special reference to pharmacotherapeutics, Pharmacodynamics and safety assessment , Feb 18-March 10,2006, Department of Pharmacology and Toxicology,Palampur: pp 226-231.

4. Mittra, S.2006. Concepts of Organic Animal Husbandry in Organic Farming System. In compendium of winter school on Recent trends in utilization of plant biodiversity in the animal health care with special reference to pharmacotherapeutics, Pharmacodynamics and safety assessment , Feb 18-March 10,2006, Department of Pharmacology and Toxicology,Palampur: pp 43 - 46

Samples examined in and around Palampur for parasitic infections.

Animal species	No.of samples examined	Samples positive for parasites Type of infection				Samples negative for parasites
		A	S	C	Th	
Cattle	52	17	35	6	9	- 2
Dog	5	1	4	-	1	- -
Calf	12	6	6	-	-	6 -
Buffalo	1 -	1	-	-	-	-
Human	1 -	1	-	-	-	-
Total	71	24	47	6	10	6 2
		(33.8%)				

A=Amphistomes ; S=Strongyles ; C= Coccidia ; Th =*Theileria*

Paper presented:

Mittra,S.;Agnihotri, R.K. 2006. Parasitic menace of lion in captivity (A lead Paper).Presented in Humboldt Kolleg on " Bio-,Nano—, Geo—Sciences: Addressing issues of concern to mankind. Organised by IHBT Palampur& Humboldt Academy Chandigarh & Humboldt Academy ,Kanpur on March 24 -26,2006.

Chapter in a book:

1. Chapter on **Pentastomiasis** by Drs. R.K.Agnihotri and S. Mittra.edited byProf. S.C.Parija ,Head Department of Microbiology JIPMER, Pondicherry in "**Review of Parasitic Zoonosis"-** in press**.**

EXTENSION ACTIVITIES:

Extension lectures:

Teachers of the department delivered 23 lectures on different topics in various training programmes organized by Directorate of Extension Education. Futher expert Lecture on Organic Farming were delivered to_field Agriculture officers of the state in the training programme organized by centre for human Resource Development , College of Agriculture,CSKHPKV.

DEPARTMENT OF VETERINARY PHARMOCOLOGY & TOXICOLOGY

Teaching:

- Teaching of B.V.Sc. & A.H. students as per the VCI standards and regulations
- Teaching of M.V.Sc. postgraduate students (both Major and Minor)

RESEARCH

Interactive Effects of Free Radicals on Vascular Calcium Channels in Goats :

The studies were undertaken to establish the normal pharmacological behaviour of goat pulmonary artery and the modulatory role of free radicals, viz., superoxide and hydroxyl radicals, thereof. The findings made in the present investigation are summarized as follows:

1. The isolated goat pulmonary artery (GPA) strips were quiescent and did not show any spontaneous movements when mounted at 3 g in the modified Krebs Henseleit solution at 37 °C.
2. The optimal resting tension for the tissue was found to be 3 g.
3. On the GPA strips, high K^+ (80 mM) elicited a contractile response of 38.84 ± 1.69 $g.g^{-1}$, which was significantly higher than NE (10^{-5} M) induced contraction of 27.64 ± 2.04 $g.g^{-1}$.
4. The tissues vitality was maintained upto third consecutive contraction, without any significant decay
5. Incubation of the tissues with superoxide or hydroxyl radicals had no effect *per se* on the basal tension in non-stimulated condition.
6. The contractile ability of goat pulmonary artery by NE was completely inhibited on prior exposure to superoxide radicals, while the contractile ability of GPA by high K^+ was not affected to any significant level. The same was also found to be true with hydroxylamine at pH 7.4. In the recovery studies, it was found that the tissue regained its ability to respond to NE completely after giving a resting period of 60 min.

Glimpses of the ICAR Sponsored Winter School on RECENT TRENDS IN UTILIZATION OF PLANT BIODIVERSITY IN ANIMAL HEALTH CARE WITH SPECIAL REFERENCE TO PHARMACOTHERAPEUTICS, PHARMACODYNAMICS AND SAFETY ASSESSMENT organized by the department

7. Similarly, the contractile ability of goat pulmonary artery by NE was completely inhibited on prior exposure to superoxide radicals while the contractile ability by high K^+ was not affected to any significant level. In the recovery studies too, it was found that the contractile ability of the tissue to NE regained upto 61.20 ± 5.51 %, which was significantly less than the control value. While the same for KCl recovered to almost complete level.
8. The superoxide radicals generating system added on the plateau of the NE induced contraction relaxed the contractile response by 74.31 ± 0.65 %, which was highly significant ($p<0.001$). Likewise, the tissue failed to recover from this superoxide radical effect even after giving sufficient rest period, to its control values. While that of KCl induced contraction was not affected by the superoxide radicals and also the recovery was complete.
9. In parallel experiments, addition of hydroxylamine on the plateau at pH 7.4 too had a similar relaxing effect upto 57.43 ± 1.56 %, but comparatively less than at pH 9.2 of MKHS. Likewise, the tissue also failed to recover from this hydroxylamine effect even after giving sufficient rest period, to its control values. However KCl induced contraction was not affected by hydroxylamine and also the recovery was complete.

10. Addition of the hydroxyl radicals on the plateau of NE induced contraction completely relaxed the tissue on all occasions; however the tissue recovered its contractile ability after giving sufficient rest period. While on high K^+ mediated contraction the hydroxyl radicals produced almost no effect on the contractile response.
11. When the tissue was depleted off the Ca^{2+} by incubating the tissue in Ca^{2+} free, NE or K^+ depolarizing solution (with and without EGTA), the tissue did not show any change in the basal tension.
12. Under Ca^{2+} depleted condition, when cumulative doses $CaCl_2$ (10^{-7} to 10^{-1} M) were added, the tissue did not exhibit any contractile response. However, at very high concentration (1 M), there was a small contraction (1 g) which did not correspond to its calcium channel stimulating action.
13. The effect of free radicals on the NE mediated contractions was of transient nature and the tissues recovered from the deleterious effects after giving sufficient rest period in most of the experiments.

Pharmacodynamic Interaction of doramectin with centrally acting drugs

The studies were conducted to examine the possible pharmacodynamic interactions that may result from concurrent administration of doramectin and CNS acting drugs. The findings of the study are summarized as below:

1. Doramectin treatment decreased the alertness, grooming time and exploratory behaviour in lab animals in dose dependent manner. At higher dose of doramectin, the lab animals showed less interest in feeding and social behaviour.
2. In tail clip test for analgesics, the reaction time taken to this central origin pain was increased in doramectin treated mice. The analgesic action of morphine was enhanced significantly in doramectin treated groups. In hot plate test, the reaction time of both peripheral and central origin pain was decreased slightly in doramectin treated mice. The analgesic action of analgin was unaffected in doramectin treated groups, while that of morphine was significantly enhanced. In writhing test, the number of writhing movements was significantly increased in doramectin group. Analgin was equally effective in control and doramectin treated mice.
3. Doramectin treatment enhanced the spontaneous locomotor activity (SLA) of mice marginally. On Acepromazine as well as Amphetamine treatment doramectin treated groups showed less SLA. In rota rod test for forced locomotor activity (FLA) in the mice, there was no fall off in both control and doramectin treated groups. On treatment with acepromazine, at 15 and 25 rpm all the mice showed fall off, with doramectin treated mice taking more time. In traction wire test for FLA, on acepromazine treatment, all the animals showed fall off at a short interval, with doramectin 600 µg/kg group taking significantly more time.
4. In supramaximal electroshock (MES) induced *grand mal* epilepsy, all the control groups showed similar timings for tonic clonic convulsions. However, the doramectin pretreated mice showed significantly more clonic jerks and long recovery time from the convulsions. On phenytoin treatment all the groups showed protection to MES convulsions. In pentylenetetrazole induced *petit mal* seizures there was no significant change in the number of convulsions and recovery time in control and doramectin treated mice. Diazepam was able to protect all the groups from *petit mal* seizures effectively.
5. Acepromazine was able to block the conditioned response in all the groups effectively. In unconditioned response avoidance test, Diazepan was effective in all the groups.
6. In diethyl ether induced general anesthesia, doramectin treatment did not alter the time taken for exhibiting various stages of anesthesia. However the total duration of anesthesia was increased in doramectin treated groups and this was significantly high in doramectin treated group.
7. In barbiturate induced sleeping time test, the induction time was increased significantly in doramectin treated mice on both acepromazine and amphetamine treatment. The duration of sleep in doramectin treated groups was significantly increased in normal doramectin treated groups as well as in presence of both amphetamine and acepromazine.
8. In Amphetamine induced aggregation toxicity there was no difference in both control and doramectin treated groups. Acepromazine, standard protective drug, was able to protect the mice against aggregation toxicity in all the groups.

Interactive pharmacokinetic studies on pefloxacin with Trikatu

The present studies were conducted to study the effect of Trikatu on the pharmacokinetics of pefloxacin in goats. Trikatu was given orally at the dose rate of 2 gm per goat (equivalent to 40.4 mg of piperine) peior to oral administration of pefloxacin for a period of 14 days. Pefloxacin was administered in single dose of 20 mg Kg^{-1} by intravenous and oral routes. On the basis of detailed pharmacokinetic studies, appropriate dosage regimen of pefloxacin for goats was also calculated. The salient findings of the present studies are as follows:

1. Following intravenous administration (20 mg Kg^{-1}), the plasma concentration > 2 µg ml^{-1} persisted for more than 4 h. The pharmacokinetic behaviour was best described by two compartment open model. The distribution half-life, elimination half-life, apparent volume of distribution and total body clearance were calculated to be 0.10 ± 0.01 h, 1.05 ± 0.03 h, 0.44 ± 0.03 L kg^{-1} and 286.40 ± 15.50 ml Kg^{-1} h^{-1}, respectively.
2. Oral administration of pefloxacin (20 mg Kg^{-1}) in control goats resulted in detectable concentration of antibacterial agent (1.76 ± 0.08 ug ml^{-1}) at 10 min and the peak plasma level of 5.31 ± 0.05 ug ml^{-1} was achieved at 1 h. Based on experimental data of observed plasma concentration, pharmacokinetics was adequately described by one compartment upon model. Absorption half-life, elimination half-life, apparent volume of distribution, total body clearance, mean residence time, total duration of pharmacological action and bioavailability were calculated to be 0.32 ± 0.01 h, 2.50 ± 0.12 h, 1.11 ± 0.08 L Kg^{-1}, 0.29 ± 0.02 L Kg^{-1} h^{-1}, 4.47 ± 0.16 h, 19.72 ± 0.38 h and 38.33 ± 1.80 per cent, respectively.
3. Oral administration of pefloxacin (20 mg Kg^{-1}) in Trikatu treated goats resulted in significantly lower concentration of the drug at 10 min, 15 min, 20 min, 30 min, 45 min, 1 h and 2 h. But pefloxacin concentrations were higher t 3 h, 4 h, 6 h, 8 h and 12 h in Trikatu treated goats. Peak plasma concentration was achieved at 1 h. Elimination half-life, AUC, AUMC, MRT and total duration of pharmacological action were calculated to be 3.30 ± 0.19 h, 30.85 ± 1.39 ug ml^{-1} h, 164.25 ± 15.62 ug ml^{-1} h^2, 5.27 ± 0.27 h and 24.16 ± 1.46 h, respectively. All the values were significantly higher as compared to the control group. Significantly lower values of elimination rates constant (0.21 ± 0.01) were observed in Trikatu treated goats. Total body clearance (0.29 ± 0.02 ml Kg^{-1} h^{-1}) was however, similar in Trikatu treated goats and control goats.
4. Following oral administration of pefloxacin, *Trikatu* reduced both loading and maintenance doses of the pefloxacin for microorganisms of different susceptibilities. The average reduction in dose ranged from 6 to 15 per cent.
5. Based on the pharmacokinetic predictors of clinical efficacy i.e. C_{max}/MIC ratio and AUC/MIC ratio, pefloxacin is effective at an oral dose of 8 mg kg-1 repeated twice daily. Similarly an intravenous dose of 20 mg kg^{-1} repeated twice daily is suggested for treatment of infections.

List of Publications of 2005-06

1. R.S.Deshwal, C.Varshneya, R.S.Telang, B.Prasad and R.K.Mandial (2005). Pharmaco therapeutic management of Respiratory Distress Syndrome in equines of Himachal Pradesh. The Indian Veterinary Journal 82(6): 609-614
2. Anita Singh, C.Varshneya and R.S.Telang (2005). *In vitro* anthelmintic effect of *Curcuma longa*. The Indian Veterinary Journal 82(6): 594-596
3. Pallavi Bhardwaj, C.Varshneya, Anita Singh and R.S.Telang (2005). *In vitro* effects of leaf extract of *Mentha spicata* on eggs and infective third stage larvae of *Haemonchus contortus*. Indian Journal of Small Ruminants 10(2): 163-165 1.
4. Anita Singh, C.Varshneya and R.S.Telang (2005). *In vitro* screening of *Thuja orientalis* leaf extract for anthelmintic activity against *Haemonchus contortus*. Indian Journal of Small Ruminants 11(1): 98-100
5. Anita Singh, C.Varshneya and R.S.Telang (2005). Flowers of *Tagetes patula* – A potential anthelmintic. Indian Veterinary Journal 82(8): 838-840
6. Anita Singh, P.Bhardwaj, C.Varshneya and R.S.Telang (2005). Anthelmintic activity of leaves of *Bauhinia variegata*. Indian Veterinary Journal 82(8): 855-857
7. M.Singh, C.Varshneya, R.S.Telang and A.K.Srivastava (2005). Alteration of pharmacokinetics of oxytetracycline following oral administration of *Piper longum* in hens. Journal of Veterinary Science (Korea) 6(3): 197-200
8. C.Varshneya, P.Bhardwaj, Anita Singh and R.S.Telang (2005). *In vitro* evaluation of adulticidal activity of *Tagetes patula* against *Haemonchus contortus*. Proceedings of 14th Asian Commonwealth Veterinary Association Conference, Lahore, Pakistan, 21-23 Sept 2005, p 134-138.
9. Anita Singh, C.Varshneya, R.K.Agnihotri and R.S.Telang (2005). Medicinal plants of Himalayan region: A potential source of anthelmintic for livestock (Review article). Journal of Veterinary Pharmacology & Toxicology 4(1-2); 1-9
10. R.S.Telang, Subhash Patial and C.Varshneya (2006). Pharmacological characterization of adenosine A_1 and A_2 receptors in goat coronary artery. Journal of Cell and Tissue Research 6(1): 567-571
9. R.S. Telang,R.K. Mandial,V.K.Gupta and R.Chahota(2005).Arsenic Poisoning in Animals of Himachal Pradesh .The Indian Veterinary Journal 82(6): 609-678

Papers presented in Conferences/Workshops /Winter School/Summer Schools

1. P.Bharadwaj, C.Varshneya, R.S.Telang and R.K.Agnihotri (2005). Ovicidal and larvicidal activity of methanolic extracts of *Bauhinia variegata* and *Tagetes patula* against *Haemonchus contortus* – An *in vitro* study. To be presented at V Annual Conference of Indian Society of Veterinary Pharmacology & Toxicology, held at TANUVAS, Chennai, from Nov. 21-24, 2005.

2. Varshneya,C. (2006)Use of herbal bio-enhancers in Animal Health Care **In** Recent Trends in Utilization of Plant Bio-diversity in Animal Health Care with special reference to pharmacotherapeutics ,pharmacodynamics and Safety Assessment(Eds. C.Varshneya and others),Department of Pharmacology and Toxicology,College of Veterinary and Animal Sciences,CSK Himachal Pradesh Krishi Vishvavidyalaya,Palampur(H.P.)pp. 194-198
3. Varshneya,C. (2006)Ethno-Veterinary practices of India with particular reference to the use of plant bio-resources in Animal Health Care **In** Utilization of Plant Bio-diversity in Animal Health Care with special reference to pharmacotherapeutics ,pharmacodynamics and Safety Assessment (Eds. C.Varshneya and others),Department of Pharmacology and Toxicology,College of Veterinary and Animal Sciences,CSK Himachal Pradesh Krishi Vishvavidyalaya,Palampur(H.P.)pp 184-193.
4. R.S. Telang and M.S.Dardi(2006) Herbal Drugs : Is natural always safe **In** Utilization of Plant Bio-diversity in Animal Health Care with special reference to pharmacotherapeutics ,pharmacodynamics and Safety Assessment(Eds. C.Varshneya and others),Department of Pharmacology and Toxicology,College of Veterinary and Animal Sciences,CSK Himachal Pradesh Krishi Vishvavidyalaya,Palampur(H.P.) pp276-284
5. M.S.Dardi,R.S.Telang and Simarjeet Kaur(2006).Anticancer drugs from plant origin **In** Utilization of Plant Bio-diversity in Animal Health Care with special reference to pharmacotherapeutics ,pharmacodynamics and Safety Assessment(Eds. C.Varshneya and others),Department of Pharmacology and Toxicology,College of Veterinary and Animal Sciences,CSK Himachal Pradesh Krishi Vishvavidyalaya,Palampur(H.P.)pp 162-166

Popular Articles:

1. R.S. Telang (2005). Antibiotics: Are we using them judiciously ? (Part I) Quarterly Scientific Newsletter (QSN) Vol.2, Issue-3, Oct-Dec. 2005. Published by M/S Alembic Ltd (Veterinary Division), Mumbai-59, India.

2. R.S. Telang (2006). Antibiotics: Are we using them judiciously ? (Part II) Quarterly Scientific Newsletter (QSN) Vol.3, Issue0I, Apr-Jun. 2006. Published by M/S Alembic Ltd (Veterinary Division), Mumbai-59, India.

PROFESSIONAL ACTIVITIES

The Department successfully organized ICAR sponsored Winter School on "*Recent trends in utilization of plant biodiversity in the animal health care with special reference to pharmacotherapeutics, pharmacodynamics and safety assessment*".The 21 day winter school was organized from February,18 to March 10,2006.

DEPARTMENT OF FISHERY

Coldwater fishery occupies an important place amongst the fresh water fishes of India. Its important is even far greater in Himalayan uplands but day by day the fish diversity in these waters is declining due to multiple environmental stresses. Despite of the facts that there is a vast potential for the development of coldwater fisheries resources, which comprises of River length 8243 Km, natural lakes 20,500 ha and man made reservoir about 2, 65,000 ha. in the country. Per unit production of coldwater fisheries to the total inland production basket is not very significant but it has the natural resources to make a dent and contribute to the economy, food security and employment generation of our hilly region and uplands. Recognizing these factors the Department of Fisheries has endeavored to under take need based research to develop location specific semi-intensive poly-culture fish models for integration with the conventional agricultural practices under different agro-climatic conditions of the State for security of food and nutrition to the people of hill regions. Department of fisheries with a bare minimum manpower have made significant contribution for the proper appraisal of coldwater fishery resources and evolved suitable technology to enhance productivity in mid hill region of the country.

Breeding and rearing of common carp and Golden carp:

Under the quality seed production programme of mirror carp and scale carp, a total of 35 sets of mirror carp and scale carp were bred successfully. 12 sets of golden carp were also bred. As a result 35, 093 fries of mirror and 1150 fries of golden carp are obtained and reared up to fingerlings stage for distribution among the farmers and restocking of farm's ponds. Fingerlings obtained were approximately 15,791.

Farmers being imparted training in fishery

Teaching:

Courses were offered to the under graduate students

Research Accomplishments:

Relative growth performance of exotic carps 2: 2: 1 combination under the agro climatic zone II of H.P.

In view of the high cost feed ingredients of fish feed, it was envisaged to enhance the growth by using yeast powder as one of the feed ingredients as such different experimental trials were conducted by adding yeast powder initially @ 4% of total feed which was later on reduced to 1% + 20% fermented feed. The Katcha ponds of 450m2 were used for this experiment. The fingerlings were acclimatized for seven days in present ecological condition prior to initiation of the experiment. Two diets were formulated to evaluate the growth performance i. e. Wheat bran +Soybean + mustered oil cake+ yeast powder and Wheat bran+ Soybean + mustered oil cake. The protein level in all the diets was maintained as 30%.

Stocking of 675 fingerlings of major carps in ratio of 2 CC: 2GC: 1SC were done in each experimental pond and two replicate trials were used including control one. All fish were fed three times daily at five hours intervals between 9.00 to 17.00 hours at the rate of 3% of total body weight except first 15 days after stocking only 1/3rd of the calculated feed was given so as to acclimatize the fingerlings to new environment. In order to maintain good water quality, the fresh water was allowed in ponds from time to time and application of lime as well as KMno4 was done.

Water quality parameters were monitored throughout the experimental period following the procedure recommended by APHA. Water temperature during the experiment period varied between 16 to 31.30C, the dissolved oxygen ranges between 6.3 to 9.7mg/l and the pH remained almost neutral to alkaline (6.6 to 8.5) which, altogether is conducive for the better growth of fish. The freeCo2 and hardness show their maxima during August when temperature is high. The amount of total dissolved solid is with in the recommended range and it decreases September onward when DO is also less. The alkalinity remains low through out the experimental period than the recommended value. Every month 20% of the stock was harvested to calculate the amount of feed and to observe the average growth rate. The growth performance of fish fingerlings fed on various diets is summarized in table 1. It shows that gain in average weight was high in yeast powder mixed diet. The impact of yeast powder mixed diet is quite significant in case of common carp and silver carp than that of grass carp. Further the survivability rate was also high in common carp and silver carp as compared to that of control one. The total weight harvested was 13% higher in experimental diet than that of control. The feed conversion ratio was found comparatively better in Wheat bran + Soybean + mustered oil cake +Yeast powder.

The enhancement of growth in common carp and silver carp when fed yeast powder mixed diet may be due to the supply of some digestive enzyme which help to improve their digestibility but these enzymes could not be effective for the digestion of grass in case of grass carp. However, further this trial must be repeated to determine conditions that enhance the growth of common carp and silver carp and also to reuse of fermented feed to avoid cost of yeast powder.

Growth performance of Coldwater fish species. (H.P. State)

A trial was set on growth performance of adult Mahseer on fishmeal and Soybean-based 46% protein rich diet in 200m2 water area of the pond. The 40 specimens of 150 g. average weights were stocked in 200m2 water areas of ponds and fed @ rate of 3% of total body weight at the average water temperature 230C but was decreased to 2% & 1% during October & November when water temperature declined 190C and 140C respectively. The physico-chemical and biological parameters of these ponds were monitored and compiled to arrive at the monthly average data (Table 4). Table 4 reveals that the minimum transparency and DO are observed during September due to heavy rain and alkalinity also declined below the recommended value till December whereas other parameters were found congenial for the growth of the fish. The feeding was stopped in the month of December, January and February due to low water temperature i.e. 90C, 70C and 120C respectively. Further, from March onwards they were fed @ rate of 1% of total body weight when average temperature increased to 150C and the feeding frequency was once only i.e. at 2.00 pm. But the feeding frequency was increased to thrice a day, with the gradual increase in water temperature i.e. average temperature of 190C the feeding was done @2% of total body weight but due to heavy rainfall when the water temperature decreases up to 160C , Mahseer stopped feeding and this condition create a stressful environment which is vulnerable for the fungal infection. It was also observed that during three winter months there is no growth. The trial was terminated in the end of June and harvested data computed in table 3 depicts that per month average growth was 21.24g. and survivability was remaining 90% in case of Soybean based diet, whereas in controlled condition i.e. fish meal based diet it was 22.17g and survivability was 96%. Thus it may be inferred that the growth of Mahseer fish is better on protein rich diet particularly fish meal based diet and the amount of feed as well as frequency of feeding is related with water temperature and quality of water. Feed conversion ratio was not good as by feeding one Kg. feed 140g live weights were obtained. Thus comparing the result with the control diet (inclusion of fish meal) it is seen that feed conversion ratio is almost similar in both the diet and fish meal based diet is more expensive as compared to soybean based diet so up to some extent the fish meal can be replaced by roasted soybean.

Studies on the genetic improvement of mirror carp and scale carp by selective breeding.

Implementation of selective breeding programme in fish help to increase yield, improve feed efficiency and reduce the duration for production. Selective breeding is one of the finest tools to improve genetic status of fish in a positive direction. Further, study of literature reveals that there is a potential for selective breeding in common carp. It is observed that the application of selective breeding along with proper feeding and management helped improving productivity by 15%. Thus the trial on genetic improvement of mirror and scale carp by selective breeding has been carried out to maintain genetically improved stock in carp farming. The data so far generated regarding the breeding of improved brood stock is given in table-5, which revealed that after breeding the female breeders lost their weight ranging form 30g to 170 g. i.e. 8.2 – 24.64% of their body weight irrespective of the size of fish. It is observed that the loss in weight is not only affected by the weight of male but also regulated by pond environment such as water temperature, dissolved oxygen, pH and fluctuation in these parameters with in a day. At 23^0C water temperature the relative fecundity was only 12000 to 15000 which is quite less and hatching time was 72 hours but if variation in water temperature in more than 6 0C the hatching time is extended up to 96 hours. Thus it is confirmed that environmental factor play an important role to regulate the fecundity, survivability of eggs, sperm and fries. Further the care and management of brood fish depends on the pond environment, proper feeding, quality feed and health monitoring. This year the breeding was delayed due to low temperature and it started from 24th April 2006. A total of 35 sets of genetically improved breeders were bred during this period. It is seen that due to stormy, cloudy as well as hail storm on Dhawladhar peak the percentage of egg fertilization was less that is 30 to 40% whereas during suitable environment the percentage of fertilization was noticed 80 to 90%. Similarly the hatching was also affected by this type of harsh environment. Due to maintenance of high oxygen in water the survivability of spawn was slightly better. So the impact of climate on breeding and hatching of fish is long lasting, which can not be ignored. It is necessary to maintain selective stock of common carp to get healthy stock and after two years of breeding the whole stock should be discarded to obtain an acceptable rate of genetic gain and to keep the rate of inbreeding low.

Revolving Fund Scheme:

The aim of this scheme is to set a model for the entrepreneurs/farmers of mid hill region so as to contribute to sustainable rural livelihoods of the poor farmers by adopting the package and practices of fish farming technology. A water body of 4000m^2 areas was adopted to set the trial of poly culture fish model evolved for Agro climatic zone II of Himachal Pradesh and under field condition the growth performance per unit area of this model is quite encouraging. This model has been proved to be viable for income generation as well as demonstration of fish farming to the students and farmers of mid hill region. Such low cost production technology is appropriate for the limited resource based poor farmers. As a result the income of the Department has been enhanced to the tune of Rs. 1, 79, 599 during the year. A total production of 16.0 quintals of fish has been recorded during the year under report, out of which 15, 73.800 Kg fishes worth Rs. 94, 828 were sold in the local market. Further, this scheme also proves to be fruitful to solve the problems of seed of grass carp and silver carp in the area. The fish fries of grass and silver carp were procured from M/S Himalayan Fish Farm, Jagathkhana, Nalagarh and reared up to fingerlings stage and 74,948 fingerlings of worth Rs. 77, 889 was distributed to the fish farmers of Kangra, Mandi, Shimla and Hamirpur. Thus the total earning under this scheme during this year was Rs.1, 79, 599 that enabled the Department to generate financial resources for the development of infrastructure facilities. Based on aforesaid result it is concluded that the integration of fish farming along other agricultural practices is a good enterprise to uplift the socio-economic status of the farmers of mid hill region of the state. It also serves as a demonstration for the farmers interested in this field and seeing the facts and figures of every year is encouraging them.

Empowerment of women through aquaculture intervention:

Extensive surveys of Distt. Shimla and Solan for the selection of potential sites, entrepreneur and organization of the motivation camp for the appraisal beneficiaries regarding fish farming technology have been completed. The site so selected falls under different developmental blocks viz. Rampur and Chopal (Distt.Shimla), Solan, Dharampur, Kunihar, Nalagarh and Kandaghat (Distt. Solan). In total 10 motivation camps were organized in 8 villages i.e., Badhal, Taywal (Jeori) of Tehsil Rampur and Kedi of Tehsil Chopal in Distt. Shimla and Dharampur, Sanwara, Shilli of Tehsil Solan, in Distt. Solan and the response of the rural women were quite encouraging in as much as 15 to 60 Ladies of the different villages attended each camp (Table 6). The women attending the camp were mostly literate and percentage of literacy varying from 40 to 75% and engaged in agriculture as well as various allied activity.

Four training camps (two for district Shimla and two for district Solan) of three days duration were organized at the University Fish farm in order to disseminate fish farming technology to the women farmers of both the district. More than 28 women participants attended

each training camp from different villages as such a total of 140 ladies from 42 villages were trained extensively in polyculture fish farming technology (Table 7). Three ponds of 450 m^2 were developed at HPKV, Fish Farm for conducting practical and demonstration trials by using probiotic (Brewers yeast), which reveals that the impact of probiotic is more on common carp and silver carp as compared to grass carp and total production enhanced by 13 % than the control. Four sites in different villages of District Solan and three sites of Distt. Shimla were selected for demonstrational trials in the respective villages.

Extension:

1. Four training programme of three days duration was organized in the Directorate of extension Education under the DBT sponsored project entitled "Empowerment of women through aquaculture intervention" for the women of District Shimla and Solan on 7th to 9th July, 2005, 15th to 17th January, 25th to 28th January, and 26th to28th June,2006 . About 139 women participated in this programme and imparted practical training of fish farming in the hills.
2. 466 farmers from Hamirpur, Lahul Spiti,Chamba, Kullu, Bhutan, Jammu & Kashmir, Kangra, Shimla Mandi, Dehra Block and Sirmour visited the fish farm on 8th July, 7th November 2005, 12 & 17th February 2006, 12th November 2005, 29th October, 20th October, 6th June, 2005,12th December, 2005, 31st January, 2006, 23rd February, 3rd March, 2006, 25th April, 28th April, 13th June, 06, 25th May,2006, 19th June 2006 .

Seminar and symposia attended:

1. Dr. J. R. Dhanze, prof. and Head attended the national workshop on " Freshwater fish diversity oh hill state of northern India : conservation and management of sustainable fishery" held on 24 to 25th April, 2006 at National Bureaus of fish genetic resources, Lucknow and presented a paper in Hindi entitled " Present status of fish diversity in Himachal Pradesh".
2. Department has organized a short course training on "Recent advances in cold water aquaculture" from 25th September to 5th October 2005, sponsored by ICAR, New Delhi. A total of 25 participants from different part of country were participated in this programme. A total of 17 lectures have been delivered by 10 resource personals out of which four resource persons i.e. Dr. Madan Mohan, Director, NRCCF (ICAR), Bheemtal, Dr. Indu Sharma, Scientist-B, Zoological Survey of India, Solan, Dr. D.N.Sharma, Emeritus Scientist, COVAS, CSKHPKV, Palampur and Dr. B. D. Sharma, Directorate of Fisheries, were invited from out side of the institution.
3. Dr. (Mrs) Rani Dhanze, Scientist attended a short course training on ""Fundamentals and role of computers in bioinformatics" w.e.f. 8th to 10th March 2006 organized by Advanced Centre of Hill Bioresources & Biotechnology, CSK HPKV, Palampur.

Publication during the Year:

1. Dhanze R., Sharma I. and J. R. Dhanze, 2005. Length-weight relationship of golden Mahseer Tor putitora (Ham.), from western Himalayas. J. Inland Fish. Soc. India, 37 (2): 60-62.
2. Dhanze, R., Dhanze, J. R. and I. Sharma, 2005. Limnobiotic status of River Giri. In Management of aquatic resources for biodiversity maintenance and conservation. NATCON pbl. No. 9.
3. Dhanze, Rani and J.R. Dhanze, 2006. phaD,I XaoHa mao maClaI palana ek vardana. Publ. Directorate of Extension Education, CSKHPKV, Palampur.

LIVESTOCK FARM:

The farm was established in March, 1975 as a component of prestigious "Indo New Zealand Livestock Improvement Project" the International Livestock Improvement Programme involving the University, State Govt., ICAR and New Zealand Govt. with the import of a nucleus Jersey herd of 64 pregnant heifers, 111 weaned calves and 5 proven bulls from New Zealand. The primary aim of this project was to bring about revolutionary improvement in the livestock wealth of the state by resorting to crossbreeding with exotic Jersey breed, highly suitable breed of dairy cows for hilly regions with low input support. After withdrawal of the New Zealand Govt. in 1981-82, the programme continued as "Intensive Livestock Improvement Project" funded by the State Govt. through state plan and non plan schemes under the then Deptt. of Animal Production initially under the, Directorate of Research and now under the college of Vety. & Animal Sciences. The Livestock Farm became an independent unit in 1997, with bifurcation of then Deptt. of Animal Breeding and Genetics. Since 2005, it is administratively attached with the Department of livestock Production & Management, COVAS, HPKV, Palampur.

The mandatory role of the Livestock Farm is to serve as an instructional and demonstration unit to meet the teaching, research and extension education requirements of various colleges of the university. The farm also provides research support in terms of experimental animals, materials and others facilities to various constituent Departments of the College of Veterinary & Animal Sciences in particular and other colleges in general.

The faculty was also associated with the advisory committee of two P/G students. In addition to this, students from other departments of COVAS were provided animals and other experimental materials for research trials as and when required. The animals were also made available for conducting different UG practical classes.

FODDER PRODUCTION UNIT:

The total available land area with farm is approximately 115 ha, 60 hac. of which is developed into plots and is cultivable.

During this year , 57.5 hac. of cultivated land was put under fodder cultivation during Kharif and 49.4 hac during Rabi season. Major fodder crops grown were maize (African Tall & Local varieties) and hybrid sorghum during Kharif season and oats (Kent & PLP-1), Gobi- Sarson, cowpea and barseem etc during Rabi season. The sowing is so adjusted as to get supply of green fodder over longer duration. Most of the fodder crops were raised under rain fed conditions due to limited irrigation facilities. The remaining unsown area was utilized as grasslands for grazing and harvesting local grasses both for feeding as green and as hay after drying.

The fodder production / hac. during Kharif (97.95 qt/ hac) was comparable to previous year (93.76 qts/hac.) but lower (49.19 qt/hac) during the Rabi season as compared to previous year (63.9 qt/hac) due to failure of winter rains. The total green fodder availability from different sources (11727 qtls) was however higher this year than preceding year (10100 qtls). Lesser land could be put under cultivation during both the seasons as some of the area was put under the perennial grasses cultivation.

The crop losses due to damage by stray animals also resulted in lower fodder production.

Income generation by farm section:

A sum of Rs 1,40,317 (18.7 % higher than the previous year) was realized on account of sale of FYM, auction of the unserviceable store articles, private journey and compensation charges etc. (Table 9) during this year

DAIRY SECTION

This section deals with maintenance of a dairy herd comprising of Jersey and RS X Jersey cross-bred cows including production, handling ,disposal and sale of milk and milk products. Few animals of other species like horses, goats etc. are also kept for teaching.

Herd strength and herd structure:

The initial herd strength was 231animals. A total of 87 (34 M +53 F) live births occurred during the year and 70 animals got disposed out of herd either on account of mortality (52 animals) or transfer to other deptts. for experimental work (7 animals) and to Gosadan (11 animals). The herd strength increased to 248 animals by the year end.

Conception Rate:

The % conception to AI through DFS reflects the herd reproductive efficiency. The overall conception rates averaged 45.32%, 64.74% and 72.66% for 1st, 2nd and 3rd insemination respectively. The results showed some improvement in %CR in Jersey cows both for first and three consecutive inseminations but the %CR deteriorated in crossbred cows with only 68.18 % conception over three inseminations. The %CR were poorer in crossbred cows than purebred Jersey cows both for first and repeated inseminations.

Herd strength during July 2005 to June 2006

PARTICULARS	JERSEY		CROSS		H.F.		T OTAL		G. TOTAL
	M	F	M	F	M	F	M	F	
Opening balance	4	69	10	135	1	12	15	216	231
Births during year	10	20	21	30	3	3	34	53	87
Total	**14**	**89**	**31**	**165**	**4**	**15**	**49**	**269**	**318**
Disposal									
Mortality	7	8	15	20	1	1	23	29	52
Transfer	2	2	5	8	-	1	7	11	18
Total	**9**	**10**	**20**	**28**	**1**	**2**	**30**	**40**	**70**
Closing balance	**5**	**79**	**11**	**137**	**3**	**13**	**19**	**229**	**248**

% Conception rates (% CR) to A.I. in different genetic groups.

Order of Insemination	Jersey	Red-Sindhi X Jersey	H F	Overall
First inseminatio	48.88	40.90	83.33	45.32
Second insemination	73.33	57.95	100.00	64.74
Third insemination	77.77	68.18	———	72.66
Up to three inseminations	**77.77**	**68.18**	**100.00**	**72.66**

Performance of dairy herd for economic traits:

The mean performance of dairy herd for various reproductive and milk production traits reflects the extent of genetic improvement obtained in these traits as a result of selection and adaptation along with effect of optimum management over a period of time.

Performance for reproductive traits

The performance for most production/ reproduction traits was comparable in Jersey and crossbred cows. There was significant improvement in AFC over the previous year (1360 and 1386 days) and the mean age at first calving lowered to about 41.5 months in Jersey and 39.6 months in crossbred heifers due to better management of calves and growing heifers .

Mean performance of Jersey and RS x Jersey cows for reproductive traits.

Traits	Jersey	Jx RS Crossbreds
Calving interval (days)	483.50 (20)	480.30 (39)
Service period (days)	203.75 (20)	201.53 (39)
Lactation length (days)	412.05 (20)	392.71 (39)
Gestation period (days)	279.75 (20)	278.76 (39)
Dry period (days)	76.45 (20)	90.74 (39)
Age at first calving (days)	1241.90 (11)	1187.57 (14)

ii)**Performance for milk production traits**

No specific trend was observed in milk yield across the lactations (Table: 7) due to few observations in several sub-groups. The overall lactation milk yield was higher in crossbred cows (2811.6 lt) than Jersey cows (2775.3 lt.). The crossbred cows yielded less milk during early lactations (up to 3rd) and peaked around 4th lactation. Few high yielding crossbred cows had to be retained for longer period (11th lactation) because of their better milk production potential. The proportion of the HF cows in milk declined over the years affecting the total herd milk production.

Lactation wise milk production (Lit.) of Jersey and RS x Jersey cows.

Lactation order	Jersey	Cross
1st Lactation	2709.8 (9)	2464.0 (7)
2nd Lactation	1741.9(2)	2427.1 (8)
3rd Lactation	2081.9 (2)	2580.7 (7)
4th Lactation	2925.3 (1)	3747.3 (6)
5th Lactation	3245.4 (4)	2978.3 (1)
6th Lactation	3215.2 (3)	3106.8 (1)
7th Lactation	— -	3844.6 (1)
8th Lactation	--------	2746.7 (3)
9th lactation	----------	2688.2 (1)
10thlactation	----------	2983.5 (2)
11th lactation	----------	2806.4 (2)
Over all	2775.3 (20)	2811.6 (39)

Herd Performance:

The total milk production was 2, 54,493.95 lit. with wet and herd averages were 7.04 and 5.36 lit /cow/day during this period .The wet and herd averages varied among the months due to differential availability of green fodder and herbages. The best averages were recorded during Feb. to May, 06. Aprox. 76 % of the total cows were retained in milk production during the year (66.92 to 83.61%) because of better lactation and reproductive management.

Milk Utilization:

Out of 254493.9 lit. milk produced during the period, the major portion (2,23,865 lits; 88%) was sold as fluid milk to consumers (university employees, students and local residents). The after sale surplus milk (8047 lit) was converted in to paneer. The remaining milk was used for calf-feeding either as whole or separated milk.

EXTENSION EDUCATION ACTIVITTIES

The faculty /scientists of livestock farm remained actively involved in various extension education related activities during the year. The faculty delivered 7 lectures and conducted 19 practical demonstrations to the trainees of different training programs organised by university for farmers, farm-women, unemployed youth etc. on dairying, poultry husbandry and related fields. Besides, on-farm demon

Productivity status of dairy herd during the year 2005-06.

Month	Av. cows in milk	Av. total cows	Total Milk production	Wet Av.	Herd Av.	% of cows in milk
July,2005	101	132	22059.7	7.03	5.4	76.52
Aug.2005	104	134	21823.9	6.76	5.3	77.61
Sept. 2005	107	136	21569.1	6.70	5.3	78.68
Oct. 2005	100	134	20319.6	6.60	4.9	74.63
Nov.2005	99	133	18928.7	6.40	4.7	74.44
Dec.2005	97	132	2 0112.0	6.70	4.9	73.48
Jan. 2006	87	130	19035.9	7.00	4.7	66.92
Feb.2006	87	128	17386.1	7.10	4.8	67.97
Mar.2006	98	129	23817.0	7.80	5.9	75.97
Apr.2006	104	130	24221.2	7.70	6.2	80.00
May2006	102	122	24401.8	7.70	6.4	83.61
June2006	99	123	20818.9	7.00	5.6	80.49
Overall	**99**	**130**	**254493.9**	**7.04**	**5.36**	**76.15**

stration of improved dairy husbandry practices were given to approx. 30 visitor-groups from different districts comprising of farmers, trainees and others (950 people) sponsored under ATMA, DRDA and NATP etc. The scientists also contributed towards the smooth conduct of visit of dignitaries, farmer's visits during Kisan Mela .

Extension publications:

1. Pradeep Dogra , Yash Pal Thakur and Sanjeet Katoch (2005). Garmiaon mein Dudharu pasuoan ki dhekbhal. Giriraj Saptahik, 27 (30): 5 & 11.
2. Dogra P.K. and Thakur Y.P (2005) **.** Dudharu pashpalan ke takniki avem arthik pahlooan ka avlokan. Paravatiya Khetibari 25 (3) : 24-27 .

Conference/ Symposium / Workshop/ Trainings attended by faculty:

1. Dr. Y. P. Thakur, Associate Professor / Scientist Incharge, attended the brain storming session on " Conservation and improvement of Animal Genetic Resources of Himachal Pradesh" organised jointly by Deptt of Animal Husbandry , HP and NBAGR, Karnal at Shimla on April 28, 2006.
2. Dr. Y. P. Thakur, Associate Professor / Scientist Incharge, participated in the National Training Programme on "Molecular and Quantitative Genetic Techniques for Livestock improvement" held at Centre for Advanced studies in Animal Genetics and Breeding, DCB Division, National Dairy Research Institute, Karnal, Haryana from Jan. 3 to Jan. 23, 2006.

RESEARCH PUBLICATIONS

1. Thakur, Y.P. and Singh, B.P. (2005). Factors affecting first lactation milk yield traits in Jersey cows. Indian J Animal Research, 39 (2): 115-118.
2. Thakur Y.P. Madhumeet Singh and Sandeep Jasial (2005). Semen Production and freezability attributes of Chegu Pashmina bucks. Indian J. Anim. Sci., 75 :165-67.
3. Thakur, Y.P., Singh, B.P. and Singh P. K. (2005): Effect of non –genetic factors on milk production parameters of Jersey cows maintained under sub-temperate Indian conditions. Indian Vet. Med. Journal , 29 (1) : 113-116.
4. Sharma, K B , Kumar R and Thakur Y P (2005). Haematological profile of Chegu goats. Indian Journal of Animal Physiology, 1(1) : 31-32.
5. Thakur Y P, Katoch S and Dogra P K (2005). Production system and demographic statusof Chegu goats in

their breeding tract in Himachal Pradesh. Indian Journal of Small Ruminants: 1(2):.116-120.

Monographs/ book chapters published/ submitted:

1. "Chegu: A pashmina goat of Himalayas" by RAK Agarwal, Y P Thakur, NK Verma, SP Dixit, D Kumar, R Sharma and SPS Ahlawat. Monograph No. 11, 2005 published by National Bureau of Animal Genetic Resources (ICAR) , Karnal.
2. "Sheep Genetic Resources of India : Rrampurbushair" by Sanjeet Katoch, K Gupta, Y P Thakur, Anand Jain, P K Singh, Gurmej Singh and SPS Ahlawat. Monograph (2006) published by NBAGR (ICAR) , Karnal.

Papers submitted/ presented in Conferences / symposium etc. :

1. Thakur Y P, Katoch S, Gupta K and Dogra,PK(2006).Morphological characteristics and growth potential of the Chegu Mountain goats" of Western Himalayas under the Farmer's flock condition. Paper accepted for presentation in the National symposium on " Conservation and improvement of Animal Genetic Resources under low input system : Challenges and Strategies" organised by the Society For Conservation of the Domestic Animal Biodiversity, NBAGR, Karnal on Feb. 9-10, 2006 at Karnal.
2. Katoch S, Gupta K, Dogra P K, Thakur Y P, Kailla O P and Jain A K (2006). Morphological Characterization of Rampur – Bushair sheep in its home tract. Paper accepted for presentation in the National symposium on "Conservation and improvement of Animal Genetic Resources under low input system: Challenges and Strategies" organised by the Society for Conservation of the Domestic Animal Biodiversity, NBAGR, Karnal on Feb. 9-10, 2006 at Karnal.

VETERINARY CLINICAL TEACHING COMPLEX

Teaching Veterinary Clinical Complex:

The clinic of the college is a nodal referral hospital of the state for the treatment of obscure, obstinate and undiagnosed ailing animals and an important service point of the institution for the farmers in particular. It is also a platform for imparting practical knowledge for U.G. and P.G. students in the fields of Medicine, Surgery, Gynecology, Epidemiology, Pathology, Microbiology, Parasitology and Clinical Biochemistry. A total of 0+8 credit hours are offered for U.G. teaching and 0+16 credit hour is offered by various departments for teaching their courses along with compulsory internship programme.

S.No.	Title	Number
1	New cases treated in clinic during July 05 to July 2006	3958
2	Old repeat case treating in clinic	2228
3	Total case i.e Surgery, Medicine and Gynae	6186
4	Total Lab. samples done during July 05 to 06	588
5	Total clinical Camp were held during the year	22
6	Case treated in clinical camp during the year	1140
7	Surgery	127
8	Medicine	541
9	Gynae	472
10	Emergency case treated in clinic during the year	53
11	Income through Registration Charges	Rs. 4730
12	Users charges during the year	Rs. 17530
13	Service and consolation charges	Rs. 5600
14	Lifting of dead animal charges during the year	Rs. 2161-
15	Total Income	Rs. 30021-

DEPARTMENT OF VETERINARY PUBLIC HEALTH

TEACHING:

Courses were taught to B.V.Sc. A.H. students during academic In addition to the courses, the staff member of this department were also engaged in imparting training to interns under compulsory rotational 6 months Internship programme.

RESEARCH ACTIVITIES

Investigation work is going on for the bacteriological testing of water samples from different sources in and around Palampur. In all 46 water samples were analyzed, viz. tap(37), hand pump(2) and surface water(Khud/Kuhl/Bowri-7), filter (UV-4), mineral water one and spring water one. The coliform count more than acceptable limit was found in 26 samples of tap water(10 to

> 2400), 4 samples of surface water(11 to > 2400) , 3 samples of Bowri water (10 to > 2400), 1 sample of hand pump water(10 to > 2400) .All the samples of filter water, spring water and mineral water showed coliform count <3. *Escherichia coli* was absent in water samples of UV filter, 1 sample of hand pump and 12 samples of tap water. Three samples of tap water, one sample of Tap water, one sample of Bowri water and one sample of surface water revealed the presence of *Balantidium coli* trophozoites.

Forty seven air samples were collected from different locations in and around Palampur by standard settle plate method by opening the nutrient agar plates for ½ to 1 h and the plates were incubated at 37ºC for 24 -48 hours. The colonies were counted under the digital colony counter and the numbers of colony forming units (c.f.u) are noted per plate. Randomly colonies were selected from plates and stained by standard Gram staining method to ascertain the identity of the colonies whether positive or negative and their shapes. Out of 19 samples examined from outdoor public places 4 samples revealed microbes more than common level i.e. 5 to 100 c.f.u/ft3. Contrary to this only one sample showed microbes more than common level in indoor environment.

Twenty one blood samples were tested for the presence of brucellosis in Animal Handlers/Doctors using RBPT Antigen.

Thirty soil samples and 26 vegetable samples were screened for the presence of coliforms.

Sixty six meat samples (Poultry 31, Chevon/mutton 27, cooked meat 8 and wood washings 6) were tested for its microbial quality and contamination. A few samples showed the contamination of fecal coliforms which are harmful for human health.

Forty three samples of milk (Raw 24, pasteurized 12, Boiled 5, Ice cream 1 and flavoured milk 1) were processed for microbial quality. Both the ice cream and flavored milk did not confirm the pasteurization standards. Only 5 samples of raw milk were found to contain bacteria more than the acceptable level.

EXTENSION ACTIVITIES

16 Lectures were delivered by the staff members during the Training Programs organised by the Director of extension Education CSK HPKV to the visiting group of farmers.

Faculty members/ employees who had visited abroad (with date and purpose).

DEPARTMENT	NAME	DATE	PLACE	PURPOSE
Dean	Dr. R.C.Katoch	March 14 to 17, 20006.	University of Agriculture, Faislabad. Pakistan	International symposia on "Agriculture in 21st century, strategy & issue".
Veterinary & AH Extension	Dr. Shivani Katoch, Lahore Pakistan	September 21-23, 2005	Lahore Pakistan	To attended 14th Asian Commonwealth Veterinary Associations Conference
Veterinary & AH Extension	Dr. Shivani Katoch,	23-25 September, 2005	University of Agriculture, Faislabad. Pakistan	Part of the delegation led by the Hon'ble Vice Chancellor of CSK HPKV
Veterinary Pathology	Dr. R.K. Asrani,	September 21-23, 2005	Lahore Pakistan	To attended 14th Asian Commonwealth Veterinary Associations Conference
Veterinary Pathology	Dr. R.K. Asrani,	23-25 September, 2005	University of Agriculture, Faislabad. Pakistan	Part of the delegation led by the Hon'ble Vice Chancellor of CSK HPKV
Veterinary Pathology	Sidharath Deshmukh Subhash Sharma MVSc students	22-26 August 2006	Istanbul, Turkey	14th World Veterinary Poultry Congress
Department of Veterinary Microbiology	Dr. Mandeep Sharma	22nd Nov- 14th Dec 2005	Israel	Attended International workshop on Veterinary Public Health organized by MASHAV-Ministry of Foreign Affairs, and CINADCO, Govt. of Israel
Department of Veterinary Microbiology	Dr. Mandeep Sharma	Sept 21-23, 2005	Lahore Pakistan	To attended 14th Asian Commonwealth Veterinary Associations Conference
Department of Veterinary Microbiology	Dr. Mandeep Sharma	23-25 Sept, 2005	University of Agriculture, Faislabad. Pakistan	Part of the delegation led by the Hon'ble Vice Chancellor of CSK HPKV
Department of Fisheries	Dr. J.R.Dhanze	March 14 to 17, 20006.	University of Agriculture, Faislabad. Pakistan	International symposia on "Agriculture in 21st century, strategy & issue".
Department of Animal Nutrition	Dr. V.K.Sharma	26-29 August, 2005	Beijing, China	To attend 2nd International Sea buckthorn Association Conference
Department of Veterinary Surgery & Radiology	Dr. A.C.Varshney	Sept 21-23, 2005	Lahore Pakistan	To attended 14th Asian Commonwealth Veterinary Associations Conference
Department of Veterinary Surgery & Radiology	Dr. A.C.Varshney	23-25 Sept, 2005	Faislabad. Pakistan	Part of the delegation led by the Hon'ble Vice Chancellor of CSK HPKV

Faculty members/ employees who had visited abroad (with date and purpose).

DEPARTMENT	NAME	DATE	PLACE	PURPOSE
Department of Veterinary Surgery & Radiology	Dr. A.C.Varshney	26-29 Aug, 2005	Beijing, China	To attend 2nd International Sea buckthorn Association Conference
Department of Veterinary Surgery & Radiology	Dr. S.P.Tyagi	26-29 Aug, 2005	Beijing, China	To attend 2nd International Sea buckthorn Association Conference
Department of Veterinary Surgery & Radiology	Dr. M.S.Kanwar	9-11 May, 2006	Qassim, Saudi Arabia	To attend 2nd International Scientific conference on camel
Department of Veterinary	Dr. R.S.Kishtwaria	9-11 May, 2006	Qassim, Saudi Arabia	To attend 2nd International Scientific conference on camel

Name of VIP (with date and purpose)

Date	Dignitary	Designation	Purpose
22-6-06	Dr. T.R.Dhiman	Consultant (South East Asia) American Soyabean Association & Associate Professor, Utah University USA.	To attend Seminar for dairy farmers organized by American Soyabean Association.
20-06-2006	Mrs. Hitesh Kumar Lodhi	Ex-Minister UP & Member ICAR- N-Delhi	Personal visit to the college
10-06-2006	Dr. S.S.Khera,	Ex Dean, COVAS, CSK HPKV	Personal visit to the college
10-1- 2006	SH. V.S.Kokaje	H.E, The Governor of Himachal Pradesh.	Official visit to the College.
5-10-05	Sh. B.D.Sharma	Director cum chief warden Fisheries HP	Official visit to the Department of Fisheries on concuding of the winter school
26-9-05	Dr. Madan Mohan	Director, NRCCF (ICAR) Bheemtal (Uttranchal)	Official visit to the Department of Fisheries inauguration of the winter school
16-7-2005	Agriculture Minister	Hon'ble Minister of Agriculture (Arunachal Pradesh)	Official visit to the College.

HE The Governor of HP Sh. V.S.Kokje visiting the college

AH Minister of Arunachal Pradesh in consultation with the Dean of the college prof. R.C.Katoch

Delegation of Veterinary scientists of the college led by the Vice Chancellor of CSK HPKV in UVAS Lahore, Pakistan

Faculty members/employees who had brought honor to the University in the form of awards and honors.

DEPARTMENT	FACULTY MEMBER	AWARD
Veterinary Pathology	Dr. V. K. Gupta,	Designated as Director of the Independent Study Centre by CL Davis DVM Foundation. Gurnee, Illinois, USA.
Veterinary Public Health	Dr. A.K. Panda	Fellow of Indian Association of Veterinary Public Health Specialists
Veterinary Microbiology	Dr. Mandeep Sharma	Fellow of National Academy of Veterinary Sciences
Veterinary Surgery & Radiology	Prof. S.K. Sharma	Fellow of Indian Society for Veterinary Surgery- 2005
Veterinary Surgery & Radiology	Prof. M.S.Kanwar	Fellow of Indian Society for Veterinary Surgery- 2005
Veterinary Surgery & Radiology	Prof. M.S.Kanwar	Fellow of National Academy of Veterinary Sciences
Veterinary Surgery & Radiology	Prof. M.S.Kanwar	Vijay Rattan Award- 2005
Veterinary Surgery & Radiology	Dr. S.P.Tyagi, S.K. Sharma & Dr. A.C. Varshney	Best paper Award by ISVS in 27th congress held at IVRI Izaatnagar w.e.f. 9-11 Nov. 2005.
Veterinary Surgery & Radiology	Dr. Adarsh Kumar, S.P.Tyagi, S.K. Sharma, M.S.Kanwar & Dr. A.C. Varshney	Special Award by ISVS in 27th congress held at IVRI Izaatnagar w.e.f. 9-11 Nov. 2005.
Veterinary Gynaecology Obstetrics	Dr. M.M.Singh	Best Veterinarian Award Himachal Kesari by Hon'ble Chief Minister of HP
Department of Veterinary Medicine	Dr. Des Raj	D.C.Blood National Gold Medal- 2005 by ISVM at Bangalore on 22-2-06
Dean	Prof. R.C.Katoch	Fellow of National Academy of Veterinary Sciences
Dean	Prof. R.C.Katoch	Fellow of Indian Association for the Advancement of Veterinary Research

ANNEXURE-I

COURSES OFFERED TO UNDER GRADUATE CLASSES DURING THE YEAR 2005-06

1st Professional B.V.Sc &AH (First Semester)

Sr No.	Course No.	Course Title	Cr. Hr.	Name of the Teacher
1.	VAN-111	Gross Anatomy-I	2+2	Dr. Rajesh Rajput Dr. R.L.Bhardwaj Dr. Virender Pathak
2.	VPY-111	Vety. Physiology-I	2+1	Dr. R. Kumar Dr. K.B. Sharma
3.	VBC-111	Genl. Vety. Biochestry	2+1	Dr. K.K.Dogra Dr. Naresh Kumar
4.	AGB-111	Biostatistics & computer Application	2+1	Dr. O.P. Kaila Dr. S. Katoch
5.	LPM-111	Genl. Livestock Mangt.	1+1	Dr. P.K. Dogra
6.	LPM-112	Fodder Prod. & Grassland Mangt.	1+1	Dr. Naveen
7.	AHE-111	Sociology & Principles of Vety. & A.H.Extension	1+1	Dr. Shivani Katoch Dr. Anoop Katoch
8.	NCC/NSS*	(NSS for girls only)	0+2	Maj. Dr. Ashok Sharma *Dr. Shivani Katoch

2nd Semester

1.	VAN-121	Gross Anatomy-II	2+1	Dr. L.S. Sudhakar Dr. Rajesh Rajput
2.	VAN-122	Gross Anatomy-III	1+1	Dr. Virender Pathak Dr. R.L. Bhardwaj
3.	VPY-121	Vety. Physiology-II	2+1	Dr. K.B. Sharma Dr. R. Kumar
4.	VBC-121	Physiological. chemistry	2+1	Dr. K.K.Dogra Dr. Naresh Kumar
5.	VBC-122	Intro-molecular. Biology &Biotechnology	1+1	Dr. Naresh Kumar Dr. K.K.Dogra
6.	AGB-121	Principle of Genetics & Population genetics.	2+1	Dr. O.P. Kaila Dr. S. Katoch Dr. K.Gupta
7.	LPM-121	Animal Housing and Sanitation	1+1	Dr. P.K.Dogra
8.	AHE-121	Livestock Eco.Markt. & Business Management	2+1	Dr. Shivani Katoch Dr. Ashok Kumar.

9.	NCC/NSS*	(NSS for girls only)	0+2	Dr. Ashok Sharma * Dr. Shivani Katoch

2nd professional B.V.Sc &AH (Ist Semester)

1.	VAN-211	Histology Embryology	2+2	Dr. L.S.Sudhakar
2.	VPY-211	Vet Physiology-III	2+1	Dr. K.B. Sharma Dr. R. Kumar
3.	ANN-211	Principle of Ani.Nutrition (Including Avian)Dr. Desy Rani	2+1	Dr. V.K.Sharma
4.	ANN-212	Evaluation of Feed Stuff & feed technology.	1+1	Dr. Arun Sharma Dr. K.S. Sharma
5.	VPA-211	Genl.Vety. Parsitology	1+1	Dr. R.K.Agnihotri Dr. S. Mittra
6.	VMC-211	Genl. Vety. Microbiology.	2+1	Dr. P. Dhar Dr. Mandeep Sharma
7.	VPP-211	Genl.Vety. Pathology	2+1	Dr.V.K. Gupta Dr. R.K.Asrani
8.	AGB-211	Principal of Ani.Breed. (Including Avian)	1+1	Dr. S. Katoch Dr.K. Gupta Dr. O.P.Kaila

2nd Semester

1..	VAN-221	Applied Anatomy	0+2	Dr. R.L. Bhardwaj Dr. Virender Pathak
2.	VPY-221	Vety. Physiology-IV	1+1	Dr. K.B. Sharma Dr. R. Kumar
3.	ANN-221	Applied Nutrition-I (Live stock Feeding)	2+1	Dr. V.K. Sharma Dr. Arun Sharma
4.	ANN-222	Applied Nutrition-II (Human, pet & other Animals)	1+1	Dr. Desy Rani Dr. Arun Sharma Dr. K.S.Sharma
5.	VPA-221	Vety. Helminthology +	2+1	Dr. R.K. Agnihotri Dr. S.Mittra
6.	VMC-221	Immunology & Serology.	2+1	Dr.Vipan Chander Dr. Mandeep Sharma
7.	VPP-221	Systemic Pathology	2+1	Dr. R.K.Asrani Dr. V.K.Gupta Dr.S.P.Singh
7.	AGB-221	Livestock Breeding. System	1+1	Dr. K.Gupta Dr. S. Katoch

3rd professional B.V.Sc &AH (Ist. Semester)

1.	VPT-311	Gen.& CNS Pharmacology	2+1	Dr. C. Varshney Dr. R.S. Telang
2	VPA-311	Entomology and Acarology	1+1	Dr. S. Mittra Dr.R.K. Agnihotri
3.	VMC-311	Vety. Bact.& Mycology	2+1	Dr. Mandeep Sharma & Dr. P.Dhar Dr. Vipan Katoch
4.	VPP-311	Special Pathology-I	2+1	Dr. R.K.Asrani Dr.S.P.Singh
5.	VPH-311	Milk Hygiene & Public Health	1+1	Dr.A.K.Panda
6.	LPM-311	Swine/Equine/Camel/Yak Prod. & Management	1+1	Dr. (Mrs.) Saroj Bala & Dr. C.L. Marwaha
7.	LPM-312	Wild & Zoo Animal Health Care & Management/Fish Production	1+1	Dr. M.S. Kanwar Dr. J.R.Dhanze Dr. C.L.Marwaha Dr. R.K.Asrani Dr. R.S. Kistwaria Dr. R.K. Agnihotri Dr. Sanjeet Katoch Dr. V.K. Sharma Dr.M.M. Singh
8.	LPM-313	Lab. Animal/rabbit/Fur Care and Management And pet Animal care	1+1	Dr. P.K.Dogra
9.	LPT-311	Milk and Milk Product Technology	1+1	Dr.Vikas Pathak
10.	Env.-311	An Introduction to Environ-mental Science.	2+0	Dr. G.L.Bansal
11.	NCC/NSS*	(NSS for girls only)	0+2	Dr. Ashok Sharma *Dr. Shivani Katoch

2nd Semester

1.	VPT-321	Autonomic & systemic	2+1	Dr. R.S. Telang Dr. M.S. Dardi
2.	VPA-321	Vety. Protozoology	2+1	Dr. S. Mittra Dr. R.K. Agnihotri
3.	VMC-321	Genl. & Systemic Virology	2+1	Dr. P. Dhar Dr. Mandeep Sharma
4.	VPP-321	Special Pathology-II	2+1	Dr. V.K.Gupta Dr. R.K.Asrani Dr.S.P.Singh

5.	VPH-321	Meat Hygiene and Public Health Dr. S.K.Khurana	1+1	Dr. A.K. Panda &
6.	LPM-321	Sheep/Goat Production And Management	1+1	Dr. Saroj Bala & Dr. C.L. Marwaha
7.	LPM-322	Avian Production and. Management	2+1	Dr. Saroj Bala Dr. Y.P.Thakur
8.	LPT-321	Abattoir Practice & Animal By-Product Tech.	1+1	Dr. Vikas Pathak
9.	NCC/NSS*	(NSS for girls only)	0+2	Dr. Ashok Sharma * Dr. Shivani Katoch

4th Professional B.V.Sc & AH(1st Semester)

1.	VBC-411	Clinical Bio-Chemistry	1+1	Dr. Naresh Kumar Dr. K.K.Dogra
2,	VPT-411	Chemotherapy	2+1	Dr. M.S. Dardi & Dr. C. Varshney
3.	VPH-411	Zoon sis and Human Health	1+1	Dr.S.K.Khurana
4.	VPH-412	Zoon sis and Human Health	1+1	Dr.S.K.Khurana
5.	LPM-411	Cattle and Buffalo production And management	1+1	Dr. C.L. Marwaha Dr.(Mrs.)Saroj Bala
6.	VSR-411	Genl.Surgery and Anaesthology	2+1	Dr.Adarsh Kumar Dr. S.K. Sharma Dr. A.C.Varshneya
7.	LPT-411	Meat and Meat Prod. Tech.	1+1	Dr. Vikas Pathak
8.	VEP-411	Vety. Epidemiology	1+1	Dr. K.B. Nagal
9.	AHE-411	Extn.Tech. In Vety. Practice & Livestock Prod.	1+1	Dr. Shivani Katoch Dr. J. S. Thakur
10.	NCC/NSS*	(NSS for girls only)	0+2	Dr. Ashok Sharma * Dr. Shivani Katoch

2nd semester

1.	VPT-421	Toxicology	2+1	Dr. C.Varshneya Dr M.S. Dardi
2.	VOG-421	Gynecology and obst.	2+0	Dr.N.K.Vashistha Dr. M.M. Singh Dr. Pankaj Sood
3.	VOG-422	Gynecology and obst. Clinics-I	0+2	Dr. Pankaj Sood Dr. M.M. Singh Dr.N.K.Vashistha

4	VSR-421	Regional & Clinical Surgery-I	2+0	Dr.Adarsh Kumar Dr. S.K. Sharma Dr. S.P.Tyagi Dr. M .S. Kanwar Dr. A.C.Varshney
5.	VSR-422	Regional & Clinical Surgery-I Clinics	2+0	Dr.Adarsh Kumar Dr. S.K. Sharma Dr. S.P.Tyagi Dr. M .S. Kanwar Dr. A.C.Varshney
6.	VCM-421	Clinical Vety. Medicine-I (Genl. Systemic)	2+0	Dr. Des Raj Dr. B. Pal
7.	VCM-422	Clinical Vety. Medicine-I (Genl. Systemic)	0+2	Dr. R.K. Mandial Dr. B. Pal
8..	VEP-421	Vety. Epidemiology & Prev. Medicine (Bect.Viral & Fungal Diseases)	2+0	Dr. K.B.Nagal
9.	VEP-422	Vety. Epidemiology & Prev. Medicine (Health Survey Surveillance Health tests Vaccination etc.)	0+2	Dr. K.B.Nagal
10.	VAC-421	Ambulatory Clinics-I	0+2	Dr.R. K. Mandial(I/C) Dr. S.P. Tyagi/ Dr.Adarsh Kumar Dr. Pankaj Sood
11.	VLD-421	Vety. Lab Diagnosis-I	0+1	Dr. R.K.Agnihotri Dr. R.K.Asrani Dr. Naresh Kumar Dr.P.Dhar

5th Professional B.V.Sc &AH programme (Ist semester)

1.	VOG-511	Andrology and Artificial Insemination	2+0	Dr. M.M. Singh Dr. Pankaj Sood Dr. N.K. Vashistha
2.	VOG-512	Andrology and Artificial in semination(Practice)	0+2	Dr. M.M. Singh Dr. Pankaj Sood Dr. N.K. Vashistha
3.	VSR-511	Regional Clinical Surgery-II And Lameness	2+0	Dr. S.P.Tyagi Dr. S.K. Sharma Dr darsh Kumar
4.	VSR-512	Regional Clinical Surgery-II And Lameness	0+2	Dr. S.P.Tyagi Dr. S.K. Sharma Dr.Adarsh
5.	VCM-511	Clinical Vety. Medicine-II	2+0	Dr. R.K.Mandial Dr. B. Pal

6.	VCM-512	Clinical Vety. Medicine-II (Clinics)	0+2	Dr. Des. Raj Dr. B. Pal
7.	VCM-513	Vety. Ethics & Jurisprudence	1+0	Dr. Des. Raj Dr.R.K. Mandial
8.	VEP-511	Vety. Epidemiology & Prev. Medicine I	2+0	Dr. R.K.Agnihotri Dr. S.Mitra Dr. K.B.Nagal
9.	VEP-512	Vety. Epidemiology & Prev. Medicine (Health Survey Surveillance Health tests Vaccination etc.)	0+2	Dr. K.B.Nagal
10.	VAC-511	Vety. Ambulatory Clinics-II	0+2	Dr. S.K.Sharma,(I/C) Dr. M.S. Kanwar Dr.M.M. Singh Dr.B.Pal
11.	VLD-511	Vety. Lab. Diagnosis-II	0+2	Dr. S.Mittra Dr. R.K.Asrani Dr.Naresh Dr. P.Dhar

2nd semester

Compulsory Internship Programme — Dr. R.S. Kistwaria

Courses Offered to COA, COBS and COHS CSKHPKV, Palampur.

1.	AMT-551	Live stock Prod.& Management	2+1	Dr. C.L.Marwaha Dr. K. Gupta Dr. J.S. Chauhan Dr. S. Radotra
2.	AMT-231	Live stock Prod.& Management	2+1	Dr. C.L.Marwaha Dr. K. Gupta Dr. J.S. Chauhan Dr. S. Radotra
3.	AMT-232	Poultry	0+1	Dr.(Mrs.) Saroj Bala
4.	AMT-124	Animal Dairy Science	1+1	Dr. C.L.Marwaha Dr. K. Gupta
5.	AMT-233	Fisheries	0+1	Dr.(Mrs)Rani Dhanze

ANNEXURE-II

DOWN THE MEMORY LANE

1986	College established with 6 composite Departments	
1987	Duration of B.V.Sc and AH program enhanced from 4.5 years to 5 years	
1988	The construction of main building of teaching complex was undertaken	
	Clinical complex fitted with Large animal X-ray machine and equipped with modern disease diagnostic facilities	
1992	A common entrance test for admission to B.V.Sc and AH was introduced	

1992	Main Block of the college building was constructed	
	Minimum standards of education as per the Veterinary Council of India Act 1984. was introduced and the college switched over to annual system of external examination from internal semester system.	
	College reading room established	
	M.V.Sc program started in Department of Veterinary Anatomy, Physiology, Microbiology, Medicine and Surgery	
1993	National referral laboratory for the diagnosis of Chlamydia was established	

1993	NSS unit started functioning and first Vet-fair was celebrated.	
1993	As per the regulations of VCI, new Departments were created. With this the college has now a total of 18 departments and 2 service units	
1998	Alumni of the passed out graduates was formed and registered as an official body	
2002	Ph.D program continuing in the subject of Animal Nutrition, Animal Breeding and was further started in the discipline of Veterinary Surgery and Radiology and veterinary Anatomy and Histology	
	Ultra sound machine was procured and installed in the college clinics	

2003 	Endoscope and Laparoscope was procured and installed in the college clinics
	Complete Feed Bock making machine was procured and installed in the Metabolic stall of Department of Animal Nutrition.
2003	The college was connected with EPBAX and Internet
2004	Web site of the college was prepared and launched. Ph.D program started in the discipline of Veterinary Microbiology and Veterinary Clinical Medicine College gets accreditation from Indian Council of Agricultural Research New Delhi
2005	Construction of the Block-II of the College completed The college renamed as Dr. G.C. Negi College of Veterinary & Animal Sciences, CSK HPKV, Palampur. M.V.Sc program started in Veterinary Public Health Construction of the Phase-II of the Girls Hostel started

Enrollment and out turn of undergraduate students from 1986-87

ANNEXURE-III

Year	Enrollment	Total No. of Students passed out
1986-87	27	-
1987-88	21	-
1988-89	24	-
1989-90	30	-
1990-91	29+ 6Migrated from J&K	20
1991-92	23	22
1992-93	28	17
1993-94	30	22
1994-95	32+1 Migrated from Guwahati	32
1995-96	31+6 Admitted through court	17

Year	Enrollment	Total No. of Students passed out
1996-97	30	25
1997-98	37	26
1998-99	46	11
1999-2000	38	20
2000-2001	48	19
2001-2002	45	17
2002-03	50	20
2003-04	37	30
2004-05	39	21
2005-06	37	40
2006-07	37	35

ANNEXURE-IV

Enrollment and out turn of Post graduate students from 1986-87

Year	Enrollment		Total No. of students passed out	
	M.V.Sc.	Ph.D.	M.V.Sc.	Ph.D.
1986	2	2	-	-
1987	1	-	-	-
1988	1	1	2	-
1989	2	2	1	2
1990	3	1	1	-
1991	-	-	2	2
1992	12	1	-	1
1993	9	-	4	-
1994	9	-	4	-
1995	11	-	4	1

Enrollment and out turn of Post graduate students from 1986-87

1996	12	-	6	1
1997	12	1	7	1
1998	15	2	10	-
1999	14	-	11	-
2000	16	-	3	-
2001	22	-	-	-
2002	8	3	13	2
2003	13	2	22	-
2004	15	0	3	-