THE COLLEGE:

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.

The College imparts instructions to undergraduate students for four and half years plus six months of rotational compulsory internship programme leading to the degree of Bachelor of Veterinary & Animal Sciences. The first batch passed out in January, 1991. Earlier, the annual intake undergraduate students were 30 including 5 nominees of ICAR. The students are selected on the basis of a common entrance test. The college also offers postgraduate instruction leading to M.V.Sc. in 13 disciplines and Ph. D degree in six disciplines (Animal Breeding, Animal Nutrition and Veterinary Surgery and Radiology, Veterinary Microbiology, Veterinary Medicine Ethics and Jurisprudence and Veterinary Anatomy).

The College, in its existence of 18 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.

First block of the main building of the College was occupied in 1991. Other buildings of the College include: EWperimental 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.

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 from distant 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 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. The 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.

So far, 338 students have acquired BVSc & AH degree and are serving in different parts of the Country. Besides, students have completed their Master's Programme and Doctoral programme from this College. They are duly absorbed in Government Institutions and Universities. During the period under report, the annual intake of the students in BVSc & A. H. is 37 including 5 VCI nominees, besides 5 self sponsored, one each in-service nominee each of HP State Animal Husbandry department and CSKHPKV.

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

ACCREDITATION BOARD

Letter of Accreditation

The *College of Veterinary and Animal Sciences, Palampur,* a constituent college of *Ch. Sarwan Kumar Himachal Pradesh Krishi Vishvavidyalaya, Palampur,* submitted a Self-Study Report to the Indian Council of Agricultural Research, New Delhi, for accreditation, giving details indicating the fulfillment of accreditation criteria. The ICAR sent a Peer Review Team to the University, which visited the College and submitted its report to the Council.

Upon the recommendation of the ICAR Peer Review Team and the Education Division, and being satisfied that the College fulfils the minimum accreditation criteria, the Accreditation Board is pleased to accredit the College for *Five* years from the date of issue of this letter. The University will keep the ICAR informed about any major changes with respect to Administration, Financial Resources and Academic Programs of the College. The University will also submit half yearly updates on progress for implementation of decisions of the Board for further enhancing the relevance and quality of institutional programs.

(J.C. Katyal)
Deputy Director General (Edn.), ICAR
& Vice Chairman, Accreditation Board

(Mangala Rai)
Director General, ICAR
& Chairman, Accreditation Board

Date : August 23, 2004
Place: New Delhi

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.

PROFESSIONAL YEAR	STRENGTH
I- Professional year	40
II- Professional year	39
III- Professional year	42
IV- Professional year	35
V- Professional year	40

- 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.

Result of examination with divisions (2004-05)

PROFESSIONAL YEAR	TOTAL APPEARED	PASS	FAIL	PASS %
I- Professional year	37	34	3	92
II- Professional year	47	40	7	85
III- Professional year	37	35	2	96
IV- Professional year	40	40	0	100
V- Professional year	21	21	0	100

The students of the college excelled in the All India Junior Research Fellowship conducted by the Indian Council of Agricultural Research- New Delhi for the year 2004-2005. Top positions were bagged by the final year students of the college of Veterinary & Animal Sciences, Palampur, who secured admission to Post graduate programs in various institutes of the country along with a monthly fellowship. This time, 19 students qualified the exam and secured positions, a success percentage of 73. 5 students secured top rankings below 50.

Research Activities :

- Disease monitoring data on prevalence of various diseases of different species of livestock and zoo animals as well as poultry in different regions of the state. It will be useful for Disease forecasting and preventive measures to prevent economic losses.
- Molecular characterization of Chlamydophila psittaci and development of non radio active diagnostic probe developed. Now Himachal is the only referral laboratory in India for diagnosis of Chlamydophila psittaci
- Compatible anesthesia developed for Yaks, a native animal found in the high altitude regions of the state. Pioneer work and is a major tool for conservation of yaks which is a totim animal of highlands in HP
- Extensive research on Seabuckthorn (a high altitude wild berry of HP) under taken to see its efficacy in healing of wounds, burns and gastric ulcers in cattle for the first time in world. This has exploited the indigenous technology knowledge and the potential of cultivation of seabuckthorn as medicinal plant thus lifting the socio economic status of the farmers.

- Documented the prevalence of various bacterial and mycotic diseases of fish fauna in Himachal Pradesh. It will be helpful in Diagnosis and combating outbreaks of diseases in fishes.
- Applied most recent Serological and Molecular Biology techniques for speedy and accurate diagnosis of diseases. ELISA, IMIFT, INDIRECT IMMUNO PEROXIDASE, PCR, PCR-RFLP. It will render quick diagnosis and immediate treatment measure recommendation saving huge economic losses to farmers in disease outbreaks.
- A new test to detect Sodium and salt deficiency in cow and buffalo developed. It is useful in optimizing the salt supplementation in livestock improving the reproductive efficiency of cow and buffalo.
- The local herbs were studied for its Pharmacological and Photochemical Characteristics to treat animals for parasitism and stress. It will be helpful in developing new drugs out of the local herbs.
- URO MOL MIN BLOCK developed for feeding to cows. Extensive trials at the farmers level by Directorate of extension education in Nagrota block resulted in increase of milk yield by 1.25 litres/cow/day the milk If popularized by department of Animal Husbandry, has the capacity to increase the milk yield manifold
- Researched, identified and Developed new Probiotic cultures from different indigenous sources as growth promoters in Poultry which increased the growth rates of Broiler by 19% at University level and 23% at farmers level. With the advent of WTO, use of antibiotics in Poultry has been banned and research is being done throughout the world for alternative, and the scientists of the college have successfully isolated and used the Probiotics as alternative to Antibiotics which will increase the income of the poultry farmers.
- Complete and balanced feed blocks from locally available feed resources developed which leads to 20% increase in milk yield.
- Extensive research studies conducted on the carrying capacity of natural grasslands and recommended introduction of new perennial grasses to state department of Forest. It will increases availability of more bio mass for feeding of cattle to the local people which will increase the milk yield by 7-10% and 20-25% increase in net profit
- Nutrient requirement of Angora rabbits for formulating balanced feed researched for the first time in India. Angora rearing is an important farm activity in the state having a very high potential. It will increase the production and profits of the farmers
- Characterization and conservation of Animal genetic resources like Cheegu Goat, Spiti Horse of the state was done.
- Optimization of blends of angora, yak, and sheep wool was done which will result in value addition fetching higher revenue to the farmers for wool, angora and yak hair.
- Technology evolved for Poly culture Fish Model for hills which has the capacity to increase the income of the farmers manifold.

New Addition of the year :

Running in the era of Information Technology, a new milestone was added when the Veterinary Teaching Complex of the college was fully computerized . With this, the clinicians and veterinary scientists of the college can access the information on LAN regarding the cases being treated from any where in the campus. This application software will also be useful in epidemiological studies and will create a comprehensive data base in the days to come and will help the scientists in taking preventive measures to combat the animal diseases effectively.

STAFF PATTERN

After re-organisation and establishment of 18 departments, the faculty of College has 12 Professors, 25 Associate Professors and 18 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 9 Professors, 18 Associate Professors/Scientists, 30 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	5	3	2
Veterinary Physiology	2	0	2
Veterinary Biochemistry	2	0	2
Veterinary Pharmacology and Toxicology	3	1	2
Veterinary Parasitology	3	0	3
Veterinary Microbiology	6	5	1
Veterinary Pathology	3	0	3
Veterinary Public Health	2	0	2
Animal Nutrition	5	2	3
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	2	3
Clinical Veterinary Medicine including Ethics and Jurisprudence	4	0	4
Livestock Products Technology	1	0	1
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	58	16	42

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.

VISITS OF DISTINGUISHED PERSONS

S.NO.	DATE	NAME	ADDRESS
1	2.8.04	Sh. Raj Krishan Gaur	Agriculture Minister, Govt. of HP
2	19.10.04	Dr. Sayyad Aun Mohammad	Gomal College of Veterinary Science, Gomal University, Daira Ismail Khan, Pakistan
3	19.10.04	Dr. Abdul Asim Farooq	Gomal College of Veterinary Science, Gomal University, Daira Ismail Khan, Pakistan
4	24.11.04	Mrs. Bharti S. Sihag	Secretary (Agriculture & Fisheries) Govt. of HP
5	14.12.04	Mr. Yonathom Begene	Director HRD & Training, Ministery of Agriculture, Eritrea
6	14.12.04	Dr. R.K.Sharma	Core Expert, SSC of FAO UN, Ministry of Agriculture, Asmara, Eritrea
7	12.02.2005	Mr. P.C Janartha	Secretary Animal Husbandry
8	2.3.05	Dr. Mrs Pushpa Ratnaparkhe	Retd. Director, Inst. Of A.H & V B P, Mhow. MP
9	16.07.2005	Hon'ble Minister	Agriculture (Arunachal Pradesh)

ACTIVITIES OF THE INDIVIDUAL DEPARTMENTS

1. DEPARTMENT OF VETERINARY PHYSIOLOGY

TEACHING:

The department is involved in teaching courses both to the students at the Under graduate as well as Post graduate level.

RESEARCH :

At present Dr. Madan Singh Verma, is pursuing his PG research and has conducted studies at Pancharukhi and Baijnath blocks of districts Kangra, Himachal Pradedsh to assess the mineral status of dairy cattle, feeds and fodder. Subsequently, the specific mineral supplementation was carried out in a group of animals to record its effect.

Salient findings of the study are as follows :

- Among macro minerals, Cl deficiency was most prevalent in both the blocks with 11% and 13% animals deficient in Cl in Panchrukhi and Baijnath blocks, respectively. Ca deficiency was 10% and 11%, P deficiency was 6% and 9%, Na was 6% and 9% and K was 5% and 4% in Panchrukhi and Baijnath blocks, respectively. Among micro minerals, Cu was most deficient and 48% and 49% animals were observed Cu deficient in Panchrukhi and Baijnath blocks, respectively. Zn deficiency was found in 25% and 31% animals in Panchrukhi and Baijnath

blocks, respectively; while none of the animals were deficient in Fe in Panchrukhi block and only 1% of the animals were observed deficient in Baijnath block.

- Among feed concentrate samples, an overall percent deficiency of Ca, Mg, Na, K, Cu, Zn & Fe were 10.71, 16.07, 19.64, 28.57, 64.29, 21.43 & 5.36 percent respectively. The green fodder samples showed 14, 20.63, 28.57, 03.17, 63.01, 38.09, & 0 % deficiency in Ca, Mg, Na, K, Cu, Zn and Fe, respectively. Among roughages, 66.0, 73.68, 34.21, 21.05, 91.67, 97.37, & 0 % deficiency in Ca, Mg, Na, K, Cu, Zn & Fe was recorded respectively.
- Area specific mineral supplementation had a significant effect in improving the blood plasma concentration of most of the minerals & the number of mineral deficient animals prior to mineral supplementation were greatly reduced following mineral supplementation.
- A significant increase in total plasma globulin concentration indicated as improvement in the immunity of animals following mineral supplementation.

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

The project became operational on April 1st, 2004 and our work is progressing as per the technical programme for the period. Chemicals, glassware's and equipments have been procured and staff recruited. Collection of data is in progress and samples are being analysed. Some of our salient finding from the data analyzed so far is as under in zone :

Average Family Size	7 member
Average Total Family income	Rs. 43,000/PA
Average family income from Livestock	Rs. 52/day
De-worming	55.00 %
Mineral feeding	57.50 %
Routine Vaccinations	90.00 %
Feeding Pattern	
Stall feeding	72.50 %
Mixed (Stall + Grazing)	27.50 %
Reproductive problems	27.50 %

C. EXTENSION:

Books/Compendium: Published two chapters in Book "*Migratory Livestock management System in Himachal Pradesh*"

Chapter No.	Title	Pages
7	Control of Specific Mineral Imbalances in small ruminants/Sheep by R Kumar and K B Sharma	38 – 44
8	Migratory Sheep Husbandry a Major Farming system in Himachal Pradesh by R Kumar and K B Sharma	45 – 59

Radio Talk : Dr. K.B.Sharma and Dr. R.Kumar delivered two radio talks as part of radio pathshala on care of migratory livestock and Importance of Minerals in ration of dairy cattle.

PUBLICATIONS:

1. Girish Sharma, K.B.Sharma and R.kumar (2004) Effect of Vitamin A and Minerals supplementation on Hematological Values of Anoestrous Cows. Paper presented during XX Annual convention & Natural symposium on Advanced reproductive technologies for management of fertility in Livestock, held at Durg, w.e.f. Nov. 24-26th, 2004.
2. Girish Sharma, K.B.,Sharma and R.Kumar (2004) Plasma macro and Micro Mineral Profile of Anoestrous Cow treated with Vitamin A and Minerals supplementation . Paper presented

during XX Annual convention & Natural symposium on Advanced reproductive technologies for management of fertility in Livestock, held at Durg, w.e.f. Nov. 24-26th, 2004.

3. Shagun Agrawal,R.Kumar,and K.B.Sharma (2004) Changes in trace element concentration during different stages of gestation in migratory crossbred ewes of Himachal Pradesh. Paper presented during XX Annual convention & Natural symposium on Advanced reproductive technologies for management of fertility in Livestock, held at Durg, w.e.f. Nov. 24-26th, 2004.
4. Shagun Agrawal, R.Kumar and K.B.sharma (2004) Metabolic profile of post parturient crossbred migratory ewes of north west Himalayan region. Paper presented during XX Annual convention & Natural symposium on Advanced reproductive technologies for management of fertility in Livestock, held at Durg, w.e.f. Nov. 24-26th, 2004.
5. R.L.Bhardwaj, R.Kumar, K.B.Sharma, Rajesh Rajput and Sonia Sharma (2004) Macro and micro mineral concentration in genital tissues of Gaddi Goat . Paper presented during XX Annual convention & Natural symposium on Advanced reproductive technologies for management of fertility in Livestock, held at Durg, w.e.f. Nov. 24-26th, 2004.

2. DEPARTMENT OF ANIMAL REPRODUCTION, GYNAECOLOGY & OBSTETRICS

TEACHING:

The department is involved in teaching courses both to the students at the Under graduate as well as Post graduate level. 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:

The department is though running two state funded projects entitled "*Incidence, etiology and management of repeat breeding in cross breed cattle of Himachal Pradesh and Infertility in cattle and buffaloes*". The salient findings of research work being done in the department are as under:

I. Semen: The post thaw quality of the frozen semen being used for A.I under field conditions is dependant upon the diluter/extender used. The dilutor was supplemented with either membrane stabilizer (Chloroquine phosphate) or anti oxidant (Ascorbic acid), to evaluate quality of diluted semen before and after thawing. The semen evaluation was based on physical parameters, mass motility, progressive motility, percent live sperms, acrosomal integrity, and hypo-osmotic swelling test. All the tests were conducted at various stages of dilution, freezing and subsequently after thawing of frozen semen. The fertility trials were also conducted.

Based on above findings it was concluded that addition of either membrane stabilizer or anti oxidants improve semen quality post thaw and even improve conception following A.I with frozen semen.

II. Infertility: Amongst of other causes of infertility, endometritis is the one of the major malady being observed under field conditions leading to fertilization failure or early embryonic mortality in cross bred cows. The use of appropriate antibiotic therapy is important for its successful treatment.

The cervico-vaginal mucus samples (n=20) collected from cows showing turbid discharge were subject to isolation and cultures of microbes. The culture sensitivity tests revealed that the isolated organism were highly sensitive to Ciprofloxin & Gentamycin . These animals were treated with 1322 mg of Ciprofloxin (C. Flox, Intas) administered intra-uterine for three consecutive days. The conception rates in the cows (n=17) inseminated during subsequent cycle were 47% establishing the treatment to be quite effective.

EXTENSION

I. Clinical Cases Attended in the Veterinary Clinics:

Gynecological Cases treated in Veterinary Clinics	386	Veterinary Clinical Camps organized	46
Artificial Insemination Done	508	Total Gynecological cases attended	1120
Total Gynecological cases attended	937	Extension lectures in Head Quarter	28

Farmer's education was one of the aspects covered during clinical camps. Ambulatory Clinics. The students were taken to different villages on every Saturday to fulfill two way objective of teaching and service to the farmers. The awareness was created amongst the students for working and diagnosis of prevalent reproduction problems under field conditions and farmers were educated regarding better reproductive management of crossbred cattle and buffaloes.

II. Farmers- Scientists interaction programmes:

Attended farmers interaction camp at Krishi Vigyan Kendra, Kangra on 25.5.2005 and 30 farmers participated in this programme.

PUBLICATIONS

1. Sharma,R., Vasishta,N., Madhumeet Singh and Sood,P. (2004). Efficacy of equine chorionic gonadotropin for superovulatiopn of Gaddi ewes during non breeding season. Indian Vet. J. 81:838-839
2. Sood,P., Madhumeet Singh, and Vasishta,N.K. (2004). Genital abnormalities in two cow heifers born as dizygotic heterosexual twins. Indian J. Anim. Reprod. 25: 66.
3. Sood,P., Vasishta,N.K. and Madhumeet Singh (2004). Pseudopregnancy in a Gaddi goat. Indian J. Anim. Reprod. 25: 71.
4. Sandeep Mishra, Madhumeet Singh, Sandeep Thakur, Amit Sharma and Vasishta, N. K. (2004). Management of Incomplete Cervical Dilatation in an aborting cow – A case report. Intas Polivet. 5: 154 -155.
5. Madhumeet Singh, Mansi Sharma and Vasishta, N. K. (2004). Study on the use of Norgestomet implants for the induction of oestrus in anoestrus heifers in the sub-temperate zone of Himachal Pradesh. Intas Polivet. 5: 179 – 182.
6. Madhumeet Singh, Satish Kapoor, Shweta Sharma and Vasishta, N. K. (2004). Study on the clinical efficacy of ciprofloxacin administered through intra uterine route in repeat breeder cows suffering from endometritis in Himachal Pradesh. Intas Polivet. 5:209 – 210.
7. Kumar, N., Shweta Sharma, Satish Kapoor and Madhumeet Singh (2004). Dystokia due to vaginal and vestibular fibrosis in a pluriparous goat. Intas Polivet. 5: 294 -295.
8. Amit Sharma, Madhumeet Singh, Sandeep Thakur, Sandeep Mishra and Vasishta, N. K. (2004). Successful treatment of uterine torsion in goat – A case report. Intas Polivet. 5: 296.

Presentations

1. Madhumeet Singh and Vasishta,N.K. (2004). Pregnancy rate following estrus synchronization in crossbred dairy cows maintained under sub-temperate climate – comparison of two techniques. Proc. 15th International Congress on Animal Reproduction Porto Seguro, Bahia, Brazil, 8-12, August 2004 pp 351.
2. Kumar,N., Madhumeet Singh and Kamal,R.P. (2004). Hill women and animal reproduction. Proc. XX Annual Convention and National Symposium of ISSAR on "Advanced Reproductive technologies for management of fertility in livestock", Anjora, Durg, December 14-16, 2004, pp 54.
3. 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.

3. DEPARTMENT OF VETERINARY MICROBIOLOGY

The department is involved in teaching courses both to the students at the under graduate as well as Post graduate level. 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:

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, 2004 to June, 2005, a total of 514 samples were processed microbiologically from different species of animals. The samples comprised of milk, pus, faecal swabs, blood, cervical discharge, sputum, nasal swabs, vaginal swabs from aborted animals, ear swabs, prepucial swabs, skin scrapings, eye swabs, blood and urine etc. The microbes isolated were identified, confirmed and drug sensitivity conveyed to the concerned quarters. Besides, 216 samples from humans were also processed. The details are compiled as under:

Months	Cattle	Buffaloes	Equine	Ovine /Caprine	Canine	Poultry /Rabbit	Others	Total	Humans
July 04	51	-	-	12/-	20	1/5	-	89	15
Aug 04	24	1	-	-	1	3/-	4	33	16
Sept. 04	36	-	-	-/7	3	1/-	-	47	13
Oct. 04	23	-	1	-/-	4	2/-	-	30	22
Nov. 04	9	-	-	1/1	5	-	-	16	12
Dec. 04	4	-	-	-/1	3	27/-	-	35	14
Jan. 05	18	1	-	1/-	1	2/1	-	24	18
Feb. 05	12	25	-	-/1	3	-	-	41	22
March 05	34	4	-	-/10	4	-/-	-	52	18
April 05	19	-	4	-/-	3	1/-	-	27	17
May 05	49	2	2	1/1	6	6/-	4	71	23
June 05	37	2	3	-/1	2	2/-	2	49	26
Total	316	35	10	15/22	55	45/6	10	514	216

Chief findings or microbial isolations:

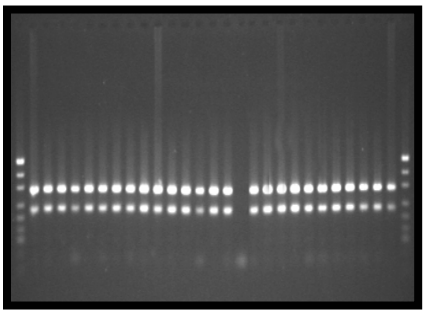
- In this year, samples like lung, liver, trachea, kidney tissue were received from 16 outbreaks suspected for Pasteurellosis to this laboratory. *Pasteurella multocida* was recovered from 14 outbreaks samples.
- *S. gallinarun* was isolated from Poultry samples submitted from the Department of Vety. Pathology.
- *Klebsiella pneumoniae*, E. coli, Candida spp. were recovered from milk samples of animals.
- *Pseudomonas aeruginosa* was recovered from urine sample of caprine and from faecal samples of cattle.
- *Klebsiella pneumoniae* was isolated from nasal sample of equine.
- *Citrobacter freundii* was revealed in the lung tissue of a goat.
- The serum samples (316) that comprised of 161 from buffalo 155 from cattle were tested for chlamydial antibodies. Out of 316 serum samples, only 38 samples were tested positive.

- *Pseudomonas aeruginosa* and Corynebacterium spp. were recovered from pus samples of humans.
- *E. coli.* Corynebacterium spp., Streptococcus spp. Pseudomonas spp., Klebsiella pneumoniae and Citrobacter spp. were revealed from urine samples of humans.
- Candida spp. was recovered from throat swab culture of a human child.

Application of RBPT, SAT and Avidin-biotin serum Elisa for detecting brucellosis among livestock in Himachal Pradesh:

A total of 1113 serum samples from cattle, buffaloes, sheep and goats were collected from different parts of Himachal Pradesh and subjected to detection of antibodies against brucella. The sera samples were examined by RBPT, SAT and avidin-biotin serum ELISA tests. Out of 641 cattle, 146 buffaloes, 141 sheep and 185 goats' serum samples tested only 17 cattle, 5 buffaloes, 22 sheep and 10 goats were found positive, respectively. The results were based on RBPT as this test is considered suitable and usually recommended for random screening of animals against brucellosis as per OIE. The sero prevalence of brucellosis was uppermost in sheep and low down in cattle irrespective of their age. It was also high in females having history of reproductive problems.

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 as 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.

Figure: Detection of *Chlamydiaceae* by multiplex PCR

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 Chlamydiphila 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.

Dermatomycosis in equines due to Trichosporon (beigelii) cutaneum:

A sole report of isolation of Trichosporon (beigelii) cutaneum from horses suffering from dermatomycosis is described. Four equines were presented in Clinic of Veterinary College with the history of sloughing of skin and swelling at various places of limbs. The yeast was isolated and identified along with staphylococci and streptococci from the lesions.

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:

The project was launched with the following mandates:

1. Serotyping of field isolates of P. multocida on the basis of somatic and capsular antigens for epidemiological studies.
2. Application of molecular biological techniques viz. PCR, DNA fingerprinting and other related studies for quick characterisation and epidemiological studies for specific diagnosis of animal pasteurellosis.
3. Development and use of multi serotype vaccines against H.S.
4. Human Resource Development.

   All above mentioned mandates are to be carried out at Division of Bacteriology & Mycology, coordinating Centre, I.V.R.I., Izatnagar. However, collaborating centers have common objectives with following technical programme:

- Preliminary isolation and characterization of P. multocida strains from field outbreaks and forwarding of the same to Bacteriology & Mycology Division, I.V.R.I., coordinating Lab. for further serotyping and PCR characterization.
- Antibiogram of the isolates: To collect information on the epidemiological aspects/parameters of the disease in different parts of Himachal Pradesh with emphasis on Gaddi sheep, goats and rabbits.

A total of 612 samples from different places 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 Haemorrhagic Septicaemia and pneumonic pasteurellosis cases. A total of 35 samples from cattle, 71 from buffaloes, 115 from sheep, 214 from goats, 166 from rabbits and 11 from pigs were processed.

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. The talks emphasized on infectious diseases of livestock, their morbid sample diagnosis, prevention and control measures

Disease outbreaks attended:

A total of four (4) animal disease outbreaks were attended by the faculty of the department in different parts of the State during the year under report. The description of these is as under:

1. An outbreak of suspected HS was reported at Shahtalai by the Deputy Director, Animal Husbandry, Bilaspur (H.P) on 22.7.04. A team comprising of Drs. Prasenjit Dhar, V.K. Gupta and K.B. Nagal attended the outbreak. Blood samples of a moribund animal were taken which failed to show any evidence of *Pasteurella multocida.* Suitable preventive measures were directed to the authorities.
2. An outbreak of suspected HS was attended by Dr. Dushyant Gupta among buffaloes during the month of August at Jwalaji. *Pasteurella multocida*, the causative agent of HS was recovered from the samples.
3. Drs. Vipin Katoch, V.K. Gupta attended a suspected outbreak of HS during the month of February, 05 at Nadaun, Hamirpur and collected blood and nasal samples. No evidence of *Pasteurella multocida* was found in the samples.
4. An outbreak among sheep and goats was reported by the Assistant Director, Dharamshala at Fatehpur subdivision on 22.3.05. Drs. S. Mittra, R.K. Asrani and Vipin Katoch attended the outbreak. Mortality was reported in sheep and goats in the area. Post mortem was done and samples were collected. Serum samples were also collected to test for brucellosis and chlamydiosis. Suitable preventive measures were suggested to the authorities.

Apart from these, numerous samples were received in the department from suspected animal disease outbreak cases. Such samples were processed promptly and therapeutic as well as control measures were suggested to the concerned.

Month wise depiction of samples processed from outbreaks and important findings

No.	Month	No. of outbreak	Species affected	Place	Important isolation
1.	July, 04	–	–	–	–
2.	Aug, 04	–	–	–	–
3.	Sept, 04	–	–	–	–
4.	Oct, 04	2 {1 in Kamand, 1 in Palampur}	Calf, female: Kamand Ovine/caprine : Palampur	Mandi, Palampur	*P. multocida* isolated from lung and trachea from Kamand. No important isolation from Palampur outbreak.
5.	Nov, 04	2 (1 in Jwalaji, 1 in Tal farm, Hamirpur)	Bovine: Jwalaji Sheep: Tal farm	Jwalaji, Hamirpur	*P. multocida* isolated from Jwalaji. No evidence of brucellosis or *Pasteurellosis* in Tal outbreak
6.	Dec, 04	1	Cow	Shimla	*P. multocida* isolated
7.	Jan, 05	4 (1 in Amb, Una, 1 in Dagshai, Solan, 1 in Bilaspur, 1 in Hamirpur)	Buffalo Buffalo Buffalo Buffalo	Una Solan Bilaspur Hamirpur	*P. multocida* isolated from Amb and Hamirpur outbreak. None from other outbreaks.
8.	Feb, 05	4 {3 in Hamirpur, 1 in Una.}	Buffalo Buffalo	Hamirpur Una	*P. multocida* isolated from 2 outbreaks in Hamirpur None from other outbreaks.
9.	Mar, 05	2 {1 in Lung, Hmr. 1 in Dagshai}	Buffalo Cow	Kangra Solan	*P. multocida* from lung outbreak
10.	April,05	–	–	–	–
11.	May, 05	1 in sheep farm,Sarol	Ramboillet lambs	Chamba	*Pseudomonas* and *E. coli* were recovered form the intestinal contents
12.	June, 05	–	–	–	–

RESEARCH PUBLICATIONS:

1. Vinod Sharma; R.C. Katoch; Arvind Mahajan; Mandeep Sharma; Rajesh Chahota; Subhash Verma and Prasenjit Dhar (2004). Pathogenic potential of *Vibrio anguillarum* isolate in common carps. Indian Vet. J. 81(6):616-619.
2. Vipasha Kapoor; R.C Katoch; Mandeep Sharma and Prasenjit Dhar (2004). Mosaic of bacteria in respiratory diseases with special reference to pasteurellae in Gaddi sheep and goats in Himachal Pradesh. Indian J. Anim. Sci. 74 (4):365-368.

3. Vipasha Kapoor; R.C. Katoch; Mandeep Sharma and R.K. Asrani (2004). Pathogenicity test of *Pasteurella multocida* A:1 in mice. Indian J. Anim. Sci. 74 (5):495-496.
4. Rajiv Kumar; R.C. Katoch; Mandeep Sharma; Arvind Mahajan and Prasenjit Dhar (2004). Pathoetiology of pneumonic Gaddi goats in Himachal Pradesh. Ind. J. Anim. Sci.74 (6):569-571.
5. Vipasha Kapoor; R.C. Katoch; Mandeep Sharma and, Subhash Verma (2004). Bacterial panorama with reference to pasteurellae in rabbits of Himachal Pradesh. Indian J. Anim. Sci. 74 (6):612-613.
6. Vipasha Kapoor; R.C. Katoch; Mandeep Sharma; A.A. Kumar and Subhash Verma (2004). Detection of *Pasteurella multocida* by PCR. Indian J. Anim. Sci.74 (7):724-725.
7. Charanjit; Mandeep Sharma; Rajesh Chabra; Rajinder Kumar and S.K. Kalra (2004). A study of seroprevalence of Infectious bursal disease in Himachal Pradesh. J. Immunol. and Immunopathol 6 (1): 16-21.
8. Mandeep Sharma and Vipasha Kapoor (2005). Dermatomycosis in equines due to Trichosporon (beigelii) cutaneum. Centaur XXI (3): 44-45.
9. Subhash Verma; R.C. Katoch; Arvind Mahajan; Mandeep Sharma; Vipin Katoch; J. M. Kataria and K. Dhama (2005). Confirmation of an outbreak of Chicken infectious anaemia in organized poultry farm by Polymerase Chain Reaction. Indian. Vet. J. 82 (2): 119-122.
10. S. Deshmukh; R.K. Asrani; N. Jindal; D.R. Ledoux; G.E. Rottinghaus; Mandeep Sharma and S.P. Singh (2005). Effects of Fusarium Moniliforme culture material containing known levels of fumonisin B1 on progress of Salmonella Gallinarum infection in Japanese quail: Clinical signs and hematological changes. Avian Diseases 49:274-280.

4. DEPARTMENT OF VETERINARY EPIDEMIOLOGY & PREVENTIVE MEDICINE

TEACHING:

The department is involved in teaching courses both to the students at the Under graduate as well as Post graduate level. 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.


Goat pox lesions on the tongue of kid

RESEARCH:

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

EXTENSION:

Animal Disease outbreaks:

A total of five 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.

- Two outbreaks of Hemorrhagic Septicemia among buffaloes were attended at village Baragaon (district Bilaspur) and Village Tilt, Rail and Tilloo (district Hamirpur) on 23-7-2004 & 18-2-2005, respectively.
- Three outbreaks of Goat Pox virus among gaddi goats were attended at villages Majherna, Lazia and Kandwari (district Kangra) on 14-9-2004, 9-01-2005 and 17-5-2005.

Radio talks:

Delivered Two radio talks on All India Radio, Dharamshala on 15-08-2004 and 21-03-2005 on the following topics:

- Gal ghotu ek chhut ka rog : upchar evam roktham.
- Bhed-bakrio mein chechak ka rog : upchar evam roktham

Departmental activities:

Besides teaching under-graduate students, the department is actively involved in the diagnosis & treatment of animals suffering from various infectious & contagious diseases in Vety. Clinical Complex and Livestock farms.

Emergency Services:

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

Conferences / Symposia:

1. K B Nagal, D P Singh and R C Katoch (2004). Presented research finding, "Production, detection and toxigenicity of ε toxin of Clostridium perfringens Type D", in National Symposium & XXII Annual Conference of Indian Association of Veterinary Microbiologists, Immunologists and Specialists of Infectious Diseases held from Oct. 18-19,2004 at CSK HPKV, Palampur.
2. Attended a seminar on "Current status of Veterinary Services in Himachal Pradesh and Future Challenges" organized by Himachal Pradesh State Veterinary Council on Feb. 8, 2005 at Palampur

5. DEPARTMENT OF VETERINARY PATHOLOGY

TEACHING:

The department is involved in teaching courses both to the students at the Under graduate as well as Post graduate level. 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:

Live stock & Poultry Disease investigation :

The project involve Disease diagnosis from necropsy in Live stock & Poultry including wild life, biopsy & autopsy specimen examination besides attending to livestock disease out breaks and clinical pathological investigations.

Necropsy Investigation:

A total of 376 necropsies were conducted on livestock and poultry including wild life .

Research projects of Post Graduate programme:

Efficacy of S. gallinarum 9R vaccine against experimental Fowl Typhoid in Japanese quail.

Fowl typhoid continues to be a formidable problem in poultry and chemotherapy has not proven to be an appropriate remedy. Vaccination has shown promising results and is an effective tool in prevention of Salmonella infections, however, the efficacy of various types of vaccines used at present are yet to be evaluated in Japanese quail (Coturnix coturnix japonica). Therefore, it was an attempt to elucidate the pathology of locally isolated Salmonella gallinarum (9:12:-); and to ascertain the protective efficacy of Salmonella gallinarum 9R vaccine at the dose rate of 1x 105 cfu per bird. The pathology produced in quail by the challenge organism was typical of fowl typhoid and the same is well documented for poultry and is being established in quail. The disease was less severe in the vaccinated birds when compared to the unvaccinated birds following challenge with pathogenic Salmonella gallinarum (9:12 :-). The same was evident by low growth depression,

reduction in the mortality rate, delay in the onset and intensity of anemia, reduced severity of lesions, early and pronounced immune response and early clearance of the challenge organism from the tissues. It was concluded that the vaccine conferred 55.57 per cent protection in quail at the given dose.

Studies on the pathology of Hydropericardium syndrome in caged Broilers and comparative experimental observations in broilers, Japanese quail and other avian species.

Hydropericardium syndrome (HPS) is primarily a disease of broiler chickens, which was first reported from Pakistan in 1987. The disease has now spread to many parts of world viz. Iraq, Mexico, Peru, Chile, Slovakia, Russia and India. The disease is caused by fowl adenovirus serotype 4. An experimental study was conducted to know the comparative susceptibility of other avian species to HPS. Day-old commercial broilers, Japanese quail and ducklings were procured from the commercial sources and reared for two weeks under strict hygienic conditions in the department. Similarly, domesticated adult pigeons were acclimatized for one week in the department. At two weeks of age, broiler chicken and quail chicks (numbering 10 for each treatment group) were given S/C 20% and 30% HPS infected liver homogenate suspension obtained earlier from a natural outbreak in broiler chickens. The ducklings were inoculated with 30% infected homogenate suspension. Similarly five pigeons were inoculated with 30% and four with 20% infected liver homogenate suspension. All the birds were closely monitored for clinical signs and mortality. The survivors were sacrificed after 10 days of infection. The gross and histological changes were studied in both sacrificed and naturally dead birds. The 30% liver homogenate suspension prepared from either naturally dead or sacrificed quail and pigeons were reinoculated S/C in broiler chickens for production of HPS.

All the broiler chicks inoculated with either 20% or 30% HPS infected liver homogenate suspension died within 44 hours of infection. A mortality of 50% was recorded in the Japanese inoculated with 30% infected liver homogenate suspension up to 87 hours post-infection while only one bird died (mortality 10%) among those given 20% suspension. None of ducklings or pigeons died during the course of study. The characteristic gross lesions in broilers included hydropericardium and liver haemorrhages. In contrast none of the quail chicks either naturally dead or sacrificed after 10 days of infection showed hydropericardium. No significant gross lesions were observed either in ducklings or pigeons. The HPS was successfully reproduced in broiler chickens when these were inoculated S/C 30% homogenate prepared from liver of infected quail chicks while experimental reproduction of HPS from pigeons was unsuccessful. It is concluded that broiler chickens are highly susceptible to HPS followed by quail while pigeons and ducklings are resistant.

Studies on pathology of naturally occurring infectious bursal disease in poultry and comparative experimental observation in broilers.

Studies on the pathology of naturally occurring Infectious bursal disease were conducted followed by experimental reproduction of the disease in 4 weeks old broiler chicks. Grossly in naturally occurring cases lesions were observed in bursa, spleen, liver, proventriculus kidney & skeletal muscles. Bursae were swollen, edematous, haemorrhagic & in later stages atrophic. Spleen was slightly enlarged and liver was pale. Proventriculus showed haemorrhages at its junction with gizzard. Kidneys were swollen, pale with prominent tubules. Haemorrhages were observed on breast & thigh muscles. In experimentally induced disease, grossly bursae appeared swollen initially upto 6 DPI, there after these were atrophic when compared to control. Spleen was enlarged. Kidneys were pale & swollen. Mild haemorrhages were observed in thigh muscles at 4 DPI. Gross lesions were marked in naturally occurring cases when compared to experimentally induced disease. Similarly histopathological lesions were marked in naturally occurring cases, however, bursa showed almost comparable lesions. In this study sequential gross & histopathological changes were recorded which may be of use to study chronology of disease.

Attending to Disease Outbreaks/ Morbid Materials:

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

Histopathological investigations on necropsy material: Fifteen Morbid samples were received in the department for histopathological investigations and their diagnosis conveyed.

Disease outbreaks investigated:

- In July, 2004, a serious outbreak of Haematuria was reported at Sansai area, Distt. Kangra on 6.7.2004 (Dr. R.K. Asrani, attended the outbreak along with Dr Des Raj and Dr R.S. Telang).
- In July, 2004, an outbreak of suspected HS was reported at Shahtalai, Distt. Bilaspur on 22.7.2004. Dr. V.K. Gupta lead the experts team comprising, Dr. K.B. Nagal and Dr. P. Dhar.
- In September, 2004 a Clinical Camp was attended by Dr. R.K. Asrani along with Dr. M.S. Kanwar & Dr. N.K. Vashist at Gram Panchayat Badehar, Distt. Hamirpur on 18.9.2004 and treated 190 different species of livestock and poultry for various pathological conditions.
- In February, 2005, an outbreak of suspected HS was reported at Nadaun area on 18.2.2005. Dr. V.K. Gupta lead the experts team comprising, Dr. Vipin Katoch and Dr. K.B. Nagal.
- In March, 2005 an outbreak of Fascioliasis among sheep and goats was reported by the Assistant Director, Dharmshala at Fatehpur subdivision on 22.3.2005. Dr. R.K. Asrani, Dr. S.Mittra and Dr. Vipin Katoch attended the outbreak.

Biopsy material for histopathological diagnosis: 6 biopsies received in the department were examined and diagnosis conveyed.

Clinical samples analysed: A number of clinical samples received from outbreaks, College Clinic, State Veterinary hospitals, animal farms etc. were analyzed for diagnostic support.

EXTENSION:

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.

A number of lecture were delivered in specialized training programs, campus short duration farmers training courses organized by the Department of Veterinary pathology, COVAS and Directorate of Extension Education, CSK HPKV Palampur.

Radio talk: Dr. V.K. Gupta delivered a Radio talk at AIR Dharmshala: on the topic "*Common diseases of poultry and their control"* on 26.7.2004 for broadcasted on 2.8.04.

FACULTY & STAFF IMPROVEMENT:

Short courses/ summer schools / trainings attended:

1. Dr. R.K. Asrani, Associate Professor attended short term course "Accreditation and allied issues with focus on development of website of core courses of Veterinary Microbiology" w.e.f. 1st February to 21st February, 2005 at CCS HAU, Hisar.
2. Dr. V.K. Gupta Associate Professor attended Short Term Training Programme on 'Computer Networking and use of Internet for Biological Database Search and Information Retrival' from 17.3.2005 to 19.3.2005.

3. Dr. V.K. Gupta, and Dr. R.K. Asrani attended the training at CSKHPKV Library on 21.6.2005 on the topic :The Training/ Orientation about 'Access of on-line Library Resources & Services'

4. Shri Ramesh Chand, Laboratory Assistant attended Laboratory Management training w.e.f. 17.1.2005 to 24.1.2005 in the College of Basic Sciences, CSKHPKV, Palampur.

Conferences / Symposia / Seminars and other meetings attended:

1. Dr V.K. Gupta attended National Symposium and XXI Annual Conference of Indian Association of Veterinary Pathologists. Held at Kolkata from 23-25 November 2004 and presented a Lead paper 'Bird Flu: A World Health Impact'.
2. Dr. R.K. Asrani, Associate Professor represented Dean, COVAS to attend a meeting with DDG (Education), ICAR at PAU, Ludhiana in July 2004.
3. Dr V.K. Gupta, Associate Professor attended the Seminar on 'Spontaneous and induced Lesions in WistarHan: Brl Rats' on 3rd December,2004 organized by RCC Ltd., Ahmedabad (India) at Mumbai. He was sponsored by RCC to attend the seminar at Mumbai.
4. Dr. V.K. Gupta, Associate Professor delivered lecture on 11.3.2005 on the topic "Pathology of common diseases of Angora and broiler rabbits in North Hilly area" in a CSIR training course on Advance in animal health and production with special reference to North Hilly area' organized at SKUAST, Jammu, from 25.2.05 to 11.3.2005.

RESEARCH PUBLICATIONS

1. Kumar, A., Jindal, N., Shukla, C. L., Asrani, R. K., Ledoux, D. R. and Rottinghaus, G. E. 2004. Pathological changes in broiler chickens fed ochratoxin A and inoculated with Escherichia coli. Avian Pathology 33:413-417.
2. S. Deshmukh , R. K. Asrani, N. Jindal, D. R. Ledoux, G. E. Rottinghaus, Mandeep Sharma and S. P. Singh (2005). Effects of Fusarium moniliforme culture material containing known levels of fumonisin B1 on progress of Salmonella Gallinarum infection in Japanese quail: Clinical signs and hematologic studies. Avian diseases 49:274-80.
3. Telang, R.S., Mandial, R.K., Gupta, V.K., Chahota, R. (2005). Arsenic poisoning in cattle of Himachal Pradesh. Indian Vet. J. 82:677-678.
4. Gupta, V.K. (2004) 'Bird Flu- A World Health Impact' A Lead Paper. Proceedings of National Symposium on 'Advances in pathological Techniques in diagnosis of Animal, bird and Fish Diseases' and XXI Annual Conference of IAVP held at West Bengal University of Animal & Fisheries Sciences (Kolkata) form November 23-25, 2004. pp.55-57.

Abstract of research work accepted for presentation in the Conference:

1. Sidharath Deshmukh, R K Asrani, D R Ledoux, G E Rottinghaus, Mandeep Sharma and S P Singh. Gross and histological observations on extra-hepatic organs of Japanese quail fed FB1 and infected with Salmonella gallinarum. Accepted for presentation in the World Veterinary Poultry Congress scheduled to be held at Istanbul, Turkey, from August 22-25, 2005.
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. Accepted for presentation in the World Veterinary Poultry Congress scheduled to be held at Istanbul, Turkey, from August 22-25, 2005.

Extension Publications:

1. Katoch, R.C. and Asrani, R.K. 2004. Rabies. Tips for Vets. 1: 1-5.
2. Katoch, R.C. and Asrani, R.K. 2004.Bird Flue-Avian influenza. Tips for Vets. 4: 1-3
3. Katoch R.C. and Asrani, R.K. 2004. Petits Ruminants. Tips for Vets. Tips for Vets. 6: 1-5
4. Katoch, R.C. and Asrani, R.K. 2004. Tuberculosis. Tips for Vets. 9: 1-5

6. DEPARTMENT OF VETERINARY AND ANIMAL HUSBANDRY EXTENSION

- Web based teaching under taken for all the courses being offered by the Department.
- Prepared interactive learning based Practical manuals for Course No. AHE-111 & AHE-411.
- Prepared the Web site of the college which is updated every month on regular basis.
- Computerized the Veterinary Teaching clinical complex

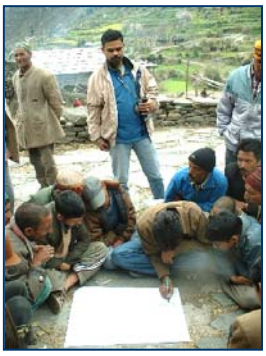
The Department of Veterinary and Animal Husbandry Extension was created in 1999 to fulfill the minimum requirements of Veterinary Education as prescribed in the Indian Veterinary Council Act 1984. The Department aims to educate the Veterinary graduates for applying technical concepts of behavioral sciences 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:

The department is involved in teaching courses to the students at the under graduate level. Efforts are on to develop a well-equipped Audio-Visual Technology Lab for a systematic Extension Teaching in communication technology to the graduate students. Digital Photography practical lessons are being imparted to the graduate students with the help of Digital Camera. DLP Multimedia Projector was purchased and has been used during seminars, conferences, symposiums & for extension and teaching related activities. Lessons in Video-film recording, production and script writing have been prepared and the same were included in extension teaching under course no. AHE-411 during the year under report. These topics are covered in addition to the prescribed VCI curriculum, so that the students from the college are well exposed to the latest communication systems / techniques.

Web Based Teaching:

The web site of the Department already prepared and launched is being updated on regular basis. The important lectures and multi media presentations pertaining to the courses offered by the department given above are regularly updated on the web site for ready reference to the students giving a boost to the internet based teaching.



A new software Adobe acrobat professional 6th Edition was purchased for preparing multi media based tutorials for teaching, research and extension purpose. The software so purchased will be useful for editing the subject matter and preparing extension literature for disseminating the latest know how in field of animal Husbandry to the farmers of the state both through print media and internet.

Practical manuals:

The department prepared Practical Manuals namely *Sociology & principles of veterinary & animal husbandry extension* and *Extension techniques in veterinary practice & livestock production* this year. Efforts have been made to make the manuals more interactive, easy to understand and providing comprehensive information. The practical manual intends to give an insight into the various extension & sociological techniques used in veterinary practice. It is very useful for the

undergraduate students of veterinary science because it explains the various audiovisual equipments, use of literature in extension and awareness campaigns on different aspects of veterinary and animal husbandry practices. The purpose of the manual is two fold:

1. To give the students an insight into the present day extension and sociological techniques.
2. To give a sound foundation of various extension techniques adopted for veterinary and animal husbandry practices

	TITLE	COURSE	YEAR	AUTHOR
1	Sociology & principles of veterinary & animal husbandry extension	AHE-111	Ist	Dr. Shivani Katoch & Dr. Alok Sharma
2	Extension techniques in veterinary practice & livestock production	AHE-411	IVth	Dr. Shivani Katoch, Dr. Anup Katoch & Dr. Alok Sharma

RESEARCH:

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.

1	Evaluation of constraints in the way of Transfer of Dairy Technology to livestock farmers in the H.P	
	A	Constraints perceived by the livestock owners
	B	Constraints perceived by the Veterinarians
	C	Constraints perceived by the Para-veterinary staff / Development agencies
2	Pilot survey of the Existing Livestock Resources and mapping of the 'felt-needs' of the livestock owners in rural areas of H.P.	
3	Livestock Resources and Animal Husbandry practices for the following species, in different parts of H.P : Cattle; Sheep; Goats; Poultry	
4	Livestock Resources, Aspirations and Constraints in way of Profitable Dairy Farming/ Animal Husbandry- a case study of village kandwari in Palam valley.	

EXTENSION :

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, 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 development agencies.

A number of lecture were delivered in specialized training programs, campus short duration farmers training courses both inside and outside the campus . Apart from this faculty member acted as resource personnel for Training in Sheep husbandry to Sheep Breeders Of HP Sponsored By HP Wool Fed. Shimla at Sheep Breeding Farm-Chamba and on Management of Dairy animals at KVK-Kangra.

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.

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

PUBLICATIONS

Research

1. Shivani Katoch, Mukul Kaistha, K.S.Sharma, Meena Kumari, and B.S.Katoch. Effect of directly fed microbial isolated and cultured from vegetable sources on the biological performance of laying pullets. *Proceeding of XXII Indian poultry science association, 2004.*
2. B.S.Katoch Shivani Katoch,, Meena Kumari, and K.S.Sharma. Effect of intermittent dietary supplementation of combination of different strains of lactobacilli, streptococci and yeast isolated from different sources vis-à-vis the combination of their standard counterparts on the growth performance of commercial laying chicken from 1 to 18 weeks of age. *Proceeding of XXII Indian poultry science association, 2004.*
3. Shivani Katoch, K.S.Sharma, Daisy rani, V.K.Sharma Meena Kumari, and B.S.Katoch Biological performance of chicken broilers fed newly isolated probiotics under varying environmental conditions. *Proceeding of XXII Indian poultry science association, 2004*
4. Shivani Katoch, Mukul kaistha, Meena Kumari, K.S.Sharma, and B.S.Katoch Growth performance of BV-300 strain of layer fed isolated probiotic. *PP-27, 1.38, Compendium of XXII Annual conference of Indian Association of Veterinary Microbiologists, Immunologists and specialists in infectious diseases"* held at Veterinary College Palampur, w.e.f 18 to 19, October, 2004.
5. R.C.Katoch **& Shivani Katoch** (2005)**. Role of youth in animal welfare.** Livestock International. pp 21-22, Vol. 9, Issue-5.

Extension:

S.NO	TYPE	TITLE	PUBLISHER	RESOURCE PERSON
1	Pamphlet	Importance of soybean as feed ingredient in nutrition of dairy animals of hilly areas. (HINDI)	Deptt. Of Animal Nutrition, COVAS, CSK HPKV, Palampur	Dr. Shivani Katoch
2	Book let	Sheep farming (HINDI)	HP Wool Fed. Shimla	Dr. Shivani Katoch
3	Folder	Sheep calendar (HINDI)	HP Wool Fed. Shimla	Dr. Shivani Katoch

4	Booklet (Report)	Annual report of the College. COVAS	COVAS, CSK HPKV, Palampur	Dr. Shivani Katoch (Editor)
5	Report	Achievement and activities of the deptt w.e.f 1999 to 2004	Deptt. Of Vety. & AH Extn.	Dr. Alok Sharma and Dr. Shivani Katoch
6	Book	Organic livestock production: Basic concepts and key practices	Centre for HRD CSKHPKV, Palampur	Dr. Alok Sharma
7	Article	*Dairy Pashooan wich afara ate langara bookhar : kaaran, ilaaz ate bachaav*	*Dairy Darpan (March 2004)* 9: 10-17	Dr. Alok Sharma

PARTICIPATION IN WORKSHOPS / SEMINAR / SYMPOSIA

Training/Seminar/ Conferences/Workshop/Symposia	PLACE	PERIOD	NAME
XXII Annual conference of Indian Association of Veterinary Microbiologists, Immunologists and specialists in infectious diseases.	Veterinary College Palampur,	18 to 19, October, 2004.	Dr. Shivani Katoch
Short course on **Training methods & Communication skills**, an off campus course of NIRD-Hyderabad. India	HIPA- Shimla	September 20 to 25, 2004	Dr. Shivani Katoch
Training on software **"VET-MASTER"**	Chandigarh	Febraury, 22 to 25,2005	Dr. Shivani Katoch

7. TEACHING VETERINARY CLINICAL COMPLEX

The clinic of the college is a nodal referral hospital of the state for the treatment of obscure and undiagnosed diseases of 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, Gynaecology and Epidemiology, Pathology, Microbiology, Parasitology and Clinical Biochemistry to some extent. A total of 0+ 8 credit hours were offered for U.G. teaching and 0+ 16 credit hours were offered by various departments for teaching their courses alongwith compulsory internship programme for forty interns. During the year a total of 3587 animals of different species mainly livestock followed by pets and wild animals were provided specialized care. The clinic also coordinated for organizing clinical camps in various parts of state as well as attended disease outbreaks. Artificial Insemination service was provided to 604 new cases.

Clinical Camps:-

The experts from clinical and para-clinical departments were supported by the clinic to attend clinical camps in different parts of state. A total of 1893 animals were attended with various afflictions in 41 camps. On the spot treatment with medicines was given to large number of animals and surgery performed in few cases in Mandi, Hamirpur, Chamba and Kangra districts.

Clinical Diagnostic Activities:-

The clinic has adequate facilities for diagnosis. Various clinical samples like faeces, blood, urine, milk skin scrapping and swabs were subjected to laboratory examinations. Altogether 1694

clinical samples were examined to give diagnosis. Main diseases diagnosed were amphistomiasis, strongylosis, babesiosis thelariosis, scabies, colic, respiratory distress syndrome, mastitis, traumatic reticulo-peritonitis and intestinal obstruction in addition to other common diseases.

Ambulatory Clinical Practice:-

Facilities were provided to the clinical departments for extensive practical exposure to the students of 4th and 5th professional classes at various villages of Hamirpur, Mandi and Kangra districts.

Care for the Wildlife:-

Captive and free ranging wild animals were treated and provided consultancy at various wildlife parks and forests in the state. Leopards which had threatened the public life were also captured and handed over to forest department. Short lectures to the people gathered at various locations were given highlighting the importance of wild fauna in sustaining ecosystem.

Emergency & Consultancy Services:-

Emergency services were provided to 51 cases in the clinic round the clock including Sunday and other holidays. Consultancy service on personal visit or on telephone has become very popular amongst farmers in the far flung areas and has helped them in taking proper measures for health and production related problems of their livestock & pets. Consultancy to 3744 cases was provided. Farmers of DRDA projects in Solan, Hamirpur, Mandi and other parts have been benefited a lot through telephonic consultancy.

Resource Generation:-

Keeping in view the resource generation in order to make this unit a self sustaining one, the detail of total income generated under resolving fund scheme is as follows-

S.NO	DETAILS	AMOUNT
1	Consultancy and service charges from wildlife department without involving any expenditure i.e. vehicle medicines etc.	Rs. 12,500/
2	Consultancy and service charges for clinical camps.	Rs. 25,000/-
3	User charges at clinical Complex .	Rs. 25,512/-
Total resources generated during the year		Rs. 63,012

Computerization:-

Clinical complex has been computerized with LAN attached to ten computer using specific software for better efficiency and interaction between clinical and para clinical departments.

8. DEPARTMENT OF ANIMAL BREEDING, GENETICS AND BIOSTATISTICS

TEACHING:

The department offers courses to veterinary undergraduates as well as to the post graduates.

RESEARCH:

Characterization and conservation of "Chegu goats"

Salient Achievements:

1. Identification and demarcation of the breeding tract of Chegu breed of mountain goats along with ancillary information on topography, agro-climatic conditions, soil type, forage resources and farming systems of the natural habitat. The true breeding tract in H.P. is the cold desert region of Kinnaur and Spiti with pockets of distribution in high altitude areas of Lahaul and Pangi sub divisions of H.P. The villages with good elite animal population of the breed were identified.
2. Primary data on population status, distribution, breed utility, production system and socio-economic status of the goat breeders. The total population of typical Chegu goats true to the breed in the state is currently 6000-7000 which is stable. The villages with major population in

the breeding tract as well as in the pockets of distribution have been identified for undertaking conservation efforts.

3. Development of breed descriptor for Chegu breed of Indian goats incorporating baseline data on utility, population status, production system in the native tract , native environs, morphological and economic characteristics of the breed under field conditions in breeding tract.
4. Identification of the elite germplasm in the breeding tract along with genetic variability for production attributes. The elite males (28 no.) were procured after selection for use in semen collection.
5. Molecular characterization of the breed using micro-satellite markers. The data is available on allelic frequency, PCR product size range, observed and effective number of alleles, observed and effective heterozygosity, and PIC in Chegu goats. The studies also showed higher relatedness of the Chegu breed with Tibetian goat breeds reflecting close relationship between the two breeds.
6. Primary data on semen characteristics, freezability and cryo-preservation of Chegu semen for future use. The semen attributes (Progressive motility, live /dead sperm count, acrosomal integrity and sperm abnormalities) has been evaluated. The freezability of Chegu buck semen in LN_2 has been studied for using the technology of AI in goats and for undertaking ex situ breed conservation.
7. Cryo-preservation of the germplasm for posterity. Till date approx. 2500 DFS straws from 15 elite bucks of Chegu breed has been cryo-preserved out of which 2300 straws from 12 bucks has already been deposited in National Animal Gene Bank at NBAGR, Karnal, the lead centre of the project. The work on collection and cryo-preservation of semen is still in progress and more straws from more elite bucks will soon be prepared and stored.
8. Social awareness among the breeders regarding utility of the breed and its conservation as a component of animal biodiversity is being created. The assistance of mass media/press is also being solicited in this campaign.

Network Project On Animal Genetic Resources Spiti Horse (In-Situ Conservation- Unit)

- Spiti (Chamurthi) is one of the six recognized breeds of Indian horses. This breed is distributed in Lahaul & Spiti and Kinnaur districts of Himachal Pradesh. Similar types of horses are also found in adjoining alpine regions of Ladhakh and Tibet. These horses are known for their stamina and sure footedness in the undulating hilly topography of the region and are utilized as multi purpose pack animal for transportation, riding, racing and other draught purposes. The main breeding tract of these horses is confined to the Pin Valley region of the Spiti sub-division.
- A total of, 59 elite Spiti female horses from seven villages (Mud-6, Sagnum-9, Guiling-6, Selling-2, Upper Guiling-2, Bhar-5 and Kungri-1) were identified, selected and registered under the project. As per the provisions under the project, the owners of theses selected broodmares were given financial incentives to the tune of Rs. 3000 per owner on account of maintenance cost of the animal so that good and healthy progeny is born. Besides, the progress of the 29 broodmares which were registered last year was also undertaken and six male foals born out of these elite female animals were also selected under the project and first installment of Rs. 5000 was provided to the owners of these animals on account of partial maintenance cost.
- Recommendations are being sent to Department of Animal Husbandry of the state for future conservation of the Spiti horses.

- The final report was presented at Scientist's meet at NBGR Karnal on 11-12th April 2005.

Improvement of Migratory Sheep Production Programme for the Tribal, Backward and Hilly Areas

Achievements:

- Due to harsh climate condition and passing through difficult terrains during breeding season in the migratory flocks in Himachal Pradesh is restricted to 2 – 3 months to have Lambing only during downward migration to avoid high mortality.
- Identified the causes of low productivity in the migratory flocks of Himachal Pradesh. Improper breeding practices inbreed migration stress, mineral cum vitamin deficiencies and insufficient Vety. aid and health coverage were identified as the factors responsible to lower the productivity of migratory flocks in H.P.
- Breeding, Nutritional and Health interventions were decided to be provided to the migratory flocks to demonstrate the migratory sheep breeders to adopt these technologies for the improvement of their flocks.
- Some migratory flocks were used as demonstrations units to demonstrate the effect of breeding nutritional and health technologies to other migratory sheep breeders in improving production and reproduction parameters and achieving higher returns from the migratory flocks.
- Few breeding rams were selected from the breeders flock, purchased and distributed to the selected breeders to demonstrate optimum male and female ratio so that maximum number of ewes may carry lambs and breed any inbreeding going on in these migratory flocks.
- Nutritional inputs in the form of mineral cum vitamin supplement was procured and distributed to the selected breeders to provide at least 8 – 12 grams of supplement per week per animal to minimize the mineral deficiencies and reduce migratory stress in these flocks.
- Timely vaccination, regular drenching and six monthly dipping schedules were followed to avoid any outbreak of certain diseases and reduce the losses due to endo and ecto parasites.
- Data on production and reproduction parameters were recorded on their animals to study the impact of these interventions on these traits.
- Results obtained from the date recorded and analysed year wise shows noticeable improvement in all production and reproduction traits over years. This shows that there is a need of providing intervention of breeding, Nutritional and health to the migratory flocks which face a lot of loss in the production in the form of Live lambs born, growth rate and wool production parameters. Improvement in the means production figures reflects the impact of these interventions by taking care of the migration stress and insufficient feeding and health resources.
- Group wise analysis of data shows impact of individual intervention on all the parameters studies. Better results observed in the animals of group- I show that the interventions provided to the animals have produced more improvement in all the parameters taken in the study as compared to other group of animals.
- A clear cut effect of each intervention can be seen from the group wise analysis of the data showing the effect of every individual intervention of these Parameters. This helps the breeders to choose all or any of the combination of interventions as per his resources to get more returns from his flock.

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

Achievements:

- The area for survey comprising of three district of the state in native breeding tract has been identified.
- The data on about 3000 sheep has been collected on body measurements for morphological traits during the year. The reproduction and production parameters were also measured.
- Wool samples of the Rampur Bushair sheep were taken for analysis of qualitative traits. These samples were sent to NTRS Garsa for further analysis.

- The data on carcass traits is also being collected.
- The socioeconomic status of the sheep breeders was studied.
- The Annual report was presented at Scientist's meet at NBGR Karnal on 11-12th April 2005.

Survey and characterization of Spiti horses

The study was conducted in three districts (Lahaul Spiti, Kinnaur and Kangra) of the state under network project (ICAR).

- Demography status of the Spiti horse breed was established by systematic survey.
- Breed was characterized morphologically (Height, length, girth etc) along with other traits including reproduction.
- Different body colors of Spiti horses were studied.
- Breed descriptor of Spiti breed of horses was developed.
- Other profiles like hematological, biochemical, anatomical and disease were studied.
- The final report was presented at Scientist's meet at NBGR Karnal on 11-12th april 2005.

EXTENSION:

Thirteen lectured were delivered to the farmers/ trainees under various programmes by the faculty members on varied topics of interest related to veterinary & Animal Sciences like Grower and Layers management, Suitable milch breeds and breeding programme for enhancing milk production in Himachal Pradesh, Scope and management of rabbits for meat and wool purpose, Scope and prospectus of poultry farming, Raising poultry for eggs and meat production and prospects and problems in H.P to the visiting farmers on the campus.

Radio Talk: Dr Sanjeet Katoch of the department delivered talk on Rampur Bushair sheep under programme radio pathshala.

Publications:

Research papers :

1. Sanjeet Katoch; Dogra, P.K.; Thakur, Y.P. and Gupta, K (2004) Phenotypic characterization of Spiti horse in its breeding tract-body measurements Centaur XX-3 : 45-47.
2. Kumar, R; Sanjeet Katoch; Gupta, K; Ajay Katoch; Dogra, P.K.; Sharma, K.B. (2004) Hematological profile of migratory Spiti Horses Centaur XX-3 : 54-56.
3. Sharma Alok; K.Panda; S.K. Khurana; Katoch S and Katoch R(2004) prevalence of Brucellosis in Spiti horses in Northen western Himalayas. Centaur XX-4 68-69
4. Ajay Katoch; Sanjeet Katoch; Gupta, K; Dogra, P.K.; Sharma, S.K. and Thakur, Y.P. (2004) Mineral and Biochemical profiles in Spiti Horses Centaur XX-3 : 48-49
5. Y.P.Thakur ; S.Katoch and K. Gupta(2004) Characterisation of Chegu breed of goats in Himachal Pradesh, Ind. J. Animal Gen. & Breeding 25:118-122
6. 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.

Research 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 deserts of Himachal Pradesh. Paper presented in the "National symposium on domestic animal diversity : Status, opportunities and challenges" held at NBAGR, Karnal. February 11-12,2005. Abstr. No. DAD-139, pp.145.
2. Gupta, K., Katoch, S., Thakur Y.P. and Dogra, P.K. (2005). Growth pattern studies of Gaddi goats in cold arid zone of Himachal Pradesh. Paper presented in the "National symposium on domestic animal diversity : Status, opportunities and challenges" held at NBAGR, Karnal. February 11-12,2005. Abstr. No. DAD-184, pp.148.

3. Thakur Y.P., Katoch, S., Gupta, K. and Dogra, P.K. (2005). Opportunities for improvement of pashmina goats in cold arid region of western Himalayas. Paper presented in the "National symposium on domestic animal diversity : Status, opportunities and challenges" held at NBAGR, Karnal. February 11-12,2005. Abstr. No. DAD-103, pp.166.

Chapters in Books:

1. Dogra P.K., Thakur, Y.P. and Katoch, S. (2004). Spiti horses in high mountains of Himachal Pradesh – a conservation approach . Chapter in "Livestock Production Systems for Sustainable Food Security and Livelihoods in Mountain Areas" by Vir Singh and P. L. Gautam. G.B. Pant University of Agriculture & Technology, Pantnagar-263145, Uttranchal, India. pp 51-54.
2. Thakur Y.P. and Dogra, P.K. (2004). Production system and demographic status of Chegu foats in their breeding tract – evidence from potential breeding tract in Himachal Pradesh. Chapter in "Livestock Production Systems for Sustainable Food Security and Livelihoods in Mountain Areas" by Vir Singh and P. L. Gautam. G.B. Pant University of Agriculture & Technology, Pantnagar-263145, Utranchal, India. pp 177-182.
3. Gupta K(2004) Gaddi sheep and goat breeds of Himachal Pradesh, Chapter in "Livestock Production Systems for Sustainable Food Security and Livelihoods in Mountain Areas" by Vir Singh and P. L. Gautam. G.B. Pant University of Agriculture & Technology, Pantnagar-263145, Utranchal, India. pp 177-182.
4. O.P.Kaila and Kamlesh Gupta(2004)Augumenting the productivity of mountain sheepfor sustainable livelihood security for tribal areas. Chapter in "Livestock Production Systems for Sustainable Food Security and Livelihoods in Mountain Areas" by Vir Singh and P. L. Gautam. G.B. Pant University of Agriculture & Technology, Pantnagar-263145, Utranchal, India. pp 177-182.

9. DEPARTMENT OF VETERINARY PUBLIC HEALTH

TEACHING:

The department offers courses to veterinary undergraduates as well as to the post graduates.

RESEARCH:

Investigation work is going on for the bacteriological testing of water samples from different sources in and around Palampur. In all 43 water samples were analyzed, viz. tap(22), hand pump(9) and surface water(Khud/Kuhl/Bowri-9) and filter (UV-4). The coliform count more than acceptable limit was found in 13 samples of tap water(10 to > 2400), 7 samples of surface water(11 to > 2400) , 2 samples of Bowri water (10 to > 2400), 5 samples of hand pump water(10 to > 2400) and 2 samples of filter water(10 to > 1100). *Escherichia coli* was absent in water samples of UV filter, 5 samples of hand pump and 12 samples of tap water. Three samples of tap water, two samples of Hand pump water through tank supply , one sample of Bowri water and Two samples of surface water revealed the presence of *Balantidium coli* trophozoites. Eight isolates of *Escherichia coli* were serotyped which revealed pathogenic serotypes like O25,O15,O139.

- Sixty seven air samples were collected (for the last three years 2003,2004,2005) 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 14 samples examined from outdoor public places no sample revealed microbes more than common level i.e. 5 to 100 c.f.u/ft3. Contrary to this

36% and 56% sample showed microbes more than common level in outdoor and indoor environment of Livestock farms, respectively. In all the four locations majority colonies revealed high presence of Gram-positive cocci followed by Gram positive rods. In addition to it, in public places both indoor and outdoor, fungal colonies were less than Gram-positive cocco bacilli. In animal farms, indoor and outdoor air samples also revealed few fungal colonies.

- Sixty four blood samples from different animals were also tested for the presence of brucellosis by RBPT antigen.
- Twenty blood samples were also tested for the presence of Salmonellosis in poultry by Salmonella coloured antigen.
- One urine sample was processed CST.
- Three feed samples were processed for CST

EXTENSION:

Lectures were delivered to the visiting groups of farmers sponsored by different agencies on varied topics related to veterinary public health chiefly Clean milk production; zoonotic diseases in animals and vice-versa;

Radio talks:

- Talk delivered on All India Radio, Dharamsala on 27.07.2004 broadcast on 05.08.2004 by Dr. A. K. Panda
- Talk delivered on All India Radio, Dharamsala on 28.07.2004 broadcast on 09.08.2004 by Dr. S. K. Khurana

Training/ Conference/Symposia attended:

1. Seventh World Congress on Environment Management (WCEM-2004) Organized by World Environment Foundation on 10-12th June 2005, at Palampur-176 062 (HP), India. (By Dr. A. K. Panda)
2. Three days Training Programme on Computer Networking and Use of Internet for Biological Database Search and Information Retrieval , March 17-19 , 2005, Advanced Centre for Hill Bioresouces & Biotechnology, CSK, Himachal Pradesh Agriculture University, Palampur-176 062(By Dr. A. K. Panda and Dr. S.K. Khurana)
3. 3rd Annual Conference of Indian Association of Veterinary Public Health Specialists,9-10th February 2005 at P. A .U, Ludhiana. (By Dr. A. K. Panda)
4. Attended the XXII Annual Conference of Indian Association of Veterinary Microbiologists, Immunologists and Specialists in Infectious Diseases and National Symposium.,October,18-19, 2004, at COVAS, CSK-HPKV, Palampur (HP), India.(By Dr. S.K. Khurana)

Publications:

Books Published:

A chapter entitled "Microbial Air Quality in Public Places and Livestock farms of North-Western Himalayas. Governance for Sustainable Development" was contributed by Panda, A. K., Katoch, R. and Sahoo, Artabandhu (2005), in the 1st Edition, MM Publishing, London, and pp 220-226.

Research Papers:

1. Katoch, R, Das, K.S.; Wadhwa, D.R.; Panda, A. K.and Agnihotri, R.K. (2004) Efficacy of doramectin against endo and ecto parasites in goats. J. Veterinary Parasitology, vol.18, pp 93-94.

Other publications/ presentations in conferences/ seminars:

1. Panda, A.K., Katoch,R. and Sahoo, Artabandhu (2005) Microbial Air Quality in Public Places and Livestock Farms of North-Western Himalayas.7th World Congress on Environment Management,10-12th June 2005, Palampur.
2. Panda, A. K., Katoch, R. and Sharma, A. K. (2004) Bacteriological examination of air in North-Western Himalayas. XXIInd Annual Conference of Indian Association of Veterinary Microbiologists, Immunologists and Specialists in Infectious Diseases and National Symposium. October, 18-19, 2004, Palampur (HP), India.
3. Katoch, R., Panda, A. K., Sharma, A. K. and Pathak, V. (2004) prevalence of Balantidium coli in water samples in North- Western Himalayas. XV Annual Congress of Indian Association for the Advancement of Veterinary Parasitology and National Symposium. October, 25-27, 2004, C O V A S, GB Pant University of Agriculture & Technology, Pantnagar (Uttaranchal), India.

10. 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.

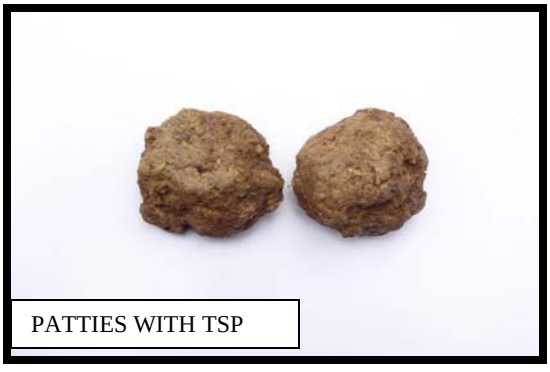
TEACHING:

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:

Carcass characteristics of adult Chegu bucks

The Chegu is a unique breed of mountain goats primarily occurring in the cold desert region of western Himalayas. The native tract of this breed extends from the Ladakh plateau of Jammu & Kashmir through mountain ranges of Pangi, Spiti and Kinnaur valley of Himachal Pradesh upto Uttarkashi, Chamoli and Pithoragarh districts of Uttaranchal. This breed of goat is most popular for its high quality textile fiber known as Pashmina though its meat is also considered as delicacy. The present study was conducted to provide base data on carcass characteristics of Chegu bucks procured from high altitude cold desert region of Western Himalayas and subsequently reared in an organized farm of CSK HPKV at Palampur. The average live weight of slaughtered bucks in the age group of 2.5 -3.0 years was 42.5±2.5 kg. The mean dressing percentage calculated was 46.18±1.88. The average percentage of blood recovered on live weight basis was 3.37±0.16. The respective percentage contribution of head, skin and feet were 9.64±0.77, 8.31±0.26 and 3.01±0.18. The mesenteric and caul fat calculated as percentage of hot carcass weight were 4.31±0.39 and 1.09±0.13. The percentage of pluck on the hot carcass weight basis was 3.35±0.28. The percent contribution of liver, spleen, kidney and testicles to the hot carcass were 3.39±0.06, 0.59±0.01, 1.19±0.07 and 1.41±0.07 respectively.



PATTIES WITH TSP

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.

Effect of Different Extenders on Sensory Evaluation of Meat Patties

This study was conducted for a dissertation under Compulsory Internship Programme of B.V.Sc. & A.H. To evaluate the effect of different soy extenders in meat products, the chevon meat patties were prepared in Department of Livestock Products Technology, CSK HPKV, Palampur (H.P.) by incorporating textured soy protein (T_1), soy protein concentrate (T_2), soy protein isolate (T_3). Patties prepared without any extender served as control. Formulation used for Chevon Patties is expressed in the following table.

Table 1. Formulation used for Chevon Patties

Ingredient	Control	T_1	T_2	T_3
Salt	1.5	1.5	1.5	1.5
Spice Mix	2.5	2.5	2.5	2.5
Fat	5.0	5.0	5.0	5.0
Extender	-	3.5	3.5	2.0
Condiments	3.0	3.0	3.0	3.0
Crushed ice	10.0	10.0	10.0	10.0
Chevon meat	78.0	74.5	74.5	76.0
Total	100.0	100.0	100.0	100.0

T_1- Patties with TSP (Textured Soy Protein)

T_2- Patties with TSP (Soy Protein Concentrate)

T_3- Patties with TSP (Soy Protein Isolates)

The cooking yield of patties was 70.0, 80.0, 81.6 and 73.3 per cent for control, T_1, T_2 and T_3 respectively. The patties prepared without and with different extenders were evaluated for different organoleptic attributes by a panel of semi-trained judges using 9 point hedonic scale. The results of sensory evaluation for different formulation of patties are expressed in the following table.

Table 2. Organoleptic Evaluation of Chevon Patties prepared with Different Extenders

Attribute	Control	T_1	T_2	T_3
Appearance and colour	7.83±0.17	8.50±022.0	8.17±0.31	8.00±0.26
Flavour	7.66±0.33	7.66±0.21	8.17±0.40	8.17±0.31
Juiciness	7.17±0.48	6.84±0.54	7.83±0.60	8.00±0.63
Texture	7.50±0.34	8.33±0.21	8.±0.52	8..00±0.37
Saltiness	7.77±0.42	8.00±0.26	8.33±0.33	8.00±0.26
Mouth coating	7.83±0.31	8.17±0.31	8.33±0.42	8.17±0.31
Overall Acceptability	7.83±0.40	8.00±0.37	8.67±0.21	8.67±0.21

EXTENSION:

The department was actively involved in extension activities and delivered 25 extension lectures/practical demonstrations to the unemployed youth and women farmers under trainings organized by Directorate of Extension Education, CSKHPKV Palampur.

FACULTY & STAFF IMPROVEMENT:

Training/workshops Attended / Organized

Dr. Vikas Pathak attended 2 days training on, "Vet-Master Software" at Chandigarh w.e.f. 23.02.05 to 24.02.05

Conferences/Symposiums attended:

Dr Vikas Pathak attended the of National Symposium on ,"Newer concepts and challenges in Veterinary Science & Animal Husbandry" and First Round Table on Rumenology held at College of Veterinary & Animal Sciences, Rajasthan Agricultural University, Bikaner, December 31st 2004 & January 1st 2005

PUBLICATIONS

Papers/abstracts presented/published in Conferences/Symposiums:

1) Y.P.Thakur, R.Katoch and V.Pathak (2004) production and utilization of Pashmina fiber in Himachal Pradesh. National Seminar on Angora Rabbit Wool and Cashmere production and Utilization held at Manali, September 25-26, 2004, p 192
2) V.Pathak and R.B.Sahrma (2004) Value added shawls prepared by blending of Angora and Merino wool. National Seminar on Angora Rabbit Wool and Cashmere production and Utilization held at Manali, September 25-26, 2004, p 209
3) V.Pathak and R.B.Sahrma (2004) Comparison of Angora blended woolen shawls woven on handloom and powerloom. National Seminar on Angora Rabbit Wool and Cashmere production and Utilization held at Manali, September 25-26, 2004, p 209
4) V.Pathak and Y.P.Thakur (2004) Carcass characteristics of adult Chegu bucks. National Symposium on ,"Newer concepts and challenges in Veterinary Science & Animal Husbandry" and First Round Table on Rumenology held at College of Veterinary & Animal Sciences, Rajasthan Agricultural University, Bikaner, December 31st 2004 & January 1st 2005, p 304-305
5) Aparana Sharma, Manoranjan Kalia and V.Pathak (2004) Effect of lean replacement on the composition of minced meat balls. National Symposium on ,"Newer concepts and challenges in Veterinary Science & Animal Husbandry" and First Round Table on Rumenology held at College of Veterinary & Animal Sciences, Rajasthan Agricultural University, Bikaner, December 31st 2004 & January 1st 2005, p 305
6) Aparana Sharma, Manoranjan Kalia and V.Pathak (2004) composition and organoleptic acceptability of soy-protein incorporated mutton nuggets. National Symposium on ,"Newer concepts and challenges in Veterinary Science & Animal Husbandry" and First Round Table on Rumenology held at College of Veterinary & Animal Sciences, Rajasthan Agricultural University, Bikaner, December 31st 2004 & January 1st 2005, p 305-306

11. DEPARTMENT OF VETERINARY PARASITOLOGY

TEACHING:

The department offers courses to veterinary undergraduates as well as to the post graduates.

RESEARCH:

Comparision of breed susceptibility for parasitism:

In this study the breed susceptibility in between cross bred (Chegu& sahlein) goats and native gaddi goats was compared for parasitism. Eight animals of each group were dewormed before rains and examined for parasitic stages, if any. Subsequently all animals of both groups were

allowed to graze for one month on same pastures. After one month the faecal examination of all sixteen animals was carried out three times at a interval of one week to observe the GIT parasitism. The faecal egg output showed higher epg of faeces in cross bred animals as compared to gaddi goats.

Efficacy of herbal antianemic (Ferrocom) against anaemia induced by *Haemonchus contortus* in sheep:

In this project 20 animals (sheep) have been purchased. Fresh *Haemonchus contortus* were procured from the local slaughter houses. These worms were processed in the laboratory. The eggs were cultured to harvest the larval stages. After treating all the animals, two animals were made as donor by feeding 1000 larvae. After patency of the infection, the faecal samples of these donor animals were collected to culture the larval stages in large quantity for feeding to experimental animals. individually have been fed with 2000 larval stages oh *Haemonchus contortus* for development of anemia. After patency of the infection the animals were devided in three groups ie.GroupI , II and IIIof six animals each. The animals of group III serves as healthy control. Haematological and biochemical examination of all the animals of three group was done at weekly interval on o,7,14, and 21 DPI. On day 21, animals of group I and II were administered Ivermectin @ 0.2 mg/Kg body weight. On the same day the animals of group I were administered Ferrocom orally at the dose rate of 250 mg/Kg body weight for three weeks and haematological and biochemical examination was again done at weekly interval on day 28 , 35, and 42 day post infection.

Analysis of data showed that the animals of group I and II showed a fall in Hb,PCV and TEC values post infection with 2000 infective third stage larvae of H. contortus. However, after anthelmintic treatment and subsequent administration of ferrocom , there was a significant($P<0.05$) increase in the values of Hb, PCVand TEC in group I . Similarly, the animals of group II also showed an increase in the value of Hb,PCV and TEC but these were not significant.Hence, the Ferrocom , an anti-anaemic compound was found to be highly effective in the treatment of anaemia induced by Haemonchus contortus.

Forecast & surveillance Lab. for Parasitic Diseases in H.P.

Samples screened from in and around Palampur:

125 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, goat, wild animals ,dog, rabbit,pigs and human beings. During the period overall parasitism in this area was found to be 40%.In cattle predominant parasites observed were amphistomes followed by strongyles and *Fasciola*.In case of rabbit coccidian parasites were found in the Table given below. Samples examined in and around Palampur for parasitic infections.

Animal species	No.of samples examined	Samples positive for parasites	Samples negative for parasites	Type of infections						
				F	A	S	C	Th	Ot	Mixed
Cattle	64	35	29	2	12	11	1	4	2(An)	03 (1A+ S ,1Ano + S,1Th+ An)
Rabbit	50	12	38	–	–	–	12	–	–	–
Dog	2	–	2	–	–	–	–	–	–	–

Lion	1	1	-	-	-	-	-	-	1As	-
Goat	1	1	-	-	-	-	-	-	-	01(S+ Tri)
Pig	1	-	1	-	-	-	-	-	-	-
Human	6	1	5	-	-	-	-	-	1Ent.	
Total	125	50 (40%)	75							

F =*Fasciola* ; A=Amphistomes ; S=Strongyles ; C= Coccidia ;As=Ascarids; Th =*Theileria,* An=Anaplasma, Ano= Anoplocephalid,Tri = Trichuris, Ent=E.histolytica.

EXTENSION:

Extension lectures: Teachers of the department delivered 23 lectures on different topics in various training programmes organized by Directorate of Extension Education, Dean COVAS and Department of Animal Nutrition

Expert lectures in organic Farming for the field Agriculture officers of the state: Lectures were delivered to_field Agriculture officers of the state in the training programme organized by centre for human Resource Development , College of Agriculture, CSKHPKV on the topic Organic aquaculture – current status and future prospects.

Radio talk: One in AIR, Dharamshala

IV. Extension Publication: Two in "Tips for Vets" published by H.P. Vety. Council.

PUBLICATIONS:

1. Chaddha, D; Agnihotri, R.K. and Katoch,R. 2004. Incidence of Ascaridia galli in Palam valley of Himachal Pradesh. Indian *J.Anim.Sci.*74 (10):1032-34.
2. Chaddha, Deepali; Agnihotri, R.K. and Katoch,R.2005. Incidence of ectoparasites in poultry in Palam valley of Himachal Pradesh. *J.Vet.Parasitol.*19 (1) : 57-58.
3. Chaddha, Deepali; Agnihotri, R.K. and Katoch,R. 2005 .Efficacy of albendazole and levamisole against *Ascaridia galli* .J.Vet.Parasitology.19(1) : 35-37.
4. Katoch,R.; Singh,M.M.;Agnihotri,R.K.and Mittra, S. (2005) Increasing incidence of hypodermosis in Kangra valley of Himachal Pradesh. *J.Vet.Parasitol.*19 (1): 67-68.
5. Sharma, Devina; Katoch, Rajesh, Agnihotri, R.K. and Panda, A.K.2005.Efficacy of mebendazole against experimental Haemonchus contortus infection in Gaddi sheep. *Veterinary Practitioner*.6 (1):30-32.
6. Katoch, R (2005) Sustainable control of Gastro intestinal nematodes. In Compendium of "Advances in Animal Health and Production with special reference to Northern Hill Area".pp.73-76.
7. Panda, A. K., Katoch, R. and Sahoo, Artabandhu (2005) Microbial Air Quality in Public Places and Livestock farms of North-Western Himalayas. Governance for Sustainable Development, 1st Edition, MM Publishing, London, pp 220-226.
8.

Abstracts Published/ Oral presentation

1. Agnihotri RK., Katoch R and Mittra S. (2004) Incidence of gastrointestinal Helminths in cattle and Buffaloes of District Kangra of Himachal Pradesh. : XV Annual Congress of Indian Association for the Advancement of Veterinary Parasitology and National Symposium. October, 25-27, 2004, C 0 V AS, GB Pant University of Agriculture & Technology, Pantnagar (Uttaranchal), India.
2. Sharma D, Katoch R, Agnihotri R.K. and Sharma Alok (22004) Seasonal incidence of gastro --intestinal Helminths of sheep in North-Western Himalayas. XV Annual Congress ofIndian

Association for the Advancement of Veterinary Parasitology and NationalSymposium. October, 25-27, 2004, C0VAS, GB Pant University of Agriculture &Technology, Pantnagar (Uttaranchal), India.
3. Sharma D, Katoch R, Agnihotri RK and Pathak V (22004) Epidemiological studies on gastrointestinal Helminths of sheep in North-Western Himalayas XV Annual Congress of Indian Association for the Advancement of Veterinary Parasitology and National Symposium. October, 25-27, 2004, C 0 V A S, GB Pant University of Agriculture & Technology, Pantnagar (Uttaranchal), India.
4. Katoch, R., Panda, A. K., and Sharma, A. K. (2004) prevalence of Balantidium coli in water samples in North- Western Himalayas. XV Annual Congress of Indian Association for the Advancement of Veterinary Parasitology and National Symposium. October, 25-27, 2004, C O V A S, GB Pant University of Agriculture & Technology, Pantnagar (Uttaranchal), India.
5. Panda, A. K., Katoch, R. and Sharma, A. K. (2004) Bacteriological examination of air in North-Western Himalayas. XXIInd Annual Conference of Indian Association of Veterinary Microbiologists, Immunologists and Specialists in Infectious Diseases and National Symposium. October, 18-19, 2004, Palampur (HP), India.
6. Thakur, Y.P. Katoch, R and Pathak, V (2004) Production and utilization of Pashmina fibre in Himachal Pradesh. Presented in National Seminar on Angro Rabbit wool and cashmere production and utilization held at Manali, 25-26 Sept. 2004.

12. DEPARTMENT OF FISHERIES

TEACHING:

The department offered courses to veterinary undergraduates as per VCI regulations Training to interns of College of Veterinary and Animal Sciences is imparted in the field of Fishery sciences.

RESEARCH:

A total of five sub projects were carried out during the year. The findings based on the data generated are summarized under each heading of the projects as given below:

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

In view of the high cost feed ingredients of fish feed, it was envisaged to develop low cost feed with the formulation of local ingredients as such different experimental trials were conducted by formulating different feeds based on the local ingredients. The Katcha ponds of 300m^2 were used for this experiment. The fingerlings were acclimatized for seven days in present ecological condition prior to initiation of the experiment. Three diets were formulated to evaluate wheat bran+ fishmeal + groundnut oil cake (control diet), Wheat bran + Soybean + mustered oil cake and Wheat bran+ Soybean + linseed oil cake. The protein level in all the three diets was maintained as 30%.

Stocking of 450 fingerlings of major carps in ratio of 2 CC: 2GC: 1SC were done in each experimental pond and two replicate trials were used for each experimental diet 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 (1980) (Table 2). Water temperature during the experiment period varied between 16 to 31.3^{0}C, 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. Every month 20% of the stock was harvested to calculate the amount of feed and to observe the average growth rate. During the feeding trials, it was seen that the acceptability of all diets was not similar, although the consumption of feed was good. 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 control diet (Wheat bran+ fishmeal + groundnut oil cake) in case of common carp and grass carp followed by Wheat bran + Soybean + mustered oil cake based diet. Where as, silver carp shows maximum gain in average weight fed Wheat bran + Soybean + linseed oil cake based diet. In Wheat bran + Soybean + mustered oil cake based diet, the growth rate was high during first four month as compared to other diets but less during last three months. The survivability rate was almost similar in all the diets except grass carp in fish meal-based diet. The total weight harvested was higher in control diet followed by Wheat bran + Soybean + mustered oil cake and Wheat bran + Soybean + linseed oil cake based diets. The feed conversion ratio was found better in Wheat bran + Soybean and mustered oil cake. According to Hasan *et a*l. (19191), the digestibility value of mustered oil cake protein is found to similar to that of fishmeal based control diet. However, the cost analysis of the different feed indicates that in terms of cost of feed the controlled diet was found to be most expensive and mustered oil cake was the cheapest. No doubt, the result of the present study indicates that fishmeal based diet showed the best performance as compared to diet containing Wheat bran + Soybean + mustered/ linseed oil cake, but the cost benefit ratio is lowest.

Poor growth performance of grass carp and common carp fed on linseed oil cake based diet may be due to the presence of some nutritional deficiency or growth inhibitory substance in it as reported by Montgonery (1980), Gohl (1981) and McDonald *et al.* (1981). Therefore, under the present circumstances locally available linseed oil cake may not be recommended for commercial production of fish in mid hill region of the estate. As such diet No. 2 (Wheat bran + Soya been+ Mustered oil cake is considered to be the cheapest and better diet for commercial production of fish in the hills.

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

A trial was set on growth performance of adult Mahseer on fishmeal-based 44% protein rich diet in 200m^2 water areas pond. The 60 specimens of 204 g. average weights were stocked in 200m^2 water area of ponds and fed @ rate of 1% of total body weight as the average water temperature remained 17.8 0C. The physico-chemical and biological parameters of these ponds were monitored and compiled to arrive at the monthly average data (Table 4). The feeding was stopped in month of December, January and February due to low water temperature i.e. 13.10C, 9.30C and 9.30C respectively. Further, form March onwards they were fed @ rate of 1% of total body weight when average temperature remained 14.82^{0}C and the feeding frequency was once only i.e. at 2pm. But the feeding frequency was increased thrice a day, as water temperature start increasing i.e. with average temperature of 18.22^{0}C the feeding was done (@2% of total body weight). It was also observed that during three winter months there is no growth. The trial was terminated at the end of June and harvested data given in table 3 depicts that per month average growth of fish was 26g. and survivability was remaining 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 200g live weights was obtained. Thus comparing the result with the control diet (exclusion 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.

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

Generally the commercial production in different parts of the country is carried out by using unselected strains. This practice of choosing only a limited stock over generations for breeding can lead to a constriction in the gene pool of the population resulting in inbreeding depression, increased fry abnormalities and reduced growth (khan, 1991). Further, study of literature reveals that there is a potential for selective breeding in this species. Thus the trial on genetic improvement of mirror and scale carp by selective breeding has been carried out and the data so 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 32g to 246 g. i.e. 11.04 – 26.82% of their body weight irrespective of the size of fish. It is observed that the loss in weight is mainly regulated by environmental factors such as water temperature, dissolved oxygen, pH and also fluctuation in these parameters with in a day besides the weight of the male. Thus it is confirmed that environmental factor play an important role to regulate the fecundity, survivability of eggs, sperm and fries. Thus it is inferred that breeding of common carps depends on the supply of quality feed as well as the suitable water temperature. Further, the genetically improved stock gave good result in respect of growth and disease resistance as much as the growth of improved stain is almost 15% higher than that of unimproved one. A total of 35 sets of genetically improved breeders were bred this year. The breeding trial was started from 4th April, 2005 and due to high temperature, 90% of breeder took 8-12 hours to breed but due to storm as well as temperature fluctuation on 6th April the breeding time was delayed to 72 hours and only 60% breeder was bred successfully. It is seen that due to stormy, cloudy as well as storm hail on Dhawladhar peak the percentage of egg fertilization was less that is 30 to 40% where as when weather was suitable the percentage of fertilization was noticed 80 to 85%. Similarly the hatching was also affected by this type of environment no doubt due to maintenance of high oxygen in water the survivability of spawn was slightly better. So the impact of climate on breeding, hatching of fish cannot be omitted. 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 avoid inbreeding.

Revolving Fund Scheme:

The aim of this scheme is to set a model for the entrepreneurs/farmers of mid hill region so as to boost their economy 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 Agroclimatic zone II of Himachal Pradesh and the growth performance per unit area of this model is quite encouraging under field condition. 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. As a result the income of the Department enhanced to the tune of Rs. 1, 79,180 during the year. A total production of 13.189 quintals of fish has been recorded during the year under report, out of which 12, 01.300 Kg fishes worth Rs. 72, 078 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 Neelamber Fish Farm, Patiala, and reared up to fingerlings stage and 88,519 fingerlings of worth Rs. 91, 670 was distributed to the fish farmers of Kangra, Mandi and Hamirpur. Thus the total earning under this scheme during this year was Rs. 1, 79, 180 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.

Aquaculture management in cold water – Evaluation of Mahseer fishery potential and its farming feasibility for conservation in Himalayan Region.

In order to monitor the growth performance of *Tor putitora* in different ecological condition, different replicate trials were conducted in different size of ponds and troughs by rearing fries fingerlings as well as yearlings. The fingerlings and yearlings were fed with 35%, 42%, 45%, and 50% protein rich pelleted feed at the rate of 4% and 3% of total body weight under different stocking density as well as different size of ponds. Feeding was done thrice daily between 9 Am to 6 pm. The physicochemical and biological parameters of water were monitored (Table 6) regularly to find out the impact on growth performance and survivability of Mahseer. Based on these trials the following observations were made.

- Mahseer does not respond on feed when temperature falls below 120c.
- 35% protein rich feed is better and more economical for rearing of fingerlings.
- The different stocking density for late fries reveals that it can be reared up to 80 fries/m3.
- The 42% protein rich feed was found suitable for rearing of Mahseer fries. If fishmeal is replaced by Soybean, 45% protein rich feed is found suitable for fingerlings and yearlings of Mahseer. The Mahseer feed better on soybean mixed feed as they like the odor of roasted Soybean. The growth performance was also found better on this feed.
- It was observed that with decreases in water level from 0.8m to 0.5m the fishes stopped feeding. The adult Mahseer (80g average weight) shows 18.3g gain in average weight per month and survivability 82% which is better than fries and fingerlings. However, Soya bean based diet shows better performance in same average group i.e 21g/month and 23g/month in average group of 300g with the survivability of 96%.
- During the month of June the preferred food of Mahseer comprises biomass of plankton dominated by Copepod production due to greater amount of sunshine and better light intensity; fishes give less response to supplementary feed.
- Culture of Mahseer species is not compatible with other cultivable major carps, as it cannot compete for food and existing environment.
- The minimum requirement of pond area for Mahseer culture is 300m2. As in smaller pond the fluctuation of temperature is comparatively more, which affects the feeding frequency. The feeding time of Mahseer changes as per water temperature in captivity as well as in stream. In captivity it accept the feed thrice a day (9 am, 1 pm & 5pm) at temperature 200c to 300c, twice a day (11am & 5pm) when average temperature ranges between 160c to 200c, as the temperature ranges from 120c to 160c the fish accept the feed only once (2pm).
- It is also observed that in captivity the maturation period of Mahseer ranges from mid of June to early July.

Empowerment of women through aquaculture intervention:

The project was started by conducting preliminary survey in distt. Shimla and Solan for selection of potential sites and organization of the motivation camp for the appraisal of beneficiaries regarding fish farming technology. The site so selected falls under different developmental blocks viz. Mashobra, Chopal, Theog and Basantpur (distt. Shimla), Solan, Dharampur, Kunihar, Nalagarh and Kandaghat (distt. Solan) In total 27 motivation camps were organized in 27 villages i.e., Mandla, Bajrolipool, Mehana, Darghot and Theog of Tehsil Theog, Lalpani, Nerua, Kiar, Jhikanipool of Tehsil Chaupal, Mashobra of Tehsil Shimla and Basantpur of Tehsil Sunni in distt. Shimla and Sultanpur, Dharja, Ambad and Bagdol of Tehsil Solan, Chandi, Badlag, Dhukariyana, Patta Mahlog, Gharerh, Kathinar kanota of Tehsil Kasauli, Larech, Mann of Tehsil Arki and Gaura of Tehsil Kandaghat, Dhang Neeli, Talad, Sai of Nalagarh Tehsil in distt. Solan and the response of the rural women were quite encouraging in as much as 15 to 45 ladies of the different villages attended each camp (Table

7). 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.

Six training camp (three for district Shimla and three for 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 20 women participants attended each training camp from different villages as such a total of 178 ladies from 70 villages were trained extensively in polyculture fish farming technology (Table 8). A manual in Hindi comprising of ten chapters on fish farming technology was prepared for easy dissemination of this technology.

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. 10 sets of golden carp were also bred. As a result 32,862 fries of mirror and 1200 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 14,788.

EXTENSION:

- Eight batches of pharmacist trainees varying from 34 to 120 in each batch from Nalagarh (Solan), Jeuri (Kinnaur), Sundarnagar (Mandi), Chamba, Nurpur (Kangra), Palampur (Kangra), and Ghanahati (Shimla) visited the fish farm on 11th Jan., 18th Jan., 3rd Feb., 15th Feb., 18th Feb. and 11th April 2005 respectively and they were appraised of the latest fish farming technology for the hills, its importance and integration with agriculture and animal husbandry practices.
- 287 farmers from Mandi, Shimla, Sirmour Solan, Kangra and Kullu visited the fish farm on 27th July, 28th & 29th October, 14th Dec., 29th Dec. 2004, 14th Jan., 18th March 2005 and they were provided with the technical know-how regarding fish farming in hill.
- 80 students of B.SC. final year from Degree College, Dharamshala, Kangra, visited the farm along with their teachers on 27th October 2004 and they were delivered a lecture on aquaculture specially on trout. 19 students of B.Sc. from Sardar Ballabh Bhai Patel University of Agriculture, Meerut visited the farm in connection with their assignment on different aspect of aquaculture on 13th December 2004.
- Organized a ten days training programme in village Sagur (Kangra) on fish farming in hills under NATP project "Empowerment of farm women" from 21st to 30th September, 2004, which was attended by 30 women of that village.
- Five 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 10th December, 24th to 26 December, 2004, 4 to 8 January, 15 to 17 March and 29th May to 2nd June, 2005. About 145 women participated in this programme and imparted practical training of fish farming in the hills.
- Conducted two training programme of three days duration for the farmers of Kandi project (Bhadroya) and consumer group sponsored by Forest Department, Dharamshala on 27th to 29th December,2004 and 15th to 17th March, 2005 respectively. 50 farmers were imparted training on skill of fish farming in hills with special reference to trout farming.
- Actively participated in State level Kishan Mela on 28th and 29th October, 2004, by displaying the live specimens, museum specimens, feed and posters as well as pamphlets.
- Participated in Exhibition of the University by exhibiting department activities during the visit of His Excellency Dr. A.P.J. Abdul Kalam, President of India and Chief Minister of Himachal Pradesh Raja Virbhadra Singh on 22nd December 2004.
- Arranged exhibition of fisheries activities in Holi Mela of Palampur from 23rd to 26th March 2005

HUMAN RESOURCE DEVELOPMENT:

Seminar and Symposia attended:

1. Dr. (Mrs) Rani Dhanze, Scientist attended the national symposium on "Sustainable aquaculture for Augmentation of Export with special reference to Environmental Engineering & value addition" held on 3-4 September at Agriculture Engineering Division, the Institute of Engineers, Kolkata and presented a paper entitle " Designing of Fish farm in the Hills".
2. Dr. J. R. Dhanze, Prof. & Head attended a national seminar on "New trends in fishery development in India" organized by Department of Zoology, Panjab University, Chandigarh from 16- 18th February, 2005 and presented a paper entitled "Assessment of Mahseer fishery potentials in up streams of Himachal Pradesh".
3. Dr. R.ani Dhanze, participated in the national workshop on "Enhancement of fish production in Pong wetland" organized by Department of Fisheries, Himachal Pradesh and H.P. State council of Science and Technology and Fishery division Ministry of Agriculture Government of India on 19th February 2005.

Summer school and training attended:

Dr. J. R. Dhanze, Prof. and Head has under taken a training program on "Prioritization techniques in fish research" held at NAARM, Hyderabad from 5th to 11 August 2004.

Guest Lectures/Radio talk delivered:

1. Dr. (Mrs) Rani Dhanze, Scientist delivered two lectures on "Technology of fish farming in hills" and "Empowerment of women farmers through aquaculture" at AIR, Dharamshala on 10th August and 1st November 2004 respectively.
2. Dr. J.R. Dhanze, Prof & Head also delivered two lectures on "Management of fish farming" and "Fish farming- a source of income in hills" at AIR, Dharamshal and in campus under Pathshala programme on 1st November, 2004 and 19th March, 2005 respectively.
3. Dr. J. R. Dhanze, Prof. & head delivered a lecture on "Fish farming in hills and its management practices" on 11th February 2005 under awareness camp in Agriculture and allied fields for unemployed youth of Manipur sponsored by 19-ASSAMRIFLES, c/o 99 APO from 3rd to 11 Feb. 2005.
4. Two invited lectures on "Development of sport fishery in Himachal Pradesh" and "Potential and constraint for fish production in Hills" has been delivered by Dr. Rani Dhanze, Scientist and Dr. J. R. Dhanze, Prof and head respectively on 11th March 2005 in a summer school organized by the Dean, College of Veterinary and Animal Sciences, SUKAT, Jammu.
5. The resource persons of this department delivered 24 lectures on different aspects of cold-water fish farming along with practical demonstration on 27th to 29th December, 2004 and 15th to 17th March, 2005 organized by the Department of Extension Education, CSKHPKV, Palampur for the farmers of Kandi Project Bhadroya and consumer group of farmers sponsored by Forest Department, Dharamshala.

PUBLICATION:

1. Indu Sharma and J.R.Dhanze, 2004. Food and feeding habits of *Tor putitora* (Ham.) in Beas River system. *Aquacult,* 5 (2):269-271, 2004
2. J.R.Dhanze and Rani Dhanze, 2005.Assessment of Mahseer fishery potentials in up streams of Himachal Pradesh. Proceedings of the National Seminar "New trends in fishery development in India". Pp. 161-172, 2005.
3. R. Dhanze and J.R.Dhanze, 2005. Empowerment of women farmers in the hills through aquaculture practices. In: *Women Empowerment in Fisheries*. Edt. A. S. Ninawe and A. D. Diwan, pp. 189-194. Narendra Publ. House, Delhi.

4. J.R. Dhanze and.Rani Dhanze, 2005. *Designing of Fish farm in the Hills.* Proceeding of All India Seminar on 'Sustainable Aquaculture for augmentation of export with special reference to environmental engineering and value addition".
5. Rani Dhanze and J.R.Dhanze, 2005. Fish farming in Hills. (In Hindi). *Parvatiya Kheti-Bari,* 25 (1&2): 6-8

13. DEPARTMENT OF VETERINARY ANATOMY

TEACHING

The department offers courses to veterinary undergraduates as well as to the post graduates.

RESEARCH

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

During the period, collection of the tissues of the male genital system, viz., testis, epididymis, vas deferens, ampulla, seminal vesicles, pelvic urethra containing the pars disseminata of the prostate gland and bulbourethral glands and the pineal gland of sexually mature Gaddi goats and Gaddi sheep (2-2½ yrs.) was completed. All these tissues were preserved in 10% neutral buffered formalin and 90% alcohol in chilled condition. They were processed for the paraffin technique using alcohol-benzene schedule; paraffin blocks, for almost all the tissues preserved in both the fixatives, were prepared. One Ph.D. student of the department was also given part of the research work of the project (Histology and histochemistry of the male accessory genital glands of Gaddi goat and Gaddi sheep in the different seasons of the year) as thesis problem. She had completed the microtomy (section-cutting) work of these tissues and started the staining work. Part of the study of the project based on the biometrical measurements (of nine sheep and eleven goats) of male genital organs and the pineal gland was presented in the National Symposium on "Recent Advances in Veterinary Anatomy and its Interdisciplinary Approach for Livestock Production" held in the Department of Anatomy, Veterinary College, Kolkata on 16-18 ,November, 2004.

The salient findings of the project, so far, are as follows:-

1. The biometrical measurements of the organs of male reproductive system and pineal gland of Gaddi sheep and Gaddi goat are more or less similar.
2. The measurements are in general maximum in winter and least in summer.
3. In the penis of both the species, 4-5 cm length of the organ is included in the sigmoid flexure.

An Emeritus Scientist scheme is running in the department with Dr. D.N. Sharma as Emeritus Scientist w.e.f. 22.3.04. He has been working on the "Reproductive Endocrine Interplay in Gaddi goats- A seasonal study". A detailed seasonal study on the Hypothalamus, Pituitary- Gonads relationship in sheep and goat prompted the further investigation on the histology and histochemistry of other endocrine glands in different seasons of the year in these animals. The preliminary studies in Gaddi goats revealed that the Thyroid gland weighed highest during the summer season, and the lowest in the autumn season. The adrenal gland weighed highest in spring season and lowest in the winter season. The weight of the adrenal gland in summer closely corresponded with that of the spring (highest).

The observations are being correlated with the various reproductive phases of the animals as they are also affected due to the translocation from higher altitude to plains.

Other Departmental Research Activities:-

The topographic location, relation and structure of the thyroid gland of mule were recorded. The thyroid gland was located on the ventrolateral aspect of the cranial end of the trachea. The gland comprised of two lateral lobes joined together by a thin double isthmus. The length, width, thickness and weight and volume of both lobes were measured.

Detailed biometrical data of the skull, body and of the various visceral organs has been generated on the North western Himalayan Leopard (*Panthera pardus*). The percentage weight of muscle, bones, and viscera has been calculated.

The studies on the effect of castration on the testis of Gaddi goats revealed that in the castrated animals the overall testicular parameters reduced in prepubertal and further more in the pubertal stages, when compared to the entire group, thus indicating a profound effect of circulating testosterone on the overall morphometrical parameters of the testis in Gaddi goats.

Similar studies on the accessory glands in the same animals revealed that the castration however affect more markdly the volume of bulbourethral glands than that of the vesicular glands, although the weight of both the glands increased due to connective tissue growth during prepubertal and pubertal stages.

The anatomy of the thyroid gland and kidney of small Himalayan ruminants (sheep and goat) has been reported.

EXTENSION:

Radio Talk

A radio talk of Dr. Archana Pathak was recorded on AIR Dharamshala on 31st Oct 2004 on "Paltu Pashuon ki singo ki sangrachana unke rog evam nivaran"

HUMAN RESOURCEDEVELOPMENT:

Participation in Workshop/Conferences/Trainings:

1. Drs. L.S. Sudhakar and R.L.Bharadwaj attended the XIX Annual Convention of IAVA and National Symposium on "Recent Advancement in Veterinary Anatomy and their Inter-Disciplinary Approach in Livestock Production"held at West Bengal University of Animal and Fishery Sciences, Kolkata on Nov, 16-18,2004.
2. Dr.Archana Pathak attended the 5th Indian Veterinary Congress and XII Annual Conferenceof IAAVR-2005 held at College of Veterinary and Animal Science,RAU, Bikaner on 31st Dec 2004 and 1st January 2005.
3. Dr.Virender Pathak attended a training programme on "Computer Networking and Use of Internet for Biological Database Search and Information Retrival" organised by Bioinformatics Centre, CSK HPKV, Palampur. (January 17-19, 2005).
4. Dr. D.N. Sharma, Emeritus Scientist has attended the National Seminar on "Interdisciplinary Approach to the Research in Veterinary Anatomy" held at Orissa University of Agriculture and Technology, Bhubhaneshwar on April, 25th 2005.

Awards and Honours:-

Dr.Virender Pathak, Assistant Professor got Best Poster Presentation award for the paper entitled, "Seasonal Variation in the Micromorphometry of Preoptic, Paraventricular and Suprachiasmatic Nuclei of Hypothalamus in Gaddi Goats" in the XIX Annual Convention of IAVA and National symposium held at West Bengal University of Animal and Fishery Sciences, Kolkata on November 16-18, 2004. The paper was co-authored by Dr. R.L. Bhardwaj and Dr. D.N. Sharma.

Dr. Archana Pathak, Assistant Professor got the IAAVR Award- 2005 in recognition of outstanding profile in Veterinary profession and remarkable contribution in the field of Veterinary Anatomy. The award was conferred by Indian Association for the Advancement of Veterinary Research in Indian Veterinary Congress and XII Annual Convention of IAAVR held at Bikaner (Rajesthan) from 31st December, 2004 to 1st January 2005.

PUBLICATIONS:

List of Papers Published

1. Rajesh Rajput, Bhardwaj, R.L. and Sharma, D.N. 2004. Gross anatomy of the thyroid gland of mule. Centaur 20 (4): 57-58.
2. Katoch R, Bhardwaj RL, Rajesh Rajput, Panda AK and Sharma Alok. 2004. Incidences of Bot in equines of North Western Himalayas. Centaur 20 (4): 66-67.

3. Pathak Virender and Bhardwaj, R.L. 2004 Seasonal variation in follicular dynamics in Gaddi Goats. Indian Journal of Veterinary Anatomy.14 (1&2)39-42.
4. Pathak Virender and Bhardwaj, R.L. 2004 Seasonal variation in the gross and biometrical parameters of hypophysis cerebri in Gaddi Doe. . Indian Journal of Veterinary Anatomy. 15 (1&2): 77-79.
5. Bhardwaj, RL and Roy KS. 2004. Follicular development and micrometry in the ovary of prepubertal Indian Buffalo (*Bubalus bubalis*). Indian Journal of Animal Sciences. 74 (12): 32.
6. Bhardwaj, RL and Roy KS. 2004. Histomorphological studies on the ovary of prepubertal Indian Buffalo (*Bubalus bubalis*). Indian Journal of Animal Sciences. 75 (5): 499-502.

Popular article

1. Sudhakar, L.S.2005. Ruminant Animals. Himachal Reporter (27.2.05 and 13.3.05).

List of Papers presented in various Conferences/Symposia.

1. Sudhakar LS, Archana, and Bhardwaj RL. 2004. Biometry of the male genitalia and the pineal gland of the sexually mature Gaddi goat and Gaddi sheep. Paper presented in XIX Annual Convention of IAVA and National Symposium on "Recent Advancement in Veterinary Anatomy and their Inter-Disciplinary Approach in Livestock Production" held at West Bengal University of Animal and Fishery Sciences, Kolkata on Nov, 16-18 2004.
2. Sharma, D.N.2005. Reproductive Behaviour of gaddi sheep in Himachal Pradesh-An anatomical appraisal. Invited lecture presented in the National Seminar on "Interdisciplinary Approach to the Research in Veterinary Anatomy" held at Orissa University of Agriculture and Technology, Bhubhaneshwar on April, 25th 2005.
3. Bhardwaj RL, Rajesh Rajput, Pathak, V and Thakur, Kailash.2004.Comparative anatomy of the thyroid gland of small ruminants. Paper presented in XIX Annual Convention of IAVA and National Symposium on "Recent Advancement in Veterinary Anatomy and their Inter-Disciplinary Approach in Livestock Production" held at West Bengal University of Animal and Fishery Sciences, Kolkata on Nov, 16-18 2004.
4. Bhardwaj RL, Kumar R, Sharma KB, Rajesh Rajput and Sharma, Sonia. 2004. Macro and micro mineral concentration in genital tissue of Gaddi goat. Paper presented at XX Annual conference of ISSAR and National symposium held at, Durg on Dec, 14-16 2004.
5. Archana, Sharma DN, Kishtwaria RS, Rajesh Rajput and Bhardwaj RL. 2005. Anatomy of the Male Genital System of Blue Bull (Boselaphus tragocamelus). Paper presented in 5th Indian Veterinary Congress and XII Annual Conferenceof IAAVR-2005 held at College of Veterinary and Animal Science, RAU, Bikaner on 31st Dec 2004 and 1st January 2005.
6. Archana, Katiyar RS and Sharma DN. 2005. Anatomy of theBulbourethral Gland of a Day Old Kid. Paper presented in the National Seminar on "Interdisciplinary Approach to the Research in Veterinary Anatomy" held at Orissa University of Agriculture and Technology, Bhubhaneshwar on April, 25th, 2005.
7. Archana, Katiyar RS and Sharma DN. 2005. Anatomy of the Testes of a Day Old Kid. Paper presented in the National Seminar on "Interdisciplinary Approach to the Research in Veterinary Anatomy" held at Orissa University of Agriculture and Technology, Bhubneswar on April, 25th 2005.
8. Pathak, V; Bhardwaj, R.L and Sharma, D.N.2004. Histological and histochemical studies on the neurohypophysis and pars tuberalis of the Gaddi goat. . Paper presented in XIX convention of Indian association of veterinary anatomists and national symposium held on November 16-18, at Kolkata.
9. Pathak, V; Bhardwaj, R.L and Sharma, D.N.2004.Season variation in the micromorphometry of Preoptic, Paraventricular and Suprachiasmatic nuclei of hypothalamus in Gaddi goats.

Paper presented in XIX convention of Indian association of veterinary anatomists and national symposium held on November 16-18, at Kolkata.

10. Pathak, V, Bhardwaj R.L and Sharma D.N.2004. Histological and histochemical studies on the Preoptic, Paraventricular and Supraoptic nuclei of the hypothalamus in Gaddi goat. Paper presented in XIX convention of Indian association of veterinary anatomists and national symposium held on November 16-18, at Kolkata.
11. Shalini Suri, Bhardwaj RL, Rajesh Rajput and Pathak, V. 2004. Comparative anatomy of kidney of small ruminants of Himalayan region. Paper presented in XIX Annual Convention of IAVA and National Symposium on "Recent Advancement in Veterinary Anatomy and their Inter-Disciplinary Approach in Livestock Production" held at West Bengal University of Animal and Fishery Sciences, Kolkata on Nov, 16-18, 2004.

14. DEPARTMENT OF VETERINARY SURGERY & RADIOLOGY

TEACHING

The department offered courses to veterinary undergraduates as well as to the post graduates in Master and Doctoral program in Veterinary Surgery & Radiology. Training was imparted to the UG interns of the college in the field of veterinary surgery and radiology in second semester

RESEARCH

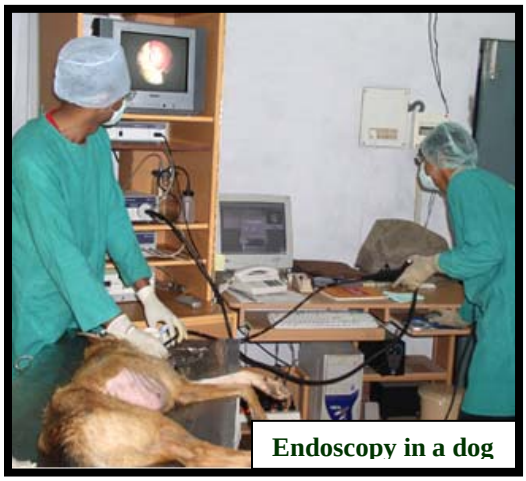
STUDIES ON THE EFFICACY OF RIDGE GOURD *(LUFFA ACUTANGULA)* ON CUTANEOUS WOUND HEALING IN ANIMALS

The wounds treated with 'Ridge gourd' extract were relatively drier and covered with a relatively stronger transparent scab. Exudation and inflammatory changes of wounds were also least and percent wound contraction was minimal. On 7^{th} postoperative day, there was development of healthy granulation tissue which was covered with blackish yellow to transparent and strong scab. The extent of inflammation and swelling was least with lesser pain reactions to palpation. Percent wound contraction was significantly greater. On 14^{th} postoperative day the wounds were seen covered with thick and strong scab. The margins of wounds of these groups showed complete healing of underlying tissue. The extent of healing was more widespread as evidenced by presence of whitish new replacement tissue all around the wound margins. The inflammation and swelling at the wound margins were however absent at this stage. Percent wound contraction was greatest. On 21^{st} day all the wounds were devoid of any gross exudate and covered with dry and firm scab. Majority of the portion of the scab was shed at this stage revealing filling of underlying wound gap by newly formed replacement proper tissue. On 28^{th} postoperative day, the wounds were exhibiting far more advanced healing changes with even more extensive wound contraction and only very little amount of residual dry scab in the wound centers. On the basis of the present study, it can be concluded that the use of 'Ridge gourd (*Luffa acutangula*) extract is safe for topical application on cutaneous wounds in animals and hastens the wound-healing process.

STUDIES ON THE EFFICACY OF HARJORE (C*ISSUS QUADRANGULARIS*) ON THE FRACTURE HEALING IN ANIMALS

The rectal temperature, respiration rate and heart rate remained with in the normal range and did not show any significant change during entire course of study. Feed intake was also normal in all the animals of both groups throughout the period of study. The animals showed moderate pain and lameness in the affected limb up to day 3 postoperatively. The pain gradually reduced in all the animals subsequently. The rate of decline of the pain was however greater in the animals of group B

(Harjore) when compared to control group (A). Accordingly in general the animals of group B started early complete weight bearing on the affected limb from 25th day onwards as compared to 38th day in control group. All the animals showed an insignificant rise in neutrophils count in the immediate postoperative period which gradually fell back to normal by 14th day in most of the animals. No significant change was observed in any of the other haematological parameters throughout the period of study in all the animals of both the groups when compared in between and also within the groups. Calcium levels in blood slightly increased in group B and slightly decreased from 0 day to 3rd day however, the variation in these values were insignificant. The blood calcium levels remained at a slightly higher but insignificant level in both the groups at all subsequent observation intervals except on day 7th. The blood phosphorous values also remained at slightly higher levels on most of the observation intervals except on day 3rd in group B; whereas, in group A the phosphorous levels were higher continuously after 7th postoperative day. The change was however not statistically significant between the days as well as between the groups. The alkaline phosphatase levels in the blood of the animals of both the groups were significantly higher on 3rd and 7th day and became normal subsequently by 14th day.


Endoscopy in a dog

The radiographs taken immediately after creation of fracture and cooptation of limb showed the presence of a clear radiolucent line of fracture in the mid diaphysis of ulna in all the animals of both groups at day '0'. In both the groups this fracture line appeared widened in the radiographs taken on day 15th postoperatively. However in group B this widening was restricted more or less only in the outer third portion of the fracture line. Moreover, development of periosteal callus from both ends of fracture fragments was clearly visible in group B whereas no callus activity was identifiable in group A at this stage. The bridging of periosteal callus was complete at day 30th postoperatively in the animals of group B whose radiolucent fracture line also turned hazy toward transcortical aspect of ulna at fracture site indicating active osteogenesis. In the animals of group A, the development of periosteal callus was also clear as small radioopaque areas extending beyond the cis and trans cortical margins of ulna at the fracture site in the radiographs taken on day 30th postoperatively, however the callus was still at its preliminary stage and was not of bridging nature. In the radiographs taken at day 45, remodeling of periosteal callus as evident by reduction in its volume was very well evident in all the animals of group B. In this group, the endosteal callus activity in the form of increased radiodensity on endosteal site of the ulnar bone was also clear in all the animals. The fracture line turned hazy but still visible in group B at this stage. Whereas in animals of group A, the bridging of callus was still not complete radiographically even at this stage and the radiolucent fracture line was clearly visible. The radiographs taken on day 60th postoperatively revealed further progress in fracture healing in both the groups. However, on comparative basis the fracture union was far more advanced in all the animals of group B then group A. In group B, the medullary continuity was restored, further reduction in the amount of endosteal and periosteal callus was seen and the fracture line was barely visible at this stage. Whereas, in group A, the fracture line was clearly visible, amount of periosteal callus still moderate and the medullary continuity not restored at this stage. At day 0 after creation of fracture, the angiograms were obtained immediately after injection of contrast agent into the brachial artery at the distal third humeral region. They revealed complete opacification of the brachial artery and its distal branches throughout the distal limb in all the animals of both the groups. The relatively wider brachial artery branched into thinner collateral ulnar artery, superficial brachial artery and median artery at the

proximal metaphyseal level of radius bone. The main trunks of these branches were clearly visible and well defined throughout their course alongside radius and ulna. The superficial brachial and median arteries after originating from main brachial artery, immediately gave rise to many prominent smaller arterioles which coursed proximally, distally and caudally in the adjoining area. The superficial brachial artery once again branched into prominent medial and lateral divisions at about proximal third diaphyseal aspect of radius and ulna. The diameter of the main trunks of these vessels and median artery gradually decreased distally, however their entire course along side radius and ulnas well as carpal joint was very clear. The collateral ulnar artery coursed mainly on caudal aspect of ulna and tapered of quickly by the distal third diaphyseal aspect of ulna. All along their course, all these main arteries gave rise to numerous minute branches which supplied the bones and soft tissues of the area. The density of arterioles and other vessels was relatively more in proximal as well as in distal metaphyseal area of radius and ulna, whereas at rest of the places the penetration of these smaller vessels was almost uniform. At dorsal aspect of radius, the intensity of vascular network appeared further less due to presence of less quantity of soft tissue as such.

Angiograms of the limb treated with Harjore paste (Group B) at day 15^{th} postoperatively revealed extensive vascular proliferation in the proximal ulnar region. The radiodensity was profound in the developing callus surrounding fracture site indicating its extensive vascularization. The angiograms in the control group at this stage revealed only slight increase in overall vascular proliferative activity as compared to treated group. No increase in radiodensity just around the fracture fragments were noticed in this group indicating little healing activity at the site. At day 30, the increased vascularity was seen in both the groups. However the minute vascular network was less prominent in group B and relatively more pronounced in group 'A' when compared to their respective appearances at day 15^{th}. The fracture line was totally masked by radiodense vessels coursing around the fracture site in group B. Whereas, the fracture line was clearly visible in group A indicating lesser vascularization compared to group B . The opacification of the site due to increased vascularity was reduced in both the groups at day 45^{th}. The angiograms of the control group at this stage revealed increased radiodensity at fracture line indicating greater healing tissue progression at the site compared to its day 30^{th} appearance. However, the increase in local vascularity was relatively less compared to test group. In test group the fracture line was still totally obscured by radiodense vessels. The vascular pattern in test group resembled to normal 0 day angiogram except with slight increased vascular network opacity at day 60^{th} postoperatively. In control group the fracture line was still slightly visible indicating incomplete union at the fracture site.

On the basis of above clinical, haematological, biochemical, radiological and angiographic studies, it can therefore be inferred, that the use of 'Harjore (*Cissus quandrangularis*)' paste over fractured area help in fracture healing process of bone without any apparent adverse effects. The application of 'Harjore' paste increases the local blood vascularity which in turn brings in more nutrients, phagocytes and osteoblats at the fracture site and thereby results in greater osteogenic turnover. This facilitates the fracture-healing process by way of early bridging of fracture gap, rapid gain in structural strength of bone and early remodeling of fracture callus.

It was concluded that the application of 'Harjore (C*issus quandrangularis*)' in paste form over fractured area hasten the fracture-healing process.

STUDIES ON THE EFFICACY OF SEABUCKTHORN (*HIPPOPHAE* SP.) ON SOFT TISSUE REPAIR WITH PARTICULAR REFERENCE TO CUTANEOUS WOUNDS, BURNS AND GASTRIC ULCERS

To study the efficacy of seabuckthorn on experimentally induced gastric ulcers in animals.

Acetylsalicylic acid (Aspirin) @ 50 mg/kg orally b.i.d alone, Aspirin (same dose) plus Inj. Dexamethsone @ 1 mg/Kg I/M s.i.d., Inj Dexamethsone @ 1 mg/Kg I/M s.i.d., Inj Piroxicam @

1mg/Kg I/M s.i.d and Inj. Piroxicam along with Inj. Dexamethasone both @ 1mg/kg I/M s.i.d were administered in group I, II, III, IV and V, respectively for variable period for the development of gastric ulcers. Based on endoscopic observations, gastric lesions were categorized as sparse punctuate erosion, sparse linear and punctuate erosion, diffused linear and punctuate erosions and diffused erosion as grade 1, 2, 3 and 4 respectively. Based on these observations, administration of Inj dexamethasone @ 1 mg/kg I/M s.i.d. for 14 days as used in Group III was found to be the most suitable and predictable model of gastric erosions/ulcerations leading to development of grade 4 gastric lesions. In this group, the gastric lesions started appearing 6^{th} day onwards in all the animals and their intensity increased gradually. The haemoglobin and TEC values also started declining after day 10^{th} in most of the animals. However, the clinical symptoms remained variable and did not follow any definite pattern despite endoscopic detection of even severe lesions. After discontinuation of dexamethasone on 14^{th} day, spontaneous healing of these lesions as appreciated by endoscopy was found to occur within 15 days. The other groups did not result in to predictable gastric ulcer models. Therefore group III model was selected for subsequent studies.

To verify the therapeutic efficacies, Omeprazole @ 10 mg/kg orally s.i.d. (Group II) and SBT seed oil @ 5ml/animal b.i.d (Group III) were used. For verification of the prophylactic efficacy of seabuckthorn, another group (IV) was used. In these animals, SBT oil @ 5 ml/animal b.i.d. was administered simultaneously with ulcerogenic drug (Inj Dexamethasone for 14 days). The SBT oil was continued in the same dose in this group even after discontinuation of dexamethasone. Group I was kept as negative control where no treatment was adopted after creation of gastric ulcers. In group IV, the intensity of lesions was relatively less in the initial stages of gastric erosion/ulcerations development. But after 10^{th} day the gastric lesion score was similar in all the groups. However, no animal of this group showed anorexia or any other ulcer related clinical symptoms like vomition, melena and weight loss as against all the animals of other groups throughout the period of study. After start of the treatment, the group II animals showed earliest endoscopically identifiable healing of gastric lesions followed by group IV, III and I respectively. In all the groups, gradual decline in haemoglobin and TEC values stopped after discontinuation of the ulcerogenic drugs and no significant variation was observed in between the groups.

Based on these observations it is concluded that oral feeding of seabuckthorn seed oil has prophylactic value in the development of gastric erosions/ulcerations and also has therapeutic potential to aid in their healing.

Studies on the efficacy of Seabuckthorn (*hippophae sp.*) oil in the healing of aseptic incisional cutaneous wounds in calves

Following treatment the rectal temperature, respiration rate, and heart rate in the animals remained with in the normal range and the variation in these parameters was non-significant during the entire course of study. There was no clinically manifested complication throughout the study and animals remain active, alert and healthy so it favours that topical application of seabuckthorn was safe clinically. Grossly the signs of degree of inflammation in wounds were less pronounced in seabuckthorn and 5% povidone-iodine treated animals as compared to paraffin treated animals. In seabuckthorn and 5% Povidone-iodine treated animals the signs of inflammation starts subsiding by 3^{rd} day but in paraffin treated animals they subsided by 10^{th} day. There was no exudation in seabuckthorn group throughout the study. In 5% Povidone-iodine treated animals out of three one animal showed exudation at 3 day but paraffin treated animals showed exudation upto 7^{th} day. So seabuckthorn oil appears to possess good anti-inflammatory property.

Healing tissue tensile strength was measured by using tensiometer at different time intervals. The tissue tensile strength of '0' day was considered as 100% and the rest of the values were compared with it. On 3^{rd} day there was no gain in tensile strength. In all three groups there was continuous gain in healing tissue tensile strength and at end of experiment i.e. on 28^{th} day paraffin group gained strength upto 12.55%. The 5%povidone-iodine group gained strength upto

10.92% and IIIrd SBT group gained strength upto 14.28%. Statistically when group wise compared with each other there was no significant difference in the values of tensile strength but day wise from day 0 to day 28th there was a significant increase in tensile strength. Because on day 0 fresh tissue strength is considered 100% and according to that gain was up to 11%,12%,14% .

There were no significant changes in the haematological parameters i.e. Hb, PCV, TLC, TEC and DLC were noticed in any of the animals of group I^{s}t, IInd and IIIrd when compared to day 0 value and in between groups. All the values remain with in normal physiological range. So this proves that during whole period of study no systemic infection had occurred and there was no adverse effect of any treatment on the animals. So these results favour the topical application of seabuckthorn in calves in incisional cutaneous wounds. Histopathologically, the signs of inflammation were comparatively less in group IIIrd when compared to group Ist. At 7th day in group IIIrd there was substantial increase in ground substance in deeper parts of wound when compared to group Ist and IInd. At day 10th group IIIrd showed the granulation tissue of relatively mature fibers. Collagen fibers were in abundance at the base of the wound but in superficial portion the granulation tissue showed fibroblasts along with mononuclear cells. In later stages on comparison to other groups its noticed that collagen fibers appeared more earlier and arranged parallel to skin surface. The fibrous tissue was more organized in group IIIrd. The infilteration was much less in comparison to paraffin and 5% Povidone-iodine group. So all these signs indicated that seabuckthorn oil treated wounds healing was earlier than group Ist and IInd.

So the following conclusions can be drawn on basis of present study:

1. Seabuckthorn oil is safe for application on aseptic incisional cutaneous wounds in bovines as there was no adverse effect on any clinical and haematological parameters of the animals and at their wound site.
2. Seabuckthorn oil is superior to 5% Povidone-iodine and liquid paraffin as evidenced by earliest disappearance of inflammation and highest gain in tensile strength of healing tissue but is comparable to 5% Povidone-iodine and better than paraffin group.

Studies on the efficacy of seabuckthorn oil in the healing of cutaneous wounds in dogs

In Seabuckthorn oil and 5% Povidone-iodine treated animals the signs of inflammation subsided by 7'h day but in paraffin treated animals they subsided by I I 1h day. There was no exudation in Seabuckthorn oil treated group throughout the study period. 5% Povidone-iodine treated animals showed exudation at 3 d day but liquid paraffin treated animals showed exudation upto 7 1h day. Group 11 and Group III animals showed higher percent wound contraction as compared to group 1. Histopathologically, response to inflammation was comparatively less in Group III when compared to Group 1. and 11. Fibroblast proliferation was noticed at day 3 in Group 111. The fibrous tissue appeared organized and collagen fibres appeared much earlier and arranged parallel to skin surface in SBT oil treated Group in comparison to Liquid paraffin and 5% Povidone-iodine. The infiltration was much less in comparison to paraffin and 5% Povidone-iodine. It was concluded that seabuckthorn oil treated wounds healed earlier than Group I and 11.

Evaluation of the healing of infected cutaneous Wounds following seabuckthorn (*Hippophae rhamnoides*) oil application in calves.

3 groups *viz.* Group I (negative control), Group II (positive control) and Group III (test) for conducting infected wound healing study, whereas one animal was kept separately for aseptic histopathological wound healing study. The wounds were infected with *Staphylococcus aureus* suspension having $2.1x10^{9}$ organisms/ml. The wound dressing was started after two days with liquid paraffin in group I, with 5% povidone-iodine ointment in group II and with seabuckthorn seed oil in group III. Following treatment the rectal temperature, respiration rate, heart rate, Hb, PCV, TLC, TEC and DLC in the animals of all the groups remained with in the normal physiological limit. The acute inflammatory signs were less pronounced in group II up to day 7th, whereas later these were comparable in group II and III. The group I wounds exhibited greater inflammatory response. The

wound contraction was greater in group II up to day 7, but at all subsequent intervals it was greater in group III. The group III treated wound exhibited better healing response after 7th day as evidenced by greater wound contraction, early shedding of scab etc. *Staphylococcus aureus* organisms could be isolated up to day 14th from all the wounds. Seabuckthorn oil exhibited mild antimicrobial activity in its *in vitro* evaluation. Histopathologically, angiogenesis was more extensive in group III on 3rd day. Similarly later on day 7th epithelialization activity was also slightly more in group III. Whereas neutrophilic infiltration was least in group II by this stage indicating better antimicrobial activity of 5% povidone iodine. In subsequent stages though gross examinations revealed better wound healing in group III however, histopathologically epithelialization was still incomplete by day 21 in this group along with group I whereas it was complete in group II. On day 28, epithelialization was complete in all the groups except two animals of group I.

Studies on intestinal obstruction in cross-bred cattle of high altitude with special reference to prognostic, diagnostic and therapeutic aspects

Creation of Proximal and Distal strangulated intestinal obstruction:

Total of ten cow calves in the age group of 10-12 months weighing 70-90 kg were divided in two groups of five animals each. In group I creation of proximal (jejunal) strangulated intestinal obstruction was performed. The animals were restrained in left lateral recumbency and right flank was prepared for aseptic surgery. The abdomen was entered through an incision made caudal and parallel to the last rib under local infiltration analgesia using 2% lignocaine hydrochloride. The jejunum was identified and segment was exteriorized. The exposed part of the intestine was covered with moist towel to prevent evaporation. A 20 cm long segment of proximal jejunum was selected for creation of strangulation. The arterial and venous channels of the selected segment were occluded by applying ligatures using straight eyeless needle with 3-0 chromic catgut. The lumen of the jejunal segment was occluded by umbilical tape ligature.

The exteriorized part of the intestine was repositioned in the abdominal cavity. The peritoneum, abdominal muscles and subcutaneous tissue were closed in three layers with continuous sutures using chronic catgut no. 2. Finally the skin was closed by placing horizontal mattress sutures with black braided silk no. 3. The laparotomy wound was covered with a sterile povidone iodine impregnated gauge piece which was retained in place by means of stay sutures.

In group II, creation of distal (ileal) strangulated intestinal obstruction was done. For this ileum was exteriorized following right flank laparotomy as in group I. The exteriorized part of the ileum was covered with moist towels. A 20 cm loop of the ileum was selected cranial to caeco-colic junction and the mesenteric supply was ligated as in jejunal obstruction. The lumen was occluded by umbilical tape ligature at both ends. The exteriorized part of intestine was repositioned in the abdominal cavity and the laparotomy incision was closed in the routine manner as described in group I.

Creation of Simple Proximal Intestinal obstruction:

Five animals were used for the creation of proximal (jejunum) simple intestinal obstruction. With animals in lateral recumbency, laparotomy was then performed in the right flank to facilitate the approach to the proximal jejunum. Following entrance into the abdominal cavity, a constricting ligature consisting of flexible plastic tubing was loosely placed around the bowel in a double loop fashion with the help of two plastic discs on the exterior and interior side of the abdominal wall. Two plastic discs were then fixed tightly to the ventral wall by wire threads, which were passed through corresponding small holes, at the periphery and opposite positions of the two plastic discs. The discs were used to keep firm the constricting action of the loop on the bowel and also to avoid extensive adhesions which would eventually make difficult the intervention for the relief of obstruction.

Pathophysiology and survival time of proximal and distal strangulated intestinal obstruction:

All the animals were dull and depressed after 48 hours post obstruction. However, the depression was more in the animals of Group-I and they became recumbent between 48-72 hours. Acute signs of colic i.e. frequent sitting/standing up, paddling of limbs in lateral recumbency, grunting, stretching of neck, rolling of eye balls, kicking at the belly, resting head on the abdomen appeared after half an hour of creation of strangulated intestinal obstruction and lasted 3-4 hours in the calves of group I and II.

The animals of group II survived longer than group I. In group I one animal died at 48 hours and another at 72 hours post obstruction. The calves of both the groups resumed almost normal feed and water intake at 24 hours post obstruction. But the feed intake was reduced after 48 hours in the animals of group I and after 72 hours in the animals of group II. All the animals of both the groups passed mucus coated faecal balls at 48 hours post obstruction. The frequency of such balls reduced in animals of group II up to 72 hours but the animals of group I passed pure mucoid faeces after 48 hours post obstruction. Urination was normal in the calves of both the groups following strangulated intestinal obstruction but reduced at terminal stage.

The signs of muscular weakness, shivering and disinclination to move were evident at 24 to 48 hours post obstruction in the animals of group I and II. Lacrimation was also observed in some animals of both the groups during 48-72hours post obstruction. Extremities were cold to touch after 48-72 hours in group I and about 96-120 hours in group II. Inability to get up even on assistance, enopthalmia and head resting on abdomen like milk fever posture were typical signs in the animals of both the groups at terminal stage. The progressive decrease in rectal temperature was highly significant at 48 and 72 hours post-obstruction compared to base value in the animals of group I and II respectively. The heart rate increased at 24 hours post obstruction in the animals of group I and in rest of the period it remained almost normal. In the animals of groups II the increase in the heart rate was highly significant at 24 hours post obstruction and significant at 72 hours. Decreased trend in the respiratory rate was observed at all the stages of observation in animals of group I in comparison to base value. Whereas respiratory rate increases at 24 hours post obstruction and remained normal at other stages in the calves of group II.

Highly significant increase in the capillary refill time was recorded at 48-72 hours post obstruction when compared to base value, in the animals of the both the groups highly significant decrease in the rumen motility was observed at 24 hours post obstruction till the end of observations in the animals of group I and II. The decrease in ruminal fluid pH was highly significant at 24 hours post obstruction till the end of observation in the animals of group I. The progressive decrease in the ruminal fluid pH was significant at 24 hours and highly significant at 72 hours post obstruction in the calves of group I.

Haemoglobin showed an increase in both the groups. The increase was highly significant at 72 hours in animals of group I. An increase in the mean values of packed cell volume was observed in comparison to base value following strangulated intestinal obstruction in the animals of both groups.

The increasing trend in the total leukocyte count (TLC) was recorded beyond 24 hours post-obstruction in the animals of both the groups, but the increase was highly significant at 72 hours post-obstruction in the animals of group II. The progressive increase in total erythrocyte count (TEC) was significant and highly significant at 48 and 72 hours post-obstruction in the animals of group I and II respectively.

No significant variations were observed in different leukocyte count (DLC) in the animals of group I and II. However, the calves of group I showed a trend of neutrophilia. The animals of group II showed an increase in the lymphocyte at terminal stage when compared with base values.

Plasma glucose concentration increased progressively in the animals of both the groups. The increase was highly significant beyond 24 hours onwards post-obstruction in the calves of group I

whereas the animals of group II had highly significant increase in plasma glucose at 48 to 72 hours post-obstruction. The blood urea nitrogen concentration increased progressively up to the end of experiment in both the groups; however, significant increase was recorded at 24 hours post-obstruction onwards in the animals of group I. Highly significant increase in plasma total protein was recorded at 48 and 72 hours post-obstruction in the animals of group I, whereas this increase was non-significant till terminal stage in the calves of group II.

The plasma sodium concentration decreased progressively in both the groups, but this decrease was highly significant at all stages of observation as compared to base value in the animals of group I. The plasma potassium concentration decreased consistently through out the period of observation in the animals of both groups. Hypokalemia was significant at 28 and 72 hours post obstruction in the calves of group I. However, only significant decrease was recorded at 72 hours in the animals of group II.

Highly significant decrease in plasma chloride concentration was observed at 24 hours onwards in the animals of group I, whereas it was significant at 48 and 72 hours interval post obstruction in the animals of group II. The plasma calcium concentration decreased in both the groups. The decrease was significant 72 and 48 hours post obstruction in the calves of group I and II respectively. Highly significant decrease in plasma calcium was observed at 72 hours post obstruction in calves of group II.

The increase in plasma inorganic phosphorus concentration was highly significant between 24 to 48 hours post obstruction, but it remained significant at terminal stages in the animals of group I. No significant change in inorganic phosphorus concentration was observed in the calves of group II.

A significant decrease in saliva sodium concentration was recorded at 72 hours when compared to base value in the animals of both the groups. Highly significant decrease in saliva potassium concentration was observed at 48 hours onwards in animals of group II whereas group I animals had significant fall in potassium concentration at 72 hours post obstruction. A decreasing trend in saliva chloride was observed at all stage s of observation in the animals of both the groups in comparison to base value but the decrease was highly significant at 72 hours post obstruction in the animals of group II.

A progressive increase in saliva calcium concentration was observed in animals of group I whereas calves of group Ii revealed decrease in calcium concentration post obstruction. The inorganic phosphorus concentration of saliva showed inconsistent changes in the animals of group I and II.

The increasing trend in peritoneal fluid pH was recorded, when compared to base value in the animals of group I and II. However this increase was significant at 24 hours post obstruction in the animals of group II. The increase in total protein concentration of peritoneal fluid was highly significant throughout the period of observation in comparison to base value in calves of group I, but this increase was significant at 72 hours post obstruction in group II calves. The increase in the nucleated cell count in the peritoneal fluid was highly significant at all stages of observation in comparison to base value in the animals of both the groups.

The peritoneal fluid sodium concentration decreased progressively in both the groups but this decrease was significant at 48 hours and highly significant at 72 hours post obstruction in group II animals. A decreasing trend in potassium concentration of peritoneal fluid was observed in both the groups but this trend was significant at 72 hours post obstruction in calves of group II. The peritoneal fluid chloride concentration in calves of group I revealed significant increase at 48 and 72 hours. The group II animals showed highly significant increase in chloride concentration at all stages of observation post obstruction period.

The sodium concentration of ruminal fluid showed progressive increase beyond 48 hours onwards in the animals of group I, whereas in the animals of group II the sodium concentration

increased upto 48 hours post obstruction and thereafter suddenly decreased at terminal stages. There was a progressive decreased in the ruminal fluid potassium concentration in the animals of group I, which was significant at 24 and 72 hours post obstruction. In group II calves the potassium concentration decreased at 48 hours post obstruction onwards.

The chloride concentration of ruminal fluid increased in comparison to base value in both the groups. The increase was highly significant at 48 hours in group I. But it was significant in the animals of group II at 72 hours post obstruction. The calcium concentration of ruminal fluid showed inconsistent changes in both the groups. There was a significant increase at 24 and 48 hours post obstruction in the animals of group II. The ruminal fluid inorganic phosphorus was too low to be detected by the methods employed.

EXTENSION:

Participation in clinical camps: Faculty members of the department participated in 41 clinical camps in various parts of Himachal Pradesh. These camps were organized in collaboration with various agencies such as DRDA, Indo-German Changar Project, State animal husbandry department etc. A number of clinical cases presented to the camps were treated and the owners were apprised with the practices of the Veterinary Surgery.

Organization and participation in state Veterinary Council seminars: The department remained actively involved in organization and participation in state Veterinary Council seminars at different places of state i.e. Mandi (02/09/2004), Kullu (03/09/2004), Hamirpur (13/10/2004), Nahan (15/10/2004) and Palampur (08/02/2005). In these seminars, lectures were delivered to state veterinary officers on various topics.

Participation in Kisan-mela 2004 of CSKHPKV, Palampur: Department actively participated in the Kisan-mela 2004 of CSKHPKV, Palampur and displayed its stall.

Participation in Holi Mahotsava 2005: The faculty of the department in collaboration with state Animal Husbandry department organized "Dog show" in the Holi Mahotsava 2005, Palampur.

Radio-Talks: The departmental faculty members delivered four radio-talks on various topics of Veterinary Surgery at AIR Shimla and Dharamshala.

Newspaper: The departmental faculty member 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: The departmental faculty member delivered five lectures to visiting farmers on their trainings organized by Directorate of Extension Education, CSKHPKV, Palampur. Two lectures were delivered in various conferences; one at conference of Small Animal Clinician Association at Chandigarh and another in American Soybean Association conference at Palampur.

AWARDS:

1.	Fellow of National Academy of Veterinary Sciences, New Delhi, 2005.	Dr. A.C. Varshney	For significant contribution to veterinary profession in general and the field of Vety. Surgery and Radiology in particular
2.	'Vijay Shree Award', 2005	Dr. A.C. Varshney	For significant contribution to veterinary profession in general and the field of Vety. Surgery and Radiology in particular
3.	Fellow of National Academy of Veterinary Sciences, New Delhi, 2005.	Dr. S.K .Sharma	For significant contribution to veterinary profession in general and the field of Vety. Surgery and Radiology in particular
4.	Fellow of Indian Society for	Dr. S.K .Sharma	For significant contribution in the

	Veterinary Surgery (Nominated 2005).		field of Vety. Surgery and Radiology

CONFERENCES/TRAININGS ETC.

- Dr. M. S. Kanwar attended "International congress of canine practice" w.e.f . Feb 9-11, 2005, New Delhi.
- Dr. A.C.Varshney attended National Seminar on cultivation, harvesting and scientific exploitation of Seabuckthorn. FRL, DRDO, Leh, 26-27 Aug.
- Dr. S. K. Sharma attended 5 H. P. State Vet. Council Seminars at Mandi (Sept 2, 2004), Kullu (Sept 3, 2004), Hamirpur (Oct 13, 2004), Nahan (Oct 15, 2004) and Palampur (Feb 8, 2005), respectively.
- Dr. S.P.Tyagi attended National Seminar on cultivation, harvesting and scientific exploitation of Seabuckthorn. FRL, DRDO, Leh, 26-27 Aug.
- Dr. M. S. Kanwar attended "XXII Annual Conference of Indian Assoc. Vety. Microbiologist w.e.f. Oct 18-19, 2004, Palampur.
- Dr. M. S. Kanwar attended Small Animal Clinician Assoc. meeting on May, 2005, Chandigarh.
- Dr. SK Sharma and Dr. SP Tyagi attended the 28th National Conference, Indian Society for Veterinary Surgery, w.e.f. Nov. 18-20, 2004, Jabalpur.

PUBLICATIONS:

Research and clinical papers:

1. Kulbhushan, Varshney, A.C., Sharma, D.N., Sharma, S.K. and Singh, M.2005. Topographic anatomy and technique of brachial plexus block in yak. Indian Vet. J. 82:267-268.
2. Varshney, A.C., Tyagi, S.P., Kumar, Amit and Singh, V. 2004. Studies for the evaluation of anti-inflammatory activities of seabuckthorn (*Hippophae rhamnoides)* oil in canine. *The global seabuckthorn research and development* 4(2), 7-10.
3. Tyagi, S.P., Kumar, A., Varshney, A.C., Gupta, V.K., Sharma, S.K. and Singh, M. 2004. Ascites in a dog due to hepatic neoplasm. *Polivet.* 5(1): 120-122.
4. Varshney, A.C. and Tyagi, S.P. 2005. Basics of equine ocular surgery. *Centeur* XXI (3), 35-39
5. Katoch, A., Katoch, S., Gupta, K., Dogra, PK, Sharma, SK and Thakur, YP. 2004. Mineral and biochemical profiles in Spiti Horses. Centaur XX (3): 48-49.
6. Varshney, A.C., Kulbhushan, Sharma, D.N., Sharma, S.K., Singh, M. and Nigam, J.M. 2004. Regional anaesthesia in yaks: A review of nerve block techniques. Indian J. Vet. Surg. 25:98-101.
7. Kumar, V., Varshney, A.C., Sharma, D.N., Singh, M. and Sharma, S.K. 2005. Microangiography of metatarsal fracture healing with hydroxyapatite fibrillar collagen implants in bovine. Indian Vet. J. 82:503-506.
8. Singh, M. and Varshney, A.C. 2005.Therapeutic evaluation of ART-400 in traumatic arthritis in bovine. Indian Vet. J82:384-387.

Papers presented in the conferences:

- International Conferences

1. MS Kanwar and RS Kishtwaria. 2004. Community Welfare Services by Blue Cross Society of HP in north-western region of India. 10th International Conference on "Human Animal Interaction" w.e.f. Oct 6-9, 2004 at Glasgow, UK

2. MS Kanwar, MM Singh and AC Varshney. 2004. Canine pyometra complex and its management – review of 12 cases. International congress of canine practice" w.e.f . Feb 9-11, 2005, New Delhi.
3. MS Kanwar and AC Varshney. 2005. Clinical evaluation of xylazine and detomidine in ponies – comparative studies. Ist International Symposium of Veterinary Surgery & Radiology w.e.f May 10-13, 2005 at Shahrekord University, Iran.

4.A. Kumar, J.M. Nigam, S.K. Sharma, M.S. Kanwar and A.C. Varshney. 2004 Anaesthesia in Yak (*Bos grunniens*) – Clinico-sedative, Cardiovascular, Hematobiochemical and Electroencephalographic Study – PDF only. Fourth International Congress on Yak, 2004 – Chengdu, China.

5.A. Kumar, J.M. Nigam, M.S. Kanwar, S.K. Sharma and A.C. Varshney. 2004. Autotransfusion of Synovial Fluid in Yak (*Bos grunniens*) as a Therapeutic Alternative in Aseptic Arthritis – PDF only. Fourth International Congress on Yak, 2004 – Chengdu, China.

➢ National Conferences

1. Singh S, Sharma, S.K., Varshney, A. C. and Tyagi, S. P. 2004. Efficacy of seabuckthorn (*Hippophae Sp.*) oil in the healing of the aseptic incisional wounds in calves: A clinical and haematological study. 28th Annual Congress of Indian Soc. Vet. Surg. and National symposium. Jabalpur (MP). 18-21 Nov.
2. Tyagi, S. P., Kumar, Amit, Kumar, Adarsh, Sharma, S.K. and Varshney, A. C. 2004. External-fixators with epoxy-side bar for fracture repair in animals. 28th Annual Congress of Indian Soc. for Vet. Surg. and National symposium. Jabalpur. (M P) 18-21 Nov.

PUBLICATIONS (Extension):

1. Varshney, A.C. and Adarsh, Kumar 2004: The Veterinary education: Changes and challenges. University News, *Journal of Higher Education*. Association of Indian University: 42(35): 123-127.
2. Sharma, S.K. and Agnihotri, R.K.2004: Leeches in the nostrils of cattle-Common causes and possible control. *Tips for vets-HP state Veterinary Council* 6:4-5.
3. Kanwar, M.S. 2004. Upward fixation of patella in bovines. *Tips for vets-HP state Veterinary Council* 7:4-5.

15. 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.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:

The department offers courses to veterinary undergraduates as well as to the post graduates.

RESEARCH:

The department could not initiate any research activity for want of staff and infrastructural facilities. A research project is currently being prepared.

EXTENSION:

All India Radio, Dharamsala on 18/11/2004, broadcast a radio talk on the topic, "Role of Oral Rehydration Solutions in home management of acute diarrhea in calves" by Dr. Naresh Kumar, Assoc. Professor.

Trainings

Dr. Naresh Kumar, Associate Professor attended the following trainings / workshops during the year.

1. An interactive seminar on 'On-line Library Access' at CSK HPKV Palampur on 30/07/2004.
2. NATP sponsored training workshop on 'Developing winning research proposals at NAARM, Hyderabad, from Aug. 17-21, 2004.

16. DEPARTMENT OF VETERINARY CLINICAL MEDICINE, ETHICS & JURISPRUDENCE:

The Department of Veterinary Medicine is one of the six major departments since the establishment of college of Veterinary and Animal Sciences in July 1986. The name of the Department was re-designated as the Department of Veterinary Clinical Medicine, Ethics & Jurisprudence.

TEACHING

The department offered courses to veterinary undergraduates as well as to the post graduates in Master and Doctoral program in Veterinary Clinical Medicine, Ethics & Jurisprudence. Training was imparted to the UG interns of the college in the field of veterinary clinical medicine in second semester.

RESEARCH:

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

The present study was carried out to study the prevalence of endoparasitism in canine of palam valley of Himachal Pradesh and to study the clinical, haematological and biochemical alterations as well as to evaluate the efficacy of the drugs i.e. Albendazole and combination of praziquantel, pyrantel pamoate and fenbedazole (Tab. Triworm) in case of nematode and cestode infection respectively. Based on the studies, overall prevalence of endoparasitism was 50 percent with nematodes infection in 13.3 % cases and 36.6 % cestodes infection. Among 22 positive cases of cestodes infection, 12 were of *Dipilidium spp* and 10 dogs were infected with *Spirometra spp,* whereas all the 8 dogs with nematode infection were of *Ancylostoma Spp.* Affected dogs were having reduced appetite and rough & lusterless hair coat and clinical examination showed pale conjunctival mucus membranes and slightly increased respiration & cardiac rates. Haematological examination revealed anaemia in parasitic dogs as indicated by low haemoglobin and packed cell volume values. Both the drugs used were found to be effective as indicated by significant reduction in the faecal EPG after treatment

EXTENSION

Diagnosis and treatment of clinical cases at college clinics

A total of 1740 clinical cases relating to Medicine discipline, in different species of animals were diagnosed and treated.

Examination of clinical samples

A total of 841 clinical samples (Faecal, blood, urine, milk and skin scrapings) obtained from sick animals were examined to provide confirmatory diagnos

Clinical Camps

Staff members of the department participated in 20 clinical/ animal health camps where 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. The

important outbreak attended and diagnosed was Nutrional haemoglobinuria in buffaloes at village Sansai (Kangra)

Extension lectures

A total of 39 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. Additionally four specialized lectures were also delivered to Veterinary & NSS Officers by Dr. R.K. Mandial.

Radio talks:

One radio talk was given at A.I.R. Dharamshala, on the topics as given below:
"Pashuon mein Khanij tatyon se hone bale rog aur aunka niyantran"(Deficiency diseases in animals and their prevention and control) on 02-08-04.

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.

Conference/Symposia/ Workshop/ Seminar/ Training attended:

1. Dr. B. Prasad attended 7th World Environment Congress w.e.f June10-12, 2005

2. Dr. B. Prasad attended International Conference on Canine practice, held at New Delhi w.e.f. Feb 9-11,2005

3. Br. B.Pal attended XXII annual conference of Indian Association of Vety. Microbiologist, Immunologist and specialist in Infectious Diseases held at Palampur, between Oct.18-19, 2004.

4. Dr.R.K. Mandial attended seminar on"Role of Vety. Council in regulating Vety. Practice in Himachal Pradesh organiged by Himachal Vety. Council on Oct 13, 2004

5. Dr.R.K. Mandial attended seminar on"Role of Vety. Council in regulating Vety. Practice in Himachal Pradesh organized by Himachal Vety. Council on Oct 15, 2004

6. Dr.R.K. Mandial attended seminar on"Role of Vety. Council in regulating Vety. Practice in Himachal Pradesh organized by Himachal Vety. Council on Feb.08, 2005

Awards / honours

- Dr. Des Raj was honoured with "Best Review Article Award-2004" from Intas Pharmaceutical, Ahmedabad comprising a Certificate and cash award of Rs 1000/ for the review article published in Intas Polivet **4(2):** 225-233.
- Dr. B.Pal was honoured with "Best Poster Presentation Award (2nd Prize) during XXII annual conference of Indian Association of Vety. Microbiologist, Immunologist and specialist in Infectious Diseases held between Oct.18-19, 2004.

Research Project Submitted:

Ad-hoc research project entitled "Studied on haemocrisis in livestock of Himachal Pradesh" was submitted to the Department of animal Husbandry, Himachal Pradesh.

PUBLICATIONS:

1. Wadhwa, D. R. and Prasad, B. (2004). Clinico-therapeutic studies on downer syndrome in buffaloes. *Indian Vet. J.* 81: 1143-1145.
2. Katoch, R., Das, K.S., Wadhwa, D.R., Panda, A.K. and agnihotri, R.K. (2004). Efficacy of doramectin against endo and ectoparasites of goats. *J. Vet. Parasitology.* 18: 93-95.
3. Telang, R.S., Mandial, R.K., Gupta,V.K. and Dogra, R. (2005). Arsenic poisoning in cattle of Himachal Pradesh . *Indian Vet. J.* 82: 677-678.
4. Deshwal, R.S., Varshney, C., Telang,R.S.,Prasad, B. and Mandial, R.K. (2005). Pharmacotherapeutic management of respiratory distress syndrome in equines of H.P. Indian Vet. J. 82: 609-614.

Papers presented in conferences & symposiums:

1. Prasad, B. 2005 Effect of Geo-nitrae& nitrite on human and Aniam Health. Steps & strategies for its management. Paper presented at 7th World Environment Congress. w.e.f June, 10-12 held at Palampur.
2. Pal. B. and Pachauri, S.P. (2004) Studies on evaluation of Immunoglobin levels by rapid zinc sulphate turbidity test in neonatal calf serum. Indian J. Paper presented at XXII annual conference of Indian Association of Vety. Microbiologist, Immunologist and specialist in Infectious Diseases held between Oct.18-19, 2004.
3. Mandial, R.K. (2004). Haemoglobinuria and haematuria. Paper presented at Seminar on " Role of Vety. Council in regulating Vety. Practice in Himachal Pradesh organized by Himachal Vety. Council on Oct., 13,2004
4. Mandial, R.K. (2004). Mastitis in dairy Animals with special reference to Himachal Pradesh. Paper presented at Seminar on " Role of Vety. Council in regulating Vety. Practice in Himachal Pradesh organized by Himachal Vety. Council on Oct., 15,2004
5. Mandial, R.K. (2005). Recent advances in assessment and interpretation of acid bases status with special reference to therapeutic considerations. Paper presented at Seminar on " Role of Vety. Council in regulating Vety. Practice in Himachal Pradesh organized by Himachal Vety. Council on Feb.,2, 2005

17. Department of Veterinary Pharmacology & Toxicology

The discipline of Veterinary Pharmacology & Toxicology came into existence as one of the constituents of the erstwhile Department of Physiology and Pharmacology at the time of inception of College in July, 1986. The discipline gained the status of an independent Department of Pharmacology & Toxicology w.e.f. July 1, 1991 becoming one of the core subjects in the Veterinary profession.

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:

Biochemical and Pharmacological studies on Antioxidative effects of Indigenous Medicinal Plants

Salient findings:

The selection of plants having folklore claims of possessing antioxidant activity was done. In all fourteen plant samples were collected from Kangra, Solan and dry cold desert areas of HP. Following the mechanical processing, the plant samples were solvent extracted and per cent recovery noted. Recovery for crude methanolic extracts ranged from highest with *C.camphora* leaves (26.62%) and lowest with *A.nilagirica* leaves (7.23%). Similarly, recovery for aqua-methanol

and dichloromethane extracts ranged from highest with *H.rhamnoides* berries (24.58; 13.07%) and lowest with *C.sinensis* leaves (9.18% am) and *B.monierii* whole plant (1.58% dcm).

The free radical scavenging capacity (FRSC) of the various plant samples was done by DPPH method taking BHT as the standard antioxidant. The methanolic extract of *H.rhamnoides* leaves showed the highest FRSC activity of 78.96%, while *T.patula* leaves showed the lowest activity of 11.64%. The FRSC of aqua-methanol and dichloromethane was also assessed in a dose related manner. Both the extracts of whole plant of *B.monierii* showed concentration-dependent increase in FRSC. Its aqua-methanol extract was found to be a better scavenger as compared to dichloromethane. The dichloromethane extract of *W.somnifera* was found to possess better scavenging capacity as compared to its aqua-methanol extract. Both extracts showed a concentration-dependent rise in FRSC, but the same was below the standards in case of aqua-methanol extract. Similarly the aqua-methanol extract of dried leaves of *H.rhamnoides* was found to possess significantly higher FRSC as compared to the dichloromethane extract. However, the dichloromethane extracts of *C.asiatica, C.sinensis, T.cordifolia* and *H.rhamnoides* was found to have FRSC below the standards.₩

The total phenolic compounds of the plant samples were also measured using gallic acid as standard phenolic compound. The dichloromethane extract was found to possess negligible total phenolics. The leaves of *C.sinensis* and *H.rhamnoides* showed a significant phenolic activity of 327.92 and 344.24 µg.

In the experiments involving determination of superoxide radical scavenging capacity, it was found that at low concentrations, the aqua-methanol extract of *H.rhamnoides* leaves did not show promising results.

Interactive Effects of Free Radicals on Vascular Calcium Channels in Goats

Salient findings:

Around 100 experimental trials on goat pulmonary artery were conducted to standardize the isolated tissue preparation and assess the effect of various agonists and antagonists on the receptor and non-receptor mediated responses. Generation of free radicals *viz.*, superoxide and hydroxyl, *in vitro* and exposure to the isolated pulmonary artery was standardized. The effect *per se* of these free radicals on the vessel was been studied. Modulatory role of these free radicals on the calcium channels is under progress.

III. Studies on immunomodulatory activity of indigenous plants of Himachal Pradesh

Salient findings:

Survey & collection of literature was done. The plant samples were procured from high altitude areas, Lahaul & Spiti valley, for seabuckthorn berries and local places for giloy stem. The samples were shade dried and ground to fine powder. They were then extracted using aqua-methanolic solvent system. The filtrate obtained was dried using rotary vacuum evaporator. The physical characteristics and recovery of the extract were noted. Further studies to standardize the protocols for immunomodulatory effects are in progress.

EXTENSION :

- The Department participated actively in the Kisan mela held on 28-29 Oct. 2004
- Dr. C.Varshneya delivered a Radio talk on "*Pashuon mein aam rogo key gharelu upchar*" at AIR Dharamsala, broadcasted on 2-11-04 at 103.4 MHz, Dharamsala

- Dr. R.S. Telang ,Assistant Professor delivered a radio talk on "*Vishailey paudhey evam unsey bachav*" at AIR Dharamsala, broadcasted on 15-11-04 at 5:30 pm at 103.4 MHz, Dharamsala
- Dr. R.S.Telang attended disease outbreak in buffaloes at village Sansai, on 6-7-05.
- Performed toxicological analysis of the samples submitted from outbreaks to the department from time to time.

PARTICIPATION IN CONFERENCES / WORKSHOPS

1. Dr.C.Varshneya participated in Summer School on "Instructional technology and multimedia production for agricultural scientists" held at GBPUA&T, Pantnagar, from Sept. 10-30, 2004
2. Dr.C.Varshneya participated in Seminar on Recent advances in dairy production organized by the Dept of Animal Nutrition, COVAS, sponsored by American Soybean Association on 21-5-05
3. Dr.R.S.Telang participated in Workshop on Bioinformatics, held at Bioinformatics Centre, CSK~HPKV, Palampur, HP, Jan.17-19, 2005
4. Dr.R.S.Telang participated in Seminar on Current Status of Veterinary Services in Himachal Pradesh and Future Challenges, held at S.M. Convention Center, Palampur on 8-2-05
5. Dr.R.S.Telang participated in Seminar on Recent advances in dairy production organized by the Dept of Animal Nutrition, COVAS, sponsored by American Soybean Association on 21-5-05
6. Dr.R.S.Telang participated in Interactive session with the Pakistani delegates from Faisalabad, on 10-6-05, organized by the DEE at Communication Center.
7. Dr.Manmohan Singh Dardi participated in Seminar on Current Status of Veterinary Services in Himachal Pradesh and Future Challenges, held at S.M. Convention Center, Palampur on 8-2-05

Teaching / Professional activities

- The Department was awarded with the Winter School on *"Recent trends in utilization of plant biodiversity in the animal health care with special reference to pharmacotherapeutics, pharmacodynamics and safety assessment"*, scheduled to be held from Sept 30 – Oct 20, 2005.
- The Department also submitted a proposal under FIST to the Department of Science and Technology ,Govt. of India ,New Delhi
- Development of instructional video on "*Artificial Insemination*" during Summer School on "*Instructional Technology and Multimedia production for Agricultural Scientists*" from Sept. 10-30 at G.B. Pant University of Agriculture and Technology, Pantnagar (UA)

Publications

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. 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): 677-678

3. Anita Singh, C.Varshneya and R.S.Telang (2005). *In vitro* anthelmintic effect of *Curcuma longa*. *The Indian Veterinary Journal* 82(6): 594-596

4. 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

5. Anita Singh, C. Varshneya and R.S. Telang (2005). *In vitro* screening of *Thuja orientalis* leaf extracts for anthelmintic activity against *Haemonchus contortus*. *Indian Journal of Small Ruminants* (Accepted, In press)

6. Anita Singh, C.Varshneya and R.S.Telang (2005). Flowers of *Tagetes patula* – A potential anthelmintic. *Indian Veterinary Journal* 82(8): 838-840

7. 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

Conference paper(s):

1. M.K.Lonare, C.Varshneya, **R.S.Telang**, S.K.Khurana, Anita Singh and M.S.Dardi (2004). Effect of seabuckthorn supplementation on non-specific immune response in chicken. Presented in the IV Annual Conference of Indian Society of Veterinary Pharmacology & Toxicology, held at Indira Gandhi Krishi Vishvavidyalaya, Anjora, Durg, Chattisgarh, from Dec 22-24, 2004. p 38-39

2. Anita Singh, **R.S.Telang** and C.Varshneya (2004). *In vitro* free radical scavenging activity of leaves of *Hippophae rhamnoides*. Presented in the IV Annual Conference of Indian Society of Veterinary Pharmacology & Toxicology, held at Indira Gandhi Krishi Vishvavidyalaya, Anjora, Durg, Chattisgarh, from Dec 22-24, 2004. p 39

3. Varshneya,C. (2005). Enhancement of Animal Production through Pharmacological Interventions. Paper presented as Expert faculty Member at Training Course on Advances in Animal Health and Production with Special reference to Northern Hilly Area held at Faculty of Veterinary Sciences and Animal Husbandry, Sher-e-Kashmir University of Agricultural Sciences and Technology, R.S.Pura, Jammu, from Feb. 24 to Mar. 17, 2005

18. 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 the Government of the New Zealand 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 the withdrawal of the New Zealand Govt. from the project 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 college of Agriculture, Directorate of Research and now under the college of Vety. & Animal Sciences of the University.

The present Livestock Farm became an independent unit in 1997, with the bifurcation of the then Department of Animal Breeding and Genetics, COVAS, HPKV, Palampur. Like any other Department, 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.

TEACHING:

The faculty of the Livestock farm assists the concerned departments to offer courses to veterinary undergraduates as well as to the post graduates. 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 for research trials as and when required. Furthermore, dairy animals were also made available for different UG practical classes from time to time.

PROGRESS OF THE LIVESTOCK FARM

Performance of dairy herd:

Herd Strength: The total herd strength during the beginning of the period was 215 animals. Subsequently, 84 calves (42 male and 42 female) were added on account of births/calving. A total of 68 animals (43 male+ 25 Female) left the herd either because of mortality (59 animals) or transfer to other departments (9 animals). The herd strength marginally increased to 231 animals by the end of the year. The herd strength needs to be maintained at the level of previous year due to financial constraints. The comparative performance for production indicators of the Livestock Farm is as under:

Parameter	Performance during the year	
	2003- 04	2004-05
No. of cows in milk	96	99
Total milk production (lit)	2,43,419.55	2,53,340.7
Wet Average (lit/cow/day)	6.91	7.03
Herd Average (lit/cow/day)	5.68	5.67

The total milk production (2, 53,340.7 lit) during this year was 4% higher than previous year. The wet average (milk yield/milking cow/day) was marginally higher whereas the herd average, based on all the cows, remained almost similar (5.67 lit/cow/day). More number of cows in the herd (82 %) remained in milk due to better reproductive management.

Performance of dairy herd for economic traits:

The departmental research at the farm is focused at the evaluation of Jersey germplasm and its crosses with Red –Sindhi breed for various economic parameters. The performance of these genetic groups is being recorded for various production and reproduction parameters under farm conditions and local climatic conditions. Continuous efforts were made to optimize the performance of dairy herd for various economic traits by improved management, feeding and disease control measures. The comparative performance of the herd for economic traits is given below in table 1. The observation on HF cows completing lactation during the period were few to make any interpretation

Table 1 : Performance of the dairy herd for production /reproduction parameters.

Traits	Breeds					
	Jersey		Jersey X Red Sindhi		Holstein- Friesian	
	2003-04	2004-05	2003-04	2004-05	2003-04	2004-05
1. Age at first calving day	1470.62	1360.22	1646.75	1386.50	-------	-------
2. First lactation milk yield (Kg)	1958.65	2168.16	2592.8	2747.77	------	-----
3. Overall lactations milk yield(Kg)	3017.77	2816.43	2620.72	2765.18	3855.35	-----
4. Lactation length (days)	470.68	448.15	366.07	378.55	498.00	-------
5. Dry period (days)	81.50	85.85	73.48	77.57	277.00	-------
6.Service period (days)	271.50	257.23	167.58	192.06	480.50	-------
7. Calving interval (days)	553.68	534.00	449.17	475.23	757.50	-------
8. Gestation period (days)	281.50	280.85	278.28	275.78	274.50	-------
9.Birth weight(Kg)						
Male	21.66	23.00	24.54	23.07	30.00	28.33
Female	21.23	23.53	23.35	23.33	30.00	35.00
10 Concep rate (%) 1st insem.	51.11	38.46	35.53	55.55	40.31	60.00
1st - 3rd insem.	80.00	61.53	72.38	77.77	74.42	80.00
11. Adult mortality Incidence (%)	17.10	12.32	9.10	2.75	8.33	30.76

The Jersey X Red Sindhi crossbreds have performed consistently better than the purebred Jersey cows both for the milk production and reproduction parameters at the farm. The first insemination as well as first three insemination conception rates was lower in Jersey (38.46% and 61.53%) cows than crossbred (55.55% and 77.77 %) cows with deterioration over the previous year in Jersey cows. There was significant improvement in the age at first calving, both in Jersey and crossbred heifers at the farm by augmenting reproductive management, feeding and management of young heifers and growing stock. The mortality incidence in the adult stock declined considerably over the preceding year in all the genetic groups except HF due to better health control.

Fodder production and land development

The area under fodder cultivation was 53.2 hac. and 50.8 hac. during the kharif and rabi seasons under the report. The green fodder availability at the Farm declined by 11.22% during the year (10113.82 Qtls.) , while the input of dry forages increased by almost 54 % due to higher purchase of wheat straw from outside. Higher quantities of grasses and hay were harvested during the year which also improved the dry fodder availability. Lesser land area could be put under cultivation during both the seasons as some of the area was put under the perennial grasses cultivation for grazing purposes. The season – wise availability of fodder and area sown is given in the table 2.

Table 2 : Comparative statement of the fodder availability at Livestock Farm:

Season	Source	Area sown (ha)		Green fodder (qt)		Dry fodder (qt)	
		2003 - 04	2004- 05	2003 -04	2004- 05	2003 - 04	2004- 05
KHARIF	Farm area (ha.)	54.8	53.2	7465.40	5388.55	-----	-----
	Other department			402.30	755.87	277.10	190.05
	Purchased						
RABI	Farm area	50.2	50.8	2960.50 + 54.00(Napier grass)	3201.00	50.00 (Oats straw)	30.00
	Other department			94.73 (Green grasses)	730.40	296.15	566.0
	Purchased					874.15	1288.15
GRASS LAND		-----				800.00	1473.10
TREE LEAF				415.00	38.00	------	-------
TOTAL		105.00	104.0	11391.93	10113.82	2297.40	3547.30

The area that was developed for grazing by introducing improved grasses like Hybrid Napier, Setaria, and other legumes since Feb-March, 2003 after clearing the area (approx 40 ha) from bushes, weeds etc. was used for grazing by taking the non producing stock for regular grazing. Furthermore, 1800 qtls of maize silage during Kharif and 250 qtls of Oat silage during Rabi season were prepared to meet the green fodder requirements during lean winter/ summer months.

Performance of Revolving fund scheme:

The revolving fund scheme on "Maintenance of Livestock Farm" to meet the operational expenditure on maintenance of dairy herd was started during the financial year 2002-2003.The financial status of revolving fund scheme during the agricultural year 2004-05 is as below.

Particulars	2003-04	2004-05
Opening balance as on 1st July,2004.	3,91,120.76	6,48,788.37
Credit during the period (Sale proceed + interest)	33,78,996.61	35,90,411.60
Debit during the period (Contingent expenditure)	31,21,329.00	37,38,380.00
Refund / Contribution to University	1,00,000.00	----------
Closing balance as on 30th June,2005. (1+ 2-3-4)	6,48,788.37	5,00,819.97

RESEARCH:

Apart from the departmental research at livestock farm, the faculty of the livestock farm is actively engaged in the basic and applied research at farm and in association with other departments of the College/ University.

EXTENSION :

The farm faculty delivered 6 lectures and 22 practical demonstrations to the trainees of various training programs conducted by the university for the farmers, farm-women, unemployed youth etc. on dairying and related fields. Besides, on farm demonstrations of improved dairy husbandry practices were given to approx. 32 groups of visitors including farmers, trainees and others (1200 people) who visited the farm during the year.

PUBLICATIONS

1. Katoch, Sanjeet, 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. Thakur, Y P, Katoch, S and Gupta, K (2004) : Characteristics of Chegu breed of goats in the breeding tract in Himachal Pradesh. Indian J Animal Genetics and Breeding, 25 (1) : 118-122.
3. Thakur, Y.P., Madhumeet Singh and Sandeep Jasial (2005). Semen production and freezability attributes in Chegu pashmina bucks Indian J Animal Sci. 75(8) : 50-52.

Book / Proceedings chapter published:

1. Thakur, Y P (2004). Characterization and Conservation of the Chegu goats. In "Goat Genome" the proceedings of the national seminar on "Goat genome", 5-6th April, 04, Central Institute of Research on goats (CIRG), Farah- 281122, UP.
2. Thakur, YP and Dogra, PK (2004). Production system and demographic status of Chegu goats in their breeding tract. In "Livestock production systems for sustainable food security and livelihoods in mountain areas". Edited by Vir Singh and P L Gautam , Published by G B Pant Univ of Agri & Tech, Pantnagar,Uttaranchal. Pp:177-181.

Research Reports / Monograph published:

1. A Monograph on "Chegu: The pashmina goats of Himachal Pradesh" was published by Dr. YP Thakur and Dr MS Tantia , NBAGR,KArnal under the NATP (MM) project on Animal Genetic resource Biodiversity during 2005.
2. Final Report of NATP (MM) sub project "Characterization and Conservation of Chegu Goats" completed as cooperating centre.

Papers presented in conferences/symposia etc.:

1.Thakur, Y.P, Girish Sharma, Katoch, S. and Gupta, K. (2004). Production and quality of Pashmina from Chegu goats of Western Himalayas. Paper presented in the National seminar on Angora rabbit wool and Cashmere production and utilization organised at Manali (HP) on Sept. 25-26, 2004 by the ISSGPU. In proceedings. , Ab 1 : pp191.

2.Thakur, Y.P, Katoch, R. and Pathak, V. (2004). Production and utilization of Pashmina fibre in Himachal Pradesh. Paper presented in the National seminar on Angora rabbit wool and Cashmere production and utilization organised at Manali (HP) on Sept. 25-26, 2004 by the ISSGPU. In proceedings abstract 2 pp :192.

3.Girish Sharma, Thakur, Y.P. and Renu Singh (2004). Morphological and Acrosomal abnormalities in Chegu Pashmina Buck's Spermatozoa. Research paper accepted for oral presentation in XXth Annual Convention of ISSAR and National Symposium on "Management of Fertility in Livestock" to be held on December 14 -16, 2004 at IGAU, Anjora, Durg, (Chhattisgarh).

4.Pathak, V and Thakur Y P (2005). Carcass characteristics of the adult Chegu bucks. Paper presented in the National Symposium on "Newer concepts and challenges in Veterinary Science and Animal Husbandry" and XII Annual Conference of the IAVVR-2005 and 5th Indian Veterinary Congress held on Dec.31,2004 and Jan. 1, 2005 at College of Vet. & Animal Sciences (RAU) Bikaner- 334001(Raj.). Published in the proceedings; Ab., P4.38: pp 304-305.

5. Thakur Y.P , Katoch S, Gupta K and Dogra P.K. (2005). Opportunities for improvement of pashmina goat production in cold arid region of westernHimalayas. Paper presented in the 2nd National Symp. on " Domestic AnimalDiversity: Status, Opportunities and Challenges" organised by Society forConservation of Domestic Animal Biodiversity at NBAGR, Karnal on Feb. 10-11,2005. In proc., Ab.DAD 163 , pp: 166.

6. Gupta K, Katoch S , Thakur Y P and Dogra , PK (2005). Growth pattern studies of Gaddi goats of cold arid zone of Himachal Pradesh. Paper presented in 2nd National Symposium on "Domestic Animal Diversity: Status, Opportunities and Challenges"organised by the Society for Conservation of the Domestic Animal Biodiversity atNBAGR, Karnal. Feb. 10-11, 2005. In proceedings, Abstract DAD 171 PP: 148

7. Thakur Y.P, Katoch S, Gupta K and Dogra P.K. (2005). Growth and productivity potential of Chegu pashmina goats under farmer's flock in cold arid region of Himachal Pradesh. Paper accepted for presentation in VIII National Conf. of Animal Genetics and Breeding on "National Livestock Breeding Policy" held at CIRG, Makhdoom, Farah March 8-10, 2005.

19. DEPARTMENT OF ANIMAL NUTRITION

TEACHING :

The department offered courses to veterinary undergraduates as well as to the post graduates in Master and Doctoral program in Animal Nutrition. Training was imparted to the UG interns of the college in the field Feed formulation, analysis. in second semester

RESEARCH:

Field evaluation of some useful microbes as growth promoters in broilers.

Maize, wheat, deoiled rice bran, soyaflakes, groundnutcake/extraction, sunflower extraction, mustard oil cake were procured from the departmental store and were analyzed for proximate principles, calcium, phosphorus and gross energy. The standard broiler starter and finisher diets were formulated and were also analyzed for proximate principles by the standard methods of AOAC. The validity testing of promising microbes *Lactobacillus acidophilus* (bottle gourd), *Lactococcus uberis* (bitter gourd), *Saccharomyces cerevisiae* (bitter gourd) were carried out at farmers level (three sites) viz. Baijnath, Nagrota Bagwan and Jawali in commercial broiler chicks from day- one to six weeks of age for their biological performance w.r.t. various parameters like gain in body weight, feed consumption, feed efficiency ratio and mortality percentage. All the inputs for establishment of broilers units were supplied to the farmers at each site. The records w.r.t. biological performance were maintained and the data was tabulated and statistically analyzed. The overall results revealed that the supplementation of the diet with above microbes improved growth rates by 30 percent over control group alongwith better feed efficiency.

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

The UMMB was prepared for experimentation and metabolic trials were conducted to study the nutrient utilization in calves after feeding urea molasses mineral blocks prepared by hot and cold process. The samples are being analysed for proximate principles, fibre composition and minerals. The data is also being analyzed for

parameters recorded for shelf life of uromin blocks.

Revolving Fund Scheme:

Sanctioned to this department during the financial year 1994-95 with an initial outlay of Rs. 25000/- .

Progress Made:

Preparation of feed products for sale

During the year under report, the following feed products were prepared and sold:

Feed Product	Quantity Previous balance	Production	Sale	Balance
Uro-Mol-Min bricks (2.5Kg. each) Nos.	661	5600	5714	547
Uro-Mol-Min bricks (3Kg. each) Nos.	179	3525	3702	2
Mineral mixture (kg.)	908.3	6900	7624.450	183.850
Milk ration (kg.)	3430	24,780	28,150	60
Broiler feed (kg.)	50	38,255	31,805	6500
Calf grower ration (kg)	NIL	1000	1000	NIL
Layer feed (kg.)	NIL	31,600	31,600	NIL
Rabbit feed (kg.)	NIL	225	225	NIL
Dog biscuits (pack of 0.5 kg)	25	74	98.5	50
Egg production (No.)	NIL	39,164	37,416	1748
Broiler production (kg.)	NIL	311.700	311.700	NIL
Layer production (kg.)	NIL	29,550	29,550	NIL
FYM (Qtl.)	NIL	11.5	11.5	NIL
Total				

I. The seed money of Rs. 25,000.00 received during 1994 -95 was refunded to the University on 26.6.1999.

II Balance in the ledger of Revolving Fund Scheme upto 30.06.0.2005 was Rs 12,97,221.00.

Evaluation of locally available feed and fodder to improve quality and formulate complete economic rations with high roughage diet

The project "Evaluation of locally available feed and fodder to improve quality and formulate complete economic rations with high roughage diets" in PSR mode under the NATP was sanctioned vide letter F. No. NATP/AED(Arid)/PAL 028/99 dated 20.11.1999 with lead centre at CSWRI. Avikanagar and 5 (IARI, New Delhi; IGFRI, Jhansi; RAU (B), Bikaner, HPKV, Palampur, NRCC, Bikaner) co-operating centers. During the period under report, 6 experiments were conducted at HPKV, Palampur after the installation of complete feed block making machine. The complete feed blocks were prepared for carrying out field trials on milk animals and the field trials on milk animals at village Behru and Tanda (Rajpur) were conducted. The final report of the project has been submitted to the quarter concerned.

Evaluation and improving locally available feed resources and developing feeding systems for improved livestock production

Complete feed blocks were prepared for distribution among the farmers. Field trials on milk animals at different places in Kangra Distt. were conducted. Three one-day farmer workshop-cum camps were organized at village Badehar, Kangra ans Kullu under the project in which more than

200 farmers participated in each camp. The final progress report of the project has been submitted to the quarter concerned.

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

The 80 women beneficiaries were trained and selected 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 collection of laying data is in progress at all the sites. Time to time visits are being made by the project staff to solve their problems related to layer rearing. Medicines and vitamins are also supplied to the farmers as and when needed. Feed back data collected from the farmers revealed that about 42% farmers have adopted poultry farming mainly broiler rearing in order to generate a supplementary source of income as well as better nutrition for their families. The collection of feed back data from the farmers selected and involved in layer rearing is under progress. The overall data revealed on an average GIWof 1163.50g with FCR 1.97 and mortality 2.81 percent only at different sites with an average profit of Rs.17.28/-per broiler per family during one month of rearing was achieved.

EXTENSION:

Conferences/Symposia organized:

A seminar on dairy cattle Nutrition was organized in the department on May, 21, 2005. American Soybean Association sponsored this Seminar. In this Seminar **Dr. Tilak Dhiman consultant American Soybean Association, Uttah State University, USA, delivered a lecture entitled, 'Recent Advances in Dairy Production''.** More than one hundred dairy farmers, most of them women, besides veterinarians from state animal husbandry department and faculty of veterinary college participated in the seminar.

Lectures delivered: The lectures were delivered by the faculty members in the various training programmes organized by DEE, CSK HPKV, and Palampur. The Department also participated by exhibited departmental activities in a) State Level Kisan Mela

Radio Talks :-

I. "Complete feed block feeding'', dated 19.3.2005, by **Dr. K.S.Sharma**
II. "Feeding of New born calves", dated 19.3.2005 by **Dr. Desy Wadhwa**

Book/Manual written:

1. **'Pahari kshetre mein dudharo pashuon key poshan shelly'** by K.S.Sharma, V.K.Sharma, Desy Wadhawa, Shivani Katoch, Arun Sharma and Meena Kumari (2004).

WORKSHOP, CONFERENCE AND TECHNICAL MEETINGS ATTENDED BY FACULTY MEMBERS:

Sr. No.	Workshop/Conference	Name of the teacher
1.	National Seminar on 'field Research Laboratory, DRDO, Leh from 26th -27th August, 2004	Dr.. V.K. Sharma
2.	National Seminar on Angora Rabbit wool and cashmere production and utilization held at Manali from 25-26 September, 2004.	Dr. K.S. Sharma and Dr. Arun Sharma

3.	XXII Annual conference of Indian Association of Veterinary Microbiologists, Immunologists and specialists in Infectious Diseases", from October 18th -19th, 2004.	Dr. K.S. Sharma, Dr. V.K. Sharma,Dr Arun Sharma & Sh. Sunil Pathak
4.	Vth Biennial Conference of Animal Nutrition Association, at Banglore from 24th-26th November.	Dr. K. S. Sharma

PUBLICATIONS

1. V.K.Sharma, B.R.Sood and Naveen Kumar (2004). Improvement and quality evaluation of pastures, experiences from dry temperate high mountains of Himachal Pradesh. Paper in the Inter national symposium, Livestock production systems for sustain able food security and livelihoods in Mountain areas at GB Pant University of Agriculture & Technology, Pantnagar: 91-98.

2. S.K.Pathak, N.K. Tripa- thi, V.K.Sharma and A.K.Mishra (2004). Labour use pattern and income generation from Animal Husbandry Sector. Journal of State Bank of India, Monthly Review, 10:550- 558.

3. V.K.Sharma (2004). Bufalo productivity and rearing practices prevalent in Himachal Pradesh. Buffalo production under different climatic regions. International Book Distributing Co., :507-515.

4. Sudesh Radotra, B.S. Katoch and V.K. Sharma (2004). Digestibility of nutrients, balance of nitrogen and growth performance in Dairy heifers fed mixed forage diets. Indian J. Anim. Sc. 74(2), 200-204.
5. Sharma, A., Sharma, R. Sharma, K.S., Wadhwa D.,and Kumari,, M.2004. Comparitive evaluation of oral and parental administration of vitamin E and Selenium in muscular dystrophy affected male calves. Proc.of 5th ANA Conference 2004 held at NIAN Banglore.228:160.
6. Sharma, K.S.,. Kumari,, M,.Wadhwa D.and Sharma, A. 2004 .Field evaluation of some promising probiotics in combination, isolated from indigenous sources on biological performance of commercial broilers.Proc. of 5th ANA conference 2004 held at NIAN Banglore.353:249

Presentation in Conferences/Seminars:

1. V.K. Sharma 2004.Importance of Seabuckthorn (Hippophae rhamnoides) feeding to the animals. National seminar on Seabuckthorn, FRL (DRDO), Leh. August 26-27, 2004
2. V.K. Sharma 2004. 'Cultivation, Harvesting and Scientific exploitation of Seabuckthorn', organized by field Research Laboratory, DRDO, Leh from 26th -27th August, 2004

3. V.K. Sharma 2004. Physical properties of complete feed blocks. Vth Biennial conference of Animal Nutrition Association held at National Institute of Animal Nutrition & Physiology, Bangalore, 24-26 Nov., 2004, 48-49.
4. V.K. Sharma 2004. White clover (Trifolium repens) feeding of sheep for replacement of concentrates. Vth Biennial conference of Animal Nutrition Association held at National Institute of Animal Nutrition & Physiology Bangalore, 24-26 Nov, 2004, 74-75.

5. K.S. Sharma, Arun Sharma, Desy Wadhwa and Meena Kumari 2004. Comparative evaluation of oral and parentral administration in muscular dystrophy affected male calves. Vth Biennial conference of Animal Nutrition Association held at National Institute of Animal Nutrition & Physiology Bangalore, 24-26 Nov, 2004, 74-75.

6. Sharma, K.S.,. Kumari,, M,.Wadhwa D.and Sharma, A. 2004 Field evaluation of some promising probiotics in combination isolated from indigenous sources on biological performance of commercial broilers, presented at ANA Conference 2004 held at NIAN Banglore from 24-26 Nov, 2004, 353:249.

Popular articles:

1. K.S.Sharma, V.K.Sharm a, Desy Rani Wadhawa, Shivani Katoch, Arun Sharma and Meena Kumari (2004). *Pashu utpadakta barain- Sampuran Ahar "Pind" Khilayain.* Department of Animal Nutrition, Phamphelt Publication.
2. J.S.Chauhan,V.K.Sharma and J.S.Thakur (2004). *Sheetkal me dhudharu pashuoin ki dhekhbhal.* Parvateey Khetibadi ,4:2.
3. Nagender Kumar Tripathi, Sunil Pathak and Vijay Sharma (2005). *Sooar Palan avam unka poshan.* Kheti Duniya, 18.6.2005, 25:10
4. Sunil Pathak, Nagender Tripathi and V.K.Sharma (2005). *Pashu upchar ki gharelu vidhiyan.* Parvateey Khetibadi ,1-2:21
5. Sunil Kumar Pathak, V.K.Sharma and Nagender Tripathi (2005). *Gabhin avam dudh dene vale pashuon ki dekhbhal.* Kheti Duniya, Kharif Special, 21.5.2005, 1:16
6. Sunil Pathak, Nagender Tripathi and Vijay Kumar Sharma (2005). *Bhar palan avam Poshan.* Kheti Duniya, Kharif Special, 21.5.2005, 1:20.
7. Sunil Pathak, Nagender Tripathi and V.K.Sharma (2005). *Pashu dhan ahar mai soyabean ki upyogita.* Kheti Duniya, Baishakhi Special, 16.4.2005, :22.
8. Nagender Tripathi, Sunil Pathak and V.K. Sharma (2005). *Kharghosh palan "Labhpradh vyabsaya".* Kheti Duniya, Farmers Fair Special, 5.3.2005, :19.
9. Sunil Pathak, Nagender Tripathi and V.K. Sharma (2005). *Hare charre bale paid-pohdhe avam unka poshtik mahatav.* Niryatak Khetibadi, 9 : 11.

ICAR -JRF EXAMINATION

The Final year students of the college excelled in the All India Junior Research Fellowship conducted by the Indian Council of Agricultural Research- New Delhi for the year 2004-2005. Following positions were bagged by the final year students of the college who will get admission for Post graduation in the various institutes of the country along with a monthly stipend of Rs. 5000.

ANIMAL SCIENCES

ALL INDIA RANK	NAME
6	VARUN SANKHYAN
66	VIPIN SHARMA
79	ANIL KUMAR THAKUR
103	SUSHEEL SHARMA
225	RAKESH KUMAR
312	SURINDER THAKUR
325	SANDEEP GUPTA

VETERINARY SCIENCE

33	SANDEEP KHIMTA
40	VIPIN KUMAR
41	ATUL KUMAR GUPTA
45	VISHAL CHANDER
61	VISHAL DOGRA
112	ABHISHEK GANDHI
139	ASHISH SHARMA
189	DEEPAK SHARMA
192	DEEPA SHARMA
212	NEERAJ KATOCH
401	ANEESH KUMAR
417	JAI RAM

VISITS ABROAD

1	Dr. Adarsh Kumar	Assistant Professor Department Of Veterinary Surgery & Radiology	Chengdu, China	4th International Congress on Yak, w.e.f September 20-26, 2004 Presented two papers on anaesthesia and arthritis treatment in yaks.
2	Dr. M.M Singh.	Associate Professor Department Of Animal reproduction, gynaecology & obstetrics	Porto Seguro, Bahia, Brazil	15th International Congress on Animal Reproduction. From 8 - 12, August 2004 and presented paper entitled "Pregnancy rate following estrus synchronization in crossbred dairy cows maintained under sub-temperate climate - comparison of two techniques".
3	Dr. M.S. Kanwar	Associate Professor Department Of Veterinary Surgery & Radiology	Glasgow, UK	10th International Conference on "Human Animal Interaction" w.e.f. Oct 6-9, 2004 Presented a paper entitled 'Community Welfare Services by Blue Cross Society of HP in north-western region of India'.
4	Dr. M.S. Kanwar	Associate Professor Department Of Veterinary Surgery & Radiology	Shahrekord University, Iran	Ist International Symposium of Veterinary Surgery & Radiology w.e.f May 10-13, 2005. Presented a paper entitled 'Clinical evaluation of xylazine and detomidine in ponies - comparative studies.
5	Dr. R.S.Kishtwaria	Associate Professor Veterinary Teaching Clinical Complex	Shahrekord University, Iran	Ist International Symposium of Veterinary Surgery & Radiology w.e.f May 10-13, 2005