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L01 Animal Husbandry

115 Ravi ,A.; Prasad , J. Rama (College of Veterinary Science, Tirupati (India) Department of Animal Nutrition). Male kids and lambs response to supplementation under intensive system of management. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 147-156. Keywords: Lambs; Animal Husbandry Methods; Intensive system, Supplementation, Animal Production

Thirty each of growing male kids and ram lambs were stall fed *ad libitum* on fresh, hand chopped Napier Bajra-21 (NB-21) and supplemented with either concentrates (Maize grain (MG) + deoiled groundnut cake (GNC) alone (T-1) or along with groundnut haulms (T-2), dried leaf meal of *Leucaena leucocephala* (T-3), *Sesbania grandiflora* (T-4), *Gliricidia maculata* (T-5) or *Ficus bengalensis* (T-6) to meet 30% of DM requirements. The effect of supplementation on rumen fermentation pattern, digestibility of nutrients and growth performance was studied in two parallel growth trials (180 days). The concentration of rumen metabolites except total N was higher (P<0.01) in rams than in bucks across treatments and among the treatments, T-1 or T-4 sustained higher (P<0.01) concentration of rumen metabolites. Nutrient digestibility except CP was higher (P<0.01) in kids than in lambs while among treatments, the digestibility of OM, CF, ADF and cellulose was comparable.The digestibility of CP and NDF was lower (P<0.05) in T-6 than in other treatments. The nitrogen retention (g/d) and % of intake or absorbed in lambs was higher (P<0.05) in kids than in lambs and among treatments, higher (P<0.01) nitrogen retention was observed in T-3 or T-4 fed animals. The ADG was less (P<0.01) and the EFU was inferior (P<0.01) in kids than in lambs due to lower (P<0.01) DMI from NB21, and roughage supplements. Among treatments, the ADG was comparable while the EFU was superior (P<0.01) in animals fed T-3, T-4 or T-5 than in T-2 or T-6. Supplementation with legume tree leaves (T-3 to T-5) was beneficial for economic and sustainable production of ram lambs whereas, intensive system of management was not successful with kids due to low DMI from basal roughage and roughage supplements.

116 Tanwar, P.S.; Vaishanava, C.S.; Sharma, Vishnu (Maharana Pratap University of Agriculture & Technology, Udaipur (India) Rajasthan College of Agriculture, Department of Animal Production) A study on socio-economic aspects of goat keepers and management practices prevailed in the tribal area of udaipur district of Rajasthan. Indian Journal of Animal Research (March 2008) v.42 (1). Keywords: Animal Husbandry Methods, Goats

Present study was conducted on 120 goat keepers randomly selected from two tribal tehsils i.e. Mavli and Jhadol of Udaipur District of Rajasthan. The socio-economic profile of the selected respondents was that majority of the respondents belonged to 31–50 years of age group, schedule tribe, illiterate, medium size family and having small land holding. Goats were housed

near dwelling, loose housing as well as open yard/under trees was common housing practices adopted by respondents. All categories of goats *viz*; Male, Female and Kids were housed together. Floors of the shed were dusty, no provision was made in the shed for drinking water. Animals got contaminated water from village pond, when they were out for grazing. Placenta was disposed of either by throwing near the village premises or by burying in the soil. Carcass of dead animals were left to decay automatically out side the village. Knuckling method of milking was prevalent. Precautions like washing hands, washing udder and washing charry (Brass pot) with plain water were adopted by the respondents. Milk was utilized for household purpose and charry (brass pot) were used as milk collection utensil.

117 Bhat, G.A.; Gupta , S.C. (CCS Haryana Agricultural University Hissar (India) College of Animal Sciences. Department of Livestock Production and Management) Effect of anti-stress agents on the performance of WLH hens during summer season. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 259-264 Keywords : Broiler Chickens, Egg production, Egg characters; Heat tolerance

An experiment was undertaken on 210 White Leg Horn hens raised on deep litter and divided into five equal groups to study the effect of incorporating anti-stress agents viz vitamin C, vitamin E, sodium bicarbonate and ammonium chloride @ 0.8, 0.1, 15 and 10 g/kg feed respectively in the ration of WLH pullets during summer season (May to October) on, age at 50% production, percent hen day production, and egg weight. There was decrease ($P<0.05$) in age at 50% production which was 158.67, 160.00, 162.33, 165.00 days in ammonium chloride, vitamin C, sodium bicarbonate and vitamin E groups, respectively, as compared to 174.33 days in control. Incorporation of anti-stress agents resulted in improvement ($P<0.05$) in percent hen day egg production, being highest in vitamin C group (53.17%) followed by 40.85, 45.95 and 44.29 percent in vitamin E, ammonium chloride and sodium bicarbonate groups, respectively. The egg weight in the control group was lower ($P<0.05$) in the vitamin C group (50.92g) followed by 50.24, 50.22, 50.20 g in ammonium chloride, sodium bicarbonate and vitamin E groups, respectively. It could therefore be concluded that anti stress agents like vitamin C, vitamin E, sodium bicarbonate and ammonium chloride could be helpful in ameliorating the heat stress caused by high temperatures during summer season.

118 Bhatt, R.S. (North Temperate Regional Station Central Sheep and Wool Research Institute, Kullu (India)); Mondal, D. (Central Sheep and Wool Research Institute, Avikanagar (India)); Sharma R.B. (Central Instititute for Research on Goats, Makhdoom (India.)). Risam K.S. (North Temperate Regional Station Central Sheep and Wool Research Institute, Kullu (India)). Utilization of mulberry (Morus alba) leaves for economic angora rabbit production. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. Keywords: Mulberry leaves, Rabbit, Wool production, Digestibility

An experiment was conducted on 38 adult angora rabbit divided into two equal groups to study the utilization of mulberry leaves as compared to control. Rabbits in T_1 group were offered 110g of concentrate pellets and *ad libitum* green grass. In T_2 group rabbits were given 80g of concentrate, *ad libitum* green grass and remaining 30 g of concentrate was supplemented through 200 g of fresh mulberry leaves. The experiment was conducted for a period of 225

days. Initial body weight in T_1 and T_2 groups was 3.14 kg and 3.14 kg respectively. At the end of 3rd shearing (at 225 d) the respective body weights were 3.16 kg and 3.10 kg in both the groups, and the differences were non-significant. The total average wool production in three shearing in these groups was 431.5 g and 421.8 g in T_1 and T_2 group while the wool yield/shearing as 130.8g and 125.3g respectively. Total dry matter intake in T_1 and T_2 group was 139.3±8.3 g and 162.8±5.3 g respectively. Proportion of mulberry leaves in daily dry matter intake was 40.72%. Nonsignificant differences were recorded for staple length, fiber diameter, medullation percent, pure fiber and guard hair. Significant differences were recorded for the digestibility of crude fiber and ether extract. Dry matter required for producing 100 g wool was 7.84 kg in T_1 and 9.12 kg in T_2 groups with the respective cost as Rs. 49.82 and 41.66. From this experiment, it may be concluded that the mulberry leaves can successfully replace upto 28% of concentrate from the daily concentrate requirement of adult angoras.

119 Geetha, N.; Xavier Francis; Anil Leena (College of Veterinary and Animal Sciences, Mannuthy (India)) Stress assessment of piglets utilising behaviour tools under different managemental practices. Indian Journal of Animal Research (March 2008) v.42 (1)
Stress in piglets undergoing routine surgical procedures related to managemental practices was assessed in the present study. Sixty male piglets formed ten treatments with six replicates. Treatments undertaken were ear notching, handling for ear notching, castration, sham castration (restrained identically but not castrated), combined handling and performance of ear notching and castration. Behaviour was observed during four different time frames *viz:* 30 minutes before the treatment, during the treatment, 30 minutes after the treatment and 24 hours after the treatment respectively. In one-week-old piglets, though the stress related behavioural scores due to ear notching was higher during the procedure, the scores got decreased after 30 minutes and 24 hours of ear notching. The scores were intermediate in the combined performance of ear notching and castration compared to individual performance at one week. Castrates at eight weeks showed fewer stress related behaviours than the castrates at one week of age.

120 Patil, R.A.; Karanjkar, L.M.; Jadhav, V.S.; Narwade, S.G. (Marathwada Agricultural University, Parbhani (India) Department of Animal Husbandry and Dairy Science) Response in growth of osmanabadi weaned kids to various housing patterns. Indian Journal of Animal Research (March 2008) v.42 (1)
Twenty four Osmanabadi weaned kids of similar age and body weights were randomly allotted to six housing patterns *viz*., T_0: Floor *murum* with no ventilator + thatch roof (control), T_1: Floor *murum* with no ventilation + tin roof, T_2: Floor *murum* with one ventilator + thatch roof, T_3: floor *murum* with one ventilator + tin roof, T_4: floor *murum* with two ventilators + thatch roof and T_5: Floor *murum* with two ventilators + tin roof. All the kids were maintained on the common feeding regime of available roughages and home-made concentrate mixture. The observations on body weight gains showed significant ($P<0.01$) differences among the treatments means. The kids kept under T_2 (12.30 kg) and T_4 (12.42 kg) showed superior growth to those under other treatments. Providing ventilation proved significantly superior ($P<0.01$) for body weight gains as compared with no floor ventilation. However, no significant gains in live weight could be recorded by providing either one or two floor ventilators. Provision of various

roofs to the shed resulted in significant differences among the mean values of body weight gains. Covering the roof with a thatching materials proved beneficial and resulted significantly ($P<0.01$) higher body weight gains over to tin roofing. The cost of one kg gain in body weight was highest (Rs.9.41) in T_1 (tin roof with no ventilator) whereas lowest (Rs. 7.80) in T_2 (thatch roof with two ventilators). It is concluded that thatch roofed house with floor ventilation is economical for the better comfort and growth of the kids.

121 Manhas, Jasbir Singh; Sharma ,V.P. (Maharana Pratap University of Agriculture and Technology, Udaipur (India) Department of Extension Education) Constraints in dairy farming in Jammu district of Jammu and Kashmir. Indian Journal of Animal Research (March 2008) v.42 (1)
The milk production in Jammu district of Jammu and Kashmir was not in accordance with their bovine population because of various problems. An attempt to study the constraints faced by 200 dairy farmers in dairying were analyzed. Information relating to various problems faced by the dairy farmers in rearing bovine were enlisted in a pre-tested interview schedule. The farmers were asked to rank the constraints in order of their importance. The study revealed that half of the dairy farmers (50 per cent) had faced medium level of constraints, while 32.50 and 17.50 per cent respondents had faced high and low level of constraints, respectively. The respondents had expressed infrastructural constraints as the most severe impediments, whereas technical constraints were hampering the dairying to the least extent. There was a significant difference between different groups of respondents with respect to constraints encountered by them.

122 Dhaware, S.A.; Deshpande, K.S.;Thombre, B.M.;Deshmukh, D.S.; Chauhan, D.S. (College of Veterinary Science and Animal Husbandry, Udgir (India) Dept. of Animal Genetics and Breeding) Evaluation of some economic traits in khillar cattle. Indian Journal of Animal Research (March 2008) v.42 (1)
Khillar is draft purpose breed of Maharashtra, and males are famous for fast transport and speedy farm operations. In the present study data on 302 Khillar cows for 1000 lactations were considered for evaluation. The Least Square Means (LSM) for Age at First Calving (AFC), Age at Second Calving (ASC) and Breeding Efficiency (BE) in Khillar cattle were 1361.96+14.49 days, 1914.64+20.55 days and 75.48+0.64 per cent, respectively. The heritability (h^2) values for AFC, ASC and BE recorded as 0.03+0.03, 0.01+0.06 and 0.03+0.07 respectively. The phenotypic correlation (rp) recorded among AFC and BE, AFC and ASC and ASC and BE were -0.58, -0.767 and -0.591, respectively. The season showed non-significant effect on AFC, ASC and BE whereas period had significant effect ($P<0.01$) on these traits.

123 Ramesha, K P; Pradhan, V K; Kataktalware, M A; Rajkhowa, J; Bora, Manajit; Krishnan, G; Nirbhay Kumar;, Saravanan, B C ; Biswas, T K; Bhattacharya, M (National Research Centre On Yak, Dirang (India)) Effect of pack at high altitude on yaks (*Poephagus grunniens*). Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 487–488
Yaks were able to carry load up to 60 kg to different higher altitude at a distance of 4.5 km to 7.5 km one-way even during extreme cold. The physiological parameters were similar when they carried 50 kg and 60 kg load to distances ranging from 4.5 to 7.5 km. Higher percentage of

animals showed signs of fatigue on sunny day as compared to cloudy day. The hemoglobin and PCV concentrations increased immediately after pack irrespective of distance and load.

124 Krishnan, G; Sarkar, Ramesha, M K P ; Ghosh, M K; Kataktalware, M A (National Research Centre on Yak**,** Dirang (India)**)** Production performance of yaks during winter**.** Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 485–486 Keywords: Yaks, Weight gain, Feeds, Fodders, Milk yield,
The present study was carried out with 30 healthy yaks at the NRC on Yak. The animals were divided into 3 groups, viz. calves (8-12 months with body weight of 67.94±5.09 kg), adult bulls (3-5 years with body weight of 365.25±17.33 kg) and lactating yak cows (5-7 years with body weight of 265±10 kg). The yaks were maintained as per semi range system of management. The body weight gain was significantly higher during October in calves but from November onwards no significant increase was observed. Bulls gained significantly higher body weight compared to calves up to December. The lactating yak cows lost about 5.84% of their body weight and milk yield reduced mainly due to shortage of feed and fodder during long winter.

125 Mallick, P K; Ghosh, A K (Govind Ballav Pant University of Agriculture and Technology, Pantnagar (India)) Estimation of genetic trends of first lactation milk yield for Red Sindhi cows**.** Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 525 –527. Keywords: Cows, Lactation Number, Milk Yield*,*
The study was conducted to estimate the annual genetic trends in Red Sindhi cows; and 717 records of first lactation milk yield were computed by averaging estimated breeding values (EBVs) of group of Red Sindhi cows born in a particular year, from 1963–2001 by using BLUPF90-*Dairy Pack method.* The genetic trends in FLMY of Red Sindhi cows ranged from –229.25 kg to 136.92 kg at CCBF, Chiplima and –1.922 kg to 1.97 kg at CBF, Kalshi. The average annual genetic changes on the basis of EBVs of FLMY were –5.412 kg/year and 0.0634 kg/year from the year 1963 to 2000 at CCBF, Chiplima and CBF, Kalsi, respectively.

126 Sahani, M S; Bapna D L; Mehta, S C (Central Sheep and Wool Research Institute, Bikaner, (India) Arid Region Campus).Growth of Karakul and its crosses with indigenous sheep breeds in hot arid region**.** Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 528–529*.* Keywords: Sheep, Body weight, Growth rate
The Karakul breed of sheep is well known for the production of high quality pelt. The breed has been interbred with Marwari, Malpura and Sonadi breeds for developing it as a mutton breed in the hot and arid region of the country. The average body weight of the Karakul, halfbreds and ¾ th crosses differentiated from 3.5, 3.09 and 3.4 kg at birth to 22.04, 25.95 and 23.26 kg at 12 months age, respectively. Since the lambs born out of breeding during early phase of breeding season were heavier, so the breeding should be scheduled in a manner to concentrate lambing in the month of January and February. Further, the growth performance of the ¾ th crosses of Karakul with Malpura, Marwari and Sonadi were superior at the marketing age, hence the inheritance of Karakul be preferably stabilized at ¾ th stage

127 Rathore, R S; Rajbir Singh; Kachwaha, R N; Ravinder Kumar (Chaudhary Charan Singh University, Meerut (India)) Constraints perceived by the cattle keepers in adoption of

recommended breeding, feeding and housing management practices**.** Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 530–533 Keywords: Livestock management, Animal Husbandry Methods Pregnancy, diagnosis

The study was conducted in Churu district of Rajasthan to identify the various constraints perceived by cattle keepers in adoption of recommended dairy cattle management practices. Lack of AI centres, distant location of veterinary hospitals, poor conception coupled with repeat breeding, lack of pregnancy diagnosis (P.D.) facilities and costly treatment were important constraints in adoption of recommended breeding practices. Lack of awareness about hay and silage preparation and treatment of poor quality roughages, high cost of fodder and concentrate, lack of knowledge about balance feeding and scarcity of green fodder were the main constraints in balance feeding of cattle. High cost investment in construction of scientific cattle shed, inadequate credit facilities, lack of knowledge about cheap and scientific housing and high cost of raw material were the major constraints in housing management practices.

128 Sharma, R C ; Arora, A L; S Kumar, Mishra, A K; Mehta, B S (Central Sheep and Wool Research Institute, Avikanagar (India)) Milk yield of Malpura and Awassi × Malpura ewes and its effect on lamb growth**.** Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 504–506 Keywords: Lamb, growth, Sheep, Milk yield

Awassi with potential of milk and meat production was crossed with native Malpura ewes to enhance its production potentiality. Milk experiment was initiated from third week of lactation and data were recorded twice a week in morning and evening hours up to weaning of lambs (90 days) by suckling method. Effect of crossing and other variables on milk yield of 34 Malpura and 37 Awassi×Malpura halfbreds (AM) ewes lambed during 2000 and 2002 spring lambing seasons were examined. Ewes of both the genetic groups were provided similar grazing and feeding regimen. AM ewes excelled significantly over Malpura ewes in milk production by 19.16%. Year difference in milk production was significant in AM group. Ewes of second parity produced significantly more milk than the ewes of first and third parity indicating that mammary glands secreted maximum milk during second parity. Peak yield was observed during third week of lactation (701g) and thereafter a definite decreasing trend in milk yield was obtained. Heavy ewes gave birth to heavier lambs and accordingly weaned their lambs with the same superiority trend.

129 Patel, A K ; Mathur, B K; Rohilla, P P; Usha Rani; Patil, N V (Central Arid Zone Research Institute, Jodhpur (India))Comparative analysis of different management systems in arid goat breeds**.** Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 514–518 Keywords: goats, breeds (animals), Economics, Parturition, Animal Husbandry Methods, Milk production

The aim of this study was to evaluate in a quantifiable manner the economic feasibility of raising arid goat breeds under different regimes. One-year-old Marwari (15) and Parbatsari (18) goats were equally divided and allotted to extensive (control), semi-intensive and intensive (complete diet) systems. Lactating does gained significantly higher post-partum body weight gain along with higher kidding rate and prolificacy under intensive system than those reared under semi-intensive and extensive system. Highest total lactation yield of Marwari and Parbatsari does was also recorded for intensive group followed by semi-intensive group and lowest in extensive group. Similarly, peak yield was recorded significantly higher in both the breeds (Parbatsari and

Marwari) under intensive and semi-intensive systems than control group. Economic analysis of these three systems revealed that total return were maximum in intensive management system but input cost was also high in this system, therefore, the net return was more in semi-intensive system. Higher incremental return per goat/year was Rs 235.9 (Marwari goat) and Rs 226.3 (Parbatsari goat) in semi-intensive system and comparative lower incremental return per goat/year was observed in intensive system (Rs 188.2 and Rs 108.2 for Marwari and Parbatsari goats, respectively). It could be inferred from ongoing observations that farmers of arid region may use semi-intensive system for producing more milk with low input cost in order to strengthen the goat enterprise in the fragile eco-system.

130 Prince, L. Lesile Leo; Sushil Kumar; Mishra, A.K.; Arora, A.L. (Central Sheep and Wool Research Institute, Avikanagar (India) Division of Animal Genetics and Breeding). Growth performance of chokla sheep under semi-arid conditions of Rajasthan. Indian Veterinary Journal (January 2008) v. 85 (1) p. 41-43.
Data on growth performance of 808 Chokla lambs born during years 2000 to 2003 maintained under semi-arid condition were utilised for the present study. Overall least squares means of body weights at birth, weaning, six, nine and twelve months of age, average daily gains during pre- weaning, post-weaning (3-6 and 6-12 month) were 2.74, 10.94, 17.80, 20.52 and 24.23 kg, 91 g, (75 and 32 g), respectively. Body weight from birth to yearlings and average daily gains were significantly influenced by lambing year and sex of the lamb. Ewe's weight at lambing significantly influenced birth, weaning and six months weights. It is evident from the results that there is enough possibility of improving body weights of Chokla sheep by minimising year to year environmental variation.

131 Padhi, M.K.; Panda, B.K.; Sahoo, S.K. (Central Avian Research Institute, Bhubaneswar (India) Regional centre) Evaluation of growth and carcass Characteristics of moti ducks. Indian Veterinary Journal (January 2008) v. 85 (1) p. 54-56.
The present study was under taken to record the growth pattern and carcass characteristics of the Moti duck found in hilly districts of Orissa State

132 Bidarimath, Mallikarjun; Aggarwal, Anjali (National Dairy Research Institute, Karnal (india) Dairy Cattle Physiology Division) Effect of exogenous oxytocin on cisternal and alveolar milk yield In Murrah Buffaloes. Indian Veterinary Journal (January 2008) v. 85 (1) p. 86-87
The present study was taken to study the effect of oxytocin on cisternal and alveolar milk, milk let down time, milking time and milk flow rate in Murrah buffaloes.

133 Bidarimath, Mallikarjun; Aggarwal, Anjali (National Dairy Research Institute, Karnal (india) Dairy Cattle Physiology Division) Effect of exogenous oxytocin on mammary tight junction permeability in murrah buffaloes. Indian Veterinary Journal (January 2008) v. 85 (1) p. 90-91
The present study was conducted to find out the effect of oxytocin on mammary tight junction permeability in Murrah buffaloes.

134 Gandhi, R S; Surendra Singh; Sachdeva, G K (National Dairy Research Institute, Karnal (India). Time series analysis of economic traits in Sahiwal cattle. Indian Journal of Animal

Sciences (March 2009) v. 79 (3) p. 303–305. Key words: Cattle, Statistical Methods, Time series analysis, Economic traits, Milk yield

The data on 2144 lactation records of 681 Sahiwal cows spread over 42 years (1965–2005) were analyzed for evolving correction factors to adjust the data for non-genetic factors by time series analysis. The traits considered were age at fist calving (AFC), lactation total milk yield (LTMY), lactation 305–day or less yield (L305DMY), lactation length (LL), calving interval (Cl) and service period (SP). The overall least squares population means for these traits were 1155.07±20.51 days, 2162.68±25.39 kg, 2030.19±19.96 kg, 295.71±2.61 days, 410.63±3.57 days and 119.57±3.31 days, respectively. The seasonal and cyclical components of these traits were isolated. A periodicity of 7, 5, 6, 7, 7 and 5 years was observed in the above traits. The periodic function was fitted and it explained maximum variation in the above traits ranging from 27.89% (LL) to 83.77% (AFC) revealing the periodicity of data over the years for majority of traits. Hence, animal breeding data has to be adjusted for cyclicity over the years. Further, the monthly/seasonal indices estimated by ratio to trend method accounted for more environmental fluctuations and were more appropriate for decomposing the time series data than link relative method.

135 Das, Gunjan; Sharma, M C; Joshi, Chinmay; Tiwari, Rupasi (Indian Veterinary Research Institute, Izatnagar (India)). Status of soil, fodder and serum (cattle) mineral in high rainfall area of NE region. Indian Journal of Animal Sciences (March 2009) v. 79 (3) p. 306 –310. Key words: Cattle, Fodder, Minerals, Serum, Soil, Tripura

A study was conducted to record the mineral status in soil, fodder and serum from 4 districts of Tripura state, viz. West, South, North and Dhalai Tripura. Soil samples from these districts showed an overall average prevalence of phosphorus, zinc, copper and cobalt deficiency. Similarly, overall prevalence of calcium (Ca), magnesium (Mg), phosphorus (P), zinc (Zn), copper (Cu), iron (Fe), cobalt (Co), and selenium (Se) deficiency in fodder was 8.24%, 9.61%, 27.47%, 44.78%, 30.21%, 4.12%, 39.28%, and 4.67% respectively. The overall prevalence of serum P, Zn, Cu, Co, and Se deficiency was 30.03%, 36.75%, 35.96%, 38.73% and 6.32% respectively. Cattle of Tripura State were highly deficient in phosphorus. Soil, fodder and cattle of Tripura State were highly deficient in zinc followed by copper and cobalt.

136 Senapati, B K; Dehuri, P K; Mishra, S K; Samal, P C; Das, S K (Orissa University of Agriculture And Technology, Bhubaneswar (India)) Effect of different non-feed withdrawal induced moulting methods during moult and post–moult period on the performance of commercial laying hens. Indian Journal of Animal Sciences (March 2009) v.79 (3) p. 316–320. Key words: Economics of production, Egg production, Feed conversion ratio, Layers, Moulting methods

BV–300 commercial layer birds (144) were randomly distributed into 6 groups having 24 hens in each to study the effect of different non-feed withdrawal induced moulting methods during moult and post-moult period on the performance of commercial laying hens. A complete randomized design was used. Six dietary treatments, viz. T1 (normal diet), T2 (feed withdrawal), T3 (55 g cracked maize+oyster shell grit), T4 (40 g cracked maize+oyster shell grit), T5 (60 g de-oiled rice bran+oyster shell grit), and T6 (40 g de-oiled rice bran+oyster shell grit) were tried. Body weight of birds, egg production and feed consumption were recorded during pre-moult,

moult and post-moult period. Economics of production was calculated for different periods and for the overall experimental period. Maximum 50% feather shedding was observed in T2 and 30% feather shedding was observed in DORB fed (T5 and T6) groups. The maximum per cent of body weight loss during the moult period was 30.86, 19.12, 18.61, 30.53 and 32.31 within 9, 12, 12, 21 and 21 days for T2, T3, T4, T5 and T6, respectively. Early body weight loss with feather shedding was observed in T2 followed by DORB fed groups. Higher egg production was recorded in moulted groups than that of control and it was highest in T2. During post-moult period, egg production percentage was highest in T2 followed by T6 and T5. Among moulted groups, 40 g cracked maize fed group had the lowest hen-day egg production, which lost the least body weight (18.61%). It is revealed that per cent of body weight loss is directly proportional to the post moult hen-day egg production. The feed efficiency of moulted groups was better than that of control when calculated for the entire period (moult and post-moult period). Among moulted groups, better feed efficiency was observed in feed withdrawal group and DORB fed groups. The moulted groups earned higher profit in comparison to the control. During the post-moult period, the profit was highest in feed withdrawal group in comparison to other moulted groups. But considering both moult and post-moult period, the profit was highest in T6 than that of T2. Based on the above observations, It is revealed that feeding of de-oiled rice bran is an effective alternative non-feed withdrawal method on par with the feed withdrawal method of induced moulting.

137 Churchil, R R, Narayanankutty, K; Praveena, P Ezhil; Joseph, Preethymol (Kerala Agricultural University, Mannuthy (India) AICRP on Poultry) Influence of pre-incubation storage period on fertility, hatchability and embryonic mortality pattern of two pedigreed flocks of White Leghorn. Indian Journal of Animal Sciences (March 2009) v.79 (3) p. 327–330 Key words: Broiler Chickens, Embryonic mortality, Hatchability

A study was conducted to assess the effect of length of pre-incubation storage on fertility, hatchability and mortality pattern of embryos in 2 White Leghorn breeding flocks aged from 67 to 80 weeks. Eggs from IWN strain (8478 eggs) and from IWP strain (8801 eggs) were utilized in 5 hatches in this experiment. All the traits except hatchability on total egg set and DIS differed with the strain. Fertility was significantly higher in IWN strain; while hatchability (on fertile eggs set) was significantly better in IWP strain. Compared to IWP, IWN strain showed significantly higher early embryonic death (EED), total embryonic mortality (TEM), weaklings (WL) and rotten eggs (RE); however, incidence of dead germs (DG) was significantly higher in IWP than IWN strain. Hatchability of total and fertile eggs had significant negative correlation with egg storage period in both the strains. DG and TEM had significant positive correlation with storage length in both the populations; while, EED had significant positive correlation with storage length in IWN strain alone. EED, DG and TEM had significant negative correlations with hatchability on both total and fertile eggs in both the strains. TEM had significant positive correlation with EED and DG in both the strains. Regression analysis revealed significant reduction of hatchability of total and fertile eggs over storage period (d) in both the strains. On the other hand DG and TEM significantly increased with increasing storage length in both the flocks.

138 Patil, R.A.; Karanjkar, L.M.; Jadhav, V.S.; Hanmante, A.A.; Narwade, S.G. (Marathwada Agricultural University, Parbhani (India) College of Agriculture, Department of Animal Husbandry and Dairy) Effect of Housing Patterns on Microclimate and water intake in Osmanabadi weaned kids. Veterinary World (May 2008) v.1(5) p. 144-146 Keywords: Animal Housing, Microclimate, Water intake, kids

Observations were recorded on 24 Osmanabadi weaned kids to see the effect of housing either in floor murum with no ventilation + thatch roof (T0), floor murum with no ventilation + tin roof (T1), floor murum with one ventilator + thatch roof (T2), floor murum with one ventilator + tin roof (T3), floor murum with two ventilators + thatch roof (T4) and floor murum with two ventilators + tin roof (T5). All the kids were maintained on the common feeding regime of available roughages and home-made concentrate mixture. The lowest micro temperature was recorded in thatch roof with two ventilators house whereas highest in tin roof with no ventilation house. The monthly mean water intake showed significant ($P< 0.01$) differences. Significant differences were recorded for the mean values of water intake for providing no ventilation over providing ventilation. Providing tin roof condition significantly ($P<0.01$) increased water intake in comparison with thatch roofing condition. Based on these results thatched roof shed with one or two floor ventilation has to be preferred for growing kids.

139 Verma, R.K.; Kumar, P.; Adil,A. (National Dairy Research Institute, Karnal (India) Dairy Cattle Physiology Division) Physiological performance under different housing system in Buffalo calves. Veterinary World (May 2008) v.1(5) p.138-139

A Study on physiological performance in different housing system has been evaluated. The overall values of MCH (µg) was found to be higher in control group than in treatment group but body length, heart girth and height were not found significant between the groups. Keywords: Water buffaloes, Animal Performance, Animal Housing

140 Rao, T.K.S.; Dang, A.K; Charan Singh (National Dairy Research Institute, Karnal (India) Dairy Cattle Breeding Division) Effect of Udder and Teat Characteristics on Milk Composition and Yield of Karan Fries Cows Indian Journal of Dairy Science (Sept-Oct 2007) v. 60 (5). Keywords: Mammary glands, teats, milk yield, cows

A study was conducted to see the relationship of udder and teat biometry on milk yield and composition of KF cows. Udder and teat characteristics, milk yield and composition was measured in 8 pregnant crossbred KF heifers and 8 multiparous KF cows, one week before prepartum and upto 60 days postpartum. KF cows with trough shaped udder produced more milk and also had more milk protein content, but less lactose as compared to round shaped udder. Maximum change was observed in the length and circumference of the udder during the experimental period. Shape of teats had no effect on milk yield, whereas, longer DRR teat length with smaller diameter produced more milk. The study indicated that proper shape, size and measurements of the mammary gland significantly influences milk yield, fat and protein content.

141 Agarwal, S. B.; Singh, C. B.; Jha, S. K. (National Dairy Research Institute, Karnal (India)) Constraints in Adoption of Crossbreeding Technology in Different Regions of India. Indian

Journal of Dairy Science (Sept-Oct 2007) v. 60 (5). Keywords: Crossbreeding, constraints, Innovation adoption

Based on cross section data of 225 adopters of cross breeding technology of Punjab, Karnataka and West Bengal, the present study was undertaken to identify the constraints in adoption of crossbreeding technology. Among breeding and feeding constraints, majority of the adopters of CBT in Punjab reported, lack of progeny tested bulls, low fat content in crossbred cow milk, high mortality in crossbred male calves, and repeat breeding as serious constraints. In Karnataka, low fat content in crossbred cow milk was the only serious constraints reported by majority of the adopters of CBT. In West Bengal all the constraints except for irregular P.D. and lack of progeny tested bulls were reported as serious constraints. Almost all the economic constraints in the three states were reported as serious except for lack of land for fodder production and lack of availability of dry fodder in Punjab and lack of milk marketing facilities and lack of availability of dry fodder in Karnataka. Among social constraints, inability to take animals to A.I. centre was the only serious constraints in Punjab and West Bengal. However, in Karnataka most of the social constraints were reported as serious except for hostile attitude of affluent farmers towards weaker section and inability to take animals to A.I. centers. Among administrative and organizational constraints majority of the adopters of CBT in Punjab reported non-castration of scrub bulls, non availability of HYV seeds of different fodders, lack of basic amenities and allowances to field workers, absence of timely procurement and supply of critical inputs and absence of incentives as serious constraints. However, in Karnataka and West Bengal none of the administrative and organizational constraints were found as serious, except for non-availability of HYV seeds of fodders in West Bengal. The policy implications of these findings are that concerted efforts are required by the concerned Animal Husbandry Departments to overcome these constraints encountered by the adopters of CBT, so as to achieve the desired objectives of crossbreeding programme.

L02 Animal Feeding

142 Shinde , P.L.; Dass, R.S.; Garg, A.K.; Bhadane, K.P. (Indian Veterinary Research Institute, Izatnagar (India) Centre of Advanced Studies in Animal Nutrition) Effect of vitamin E and selenium supplementation on growth, nutrient utilization and their balance in male buffalo calves. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 157-165 Keywords: Buffalo calves, Vitamin E, Selenium, Growth, Digestibility.

Twenty male buffalo calves (10–12 months, 75.30±2.20kg) were divided into four groups of five animals in each in a complete randomized design. Animals were fed on wheat straw and concentrate mixture to meet their nutrient requirements. Treatments were- group I-control (without any supplementation), whereas groups II, III and IV were supplemented with 0.3 ppm selenium, 300 IU of DL- alpha tocopheryl acetate, and both 300 IU DL-alpha tocopheryl acetate and 0.3 ppm selenium, respectively. Experimental feeding lasted for a period of 196 days during which fortnightly body weights and weekly DM intake were recorded. At 120 days of experimental feeding a metabolism trial of 6 days duration was conducted to study the effect of vitamin E and Se supplementation on digestibility of proximate principles, fiber fractions, and

balance of nitrogen, calcium and phosphorus. ADG were 423.47, 458.47, 459.65 and 462.85g respectively, in groups I, II, III and IV, revealing a statistically non-significant difference among the four groups. The intake and digestibility of DM, OM, CP, EE, NDF, ADF, cellulose and hemicellulose were also statistically comparable (P>0.05) in the different groups. The intake, excretion and balance of nitrogen, calcium and phosphorus were also found to be similar in the four groups. The TDN and DCP intake (g/day) was also found to be statistically (P>0.05) comparable in the different groups. The overall mean total dry matter intake (TDMI) for the entire experimental period was 3.02, 3.14, 3.03 and 3.18 kg/d in groups I, II, III and IV, respectively and was comparable (P>0.05) among the different groups. It is concluded that supplementation of vitamin E and Se had no effect on the growth performance and nutrient utilization in male buffalo calves.

143 Senthilkumar, P.; Reddy, Y. R.; Ramesh, S.; Gobinathand, S.; Reddy, V. R. (Sri Venkateswara Veterinary University, Hyderabad (India) College of Veterinary Science, Department of Animal Nutrition). Effect of replacing maize with pigment extracted annatto (bixa orallena) seed meal on the performance of broilers. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p.185-192. Keywords: Broiler chickens , Bixa orellana, Maize, Animal performance
effect of quantitatively replacing 0, 25, 50, 75 and 100 percent of dietary maize with pigment extracted annatto (*Bixa orellana)* seed meal (ASM) was investigated for broiler. Each one of the 5 diets was offered as mash *ad libitum* to 4 replicates (8 per replicate) of 32 chicks each, during 0–42 days of age. Replacement of maize with ASM up to 25 per cent level did not significantly (P>0.05) affect the body weight gain, feed intake, feed efficiency, dressing percentage and visceral organs weight while pigmentation of shank and skin colour was significantly (P<0.05) lower compared to control. There was no mortality in any of the dietary treatment throughout the experiment. Replacing the maize with ASM more than 25% in the diet decreased the growth performance, dressing percentage and increased the visceral organ and intestine weights and intestine length. Results indicated that ASM can replace 25 per cent level of maize without affecting the performance and return over feed cost in broiler starter and finisher rations.

144 Ganai, A.M.; Sharma, T. (Rajasthan Agricultural University, Bikaner (India) College of Veterinary and Animal Science, Department of Animal Nutrition). Performance of lambs fed formaldehyde treated mustard oil cake and bakery waste based concentrate mixture. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 203-212 . Keywords: Lambs, Oilseed cakes, Growth, wool production
Sixteen male Nali lambs (7–8 months, 15–16 kg BW) divided into 4 equal groups in a randomized block design were fed isonitrogenous and isocaloric rations in 4 different treatments viz. T_1: control, containing cotton seed cake (CSC), T_2: CSC replaced by mustard oil cake (MOC) on protein basis, T_3: CSC replaced by 1% formaldehyde (HCHO) treated MOC, and T_4: CSC replaced by 1% HCHO treated MOC and wheat bran (WB) by bakery waste on protein basis along with sewan (*Lasirus sindicus*) hay for a period of 120 days. At the end of growth trial, a metabolism trial of seven days was conducted to know the digestibility of nutrients. The digestibility of dry matter (DM) and proximate principles were similar in four treatments. Palatability score in terms of DM intake per 100 kg body weight and per kg $W^{0.75}$ was significantly (P<0.01) lower in T_3 and T_4 in comparison to T_1 and T_2. Feed efficiency in terms of

weight gain and wool production was significantly (P<0.05) higher in T_3 and T_4 in comparison to T_1 and T_2. The average body weight gain of lambs in T_3 and T_4 was significantly (P<0.05) higher than T_1 and T_2 with an average daily gain of 76.9±2.59, 57.8±4.11, 120.0±3.13 and 102.2±2.26 g in T_1, T_2, T_3 and T_4 groups, respectively. All the animals were in positive nitrogen, calcium and phosphorus balance. Significantly (P<0.05) higher nitrogen balance and blood urea nitrogen was observed in T_3 and T_4 in comparison to other groups. Highly significant (P<0.01) effect of treatment on greasy fleece weight and clean wool yield indicated better performance of T_3 and T_4 groups. Results indicated adequate scope for replacement of CSC by 1% HCHO treated MOC and WB by bakery waste in the ration of lambs without any adverse effect on growth, digestibility of nutrients and wool production in sheep.

145 Das, A. (ICAR Research Complex for NEH Region, Gangtok (India) Sikkim Centre Tadong). Effect of different levels of concentrate supplementation on growth performance of Sikkim local kids fed mixed jungle grass based diet. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 213-218 Keywords: Goats, Concentrates, Supplementary feeding, Growth, Ficus, grasses

Twelve Sikkim local male kids (3–6 months of age) of 10.29±0.70 kg body weight were divided into three groups of 4 each in an experiment based on randomized block design. Mixed jungle grass (winter season, Dec-Feb) was offered *ad libitum* to all the animals. Besides, all the kids received about 500g of fresh Nevaro (*Ficus hookerii*) leaves. Concentrate was supplemented @ 0.5, 1.0 and 1.5% of body weight, in groups I, II and III, respectively. The trial was conducted for 90 days during which weekly change in body weight and feed intake was recorded. All the kids consumed all the nevaro leaves and consumption of jungle grass was not affected by different level of concentrate supplementation. As a result, total dry matter intake (DMI) increased significantly (P<0.05) with increased level of concentrate supplementation. Digestibility of dry matter (DM) and organic matter (OM) was significantly (P<0.05) higher in groups II and III in comparison to group I. The combined effect of increased intake and digestibility of CP and OM resulted in higher (P<0.01) digestible crude protein (DCP) intake, N balance, and significant (P<0.05) increase in digestible organic matter (DOM) intake in groups II and III in comparison to group I. Average daily gain (ADG) was 24.40, 42.55 and 51.40 g/day in groups I, II and III, respectively. ADG was significantly (P<0.01) higher in group III as compared to other groups. Hence, it was concluded that maximum growth rate during winter season can be obtained in Sikkim local kids fed mixed jungle grass based diet when concentrate is supplemented @1.5% of their body weight.

146 Moorthy, M.; Viswanathan, K.(Veterinary College and Research Institute, Namakkal (India) Department of Poultry Science). Extracted coconut meal in white leghorn layer diet**.** Animal Nutrition and Feed Technology (July 2008) v.8 (2) p.227-236. Keywords: Layer chickens, Copra meal , Laying performance

An experiment was conducted using 180 Single Comb White Leghorn layers from 21 to 53 weeks by feeding extracted coconut meal (ECM) to study their production performance. These birds were randomly divided into five treatments with three replicates of twelve birds each. The treatment groups consisted of 0 (T_1), 5 (T_2), 10 (T_3), 15 (T_4) and 20 per cent (T_5) coconut meal inclusion in the diet. No significant difference was observed feed consumption, feed conversion

ratio and livability during the experimental period. Both overall hen housed (199.14) and hen day egg production (88.90%) were significantly (P<0.05) reduced in T_5 compared to other treatment groups. The per cent broken eggs was significantly (P<0.05) high in T_4 (0.47%) and T_5 (0.98%) compared to control group (0.07%). Based upon this study, it is recommended to include the coconut meal up to 10 per cent in egg type ration for better egg production

147 Bade, R.N.; Kank, V.D.; Patil, M.B.; Gadegaonkar, G.M.; Jagadale, S.D.; Phondba B.T. (Bombay Veterinary College, Mumbai (India) Department of Animal Nutrition) Effect of replacement of cottonseed cake with sunflower extraction on lactation performance of cows. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 279-284 Keywords: Cows, Crossbreds, Oilseed cakes, Milk yield

A 91 days feeding trial was undertaken on 18 crossbred cows (Gir X HF and Gir X Jersey) randomly divided into three groups of 6 cows each to study the effect of replacement of cottonseed cake with sunflower extraction on the milk yield and its composition. All the animals received a basal diet of concentrate mixture, green, hay and jowar straw. Groups I, II and III received a concentrate mixture in which cottonseed cake was replaced at 0, 50 and 75% level with sunflower extraction. The average daily milk yield of cows from groups I, II and III was 9.76±0.21, 9.77±0.20 and 9.12±0.17 kg, respectively. The average daily milk yield of group II was highest where as the group III had significantly (P£0.01) lower milk yield as compared to groups II and I. The average FCM yield was 9.07±0.09, 9.32±0.15 and 8.56±0.08 kg, for groups I, II and III, respectively and the apparent differences among different groups were statistically significant (P≤0.01). Total solids, fat, SNF, protein, ash and specific gravity of milk among different groups were statistically similar. It was concluded that 50 part cottonseed cake can be replaced by sunflower extraction to economize the cost of concentrate mixture without any adverse effect on milk yield and its composition.

148 Kumar, S.; Prasad, N.; Thakur, S.; Singh ,S.K. (Birsa Agricultural University, Ranchi (India) College of Veterinary Science and Animal Husbandry, Department of Animal Nutrition) Effect of higher levels of zinc on nutrient utilization and mineral balance in indigenous pigs. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 285-288 Keywords: Pigs, Landraces, Zinc, Digestibility, Nutrient utilization.

The study was conducted on 27 adults indigenous pigs (age 12 months; BW 56.0±5.96 kg) divided into three equal groups (2 male and 7 female) and fed concentrate mixture with different levels of zinc content. The control group (T_1) pigs received zinc as per recommended requirements i.e. 50 ppm while pigs in groups T_2 and T_3 received higher levels at 150 and 200%, respectively, of the suggested level during experimental feeding period of three months. Addition of 100 ppm zinc in concentrate mixture (T_3) had significant (P<0.05) effects on the digestibility of CP, EE, OM and balances of N, Ca, P and Zn. The intake of DCP was also significantly (P<0.05) higher in that group. It was concluded that supplementation of higher Zn levels in adult indigenous pig ration improved digestibility and balance of nutrients.

149 Madke, P.K.; Murkute, J.S.; Lathwal, S.S.; Kheir, I.M. (College of Agriculture, Nagpur (India) Department of Animal Husbandry and Dairying) Nutritional status of crossbred and local cows. Indian Journal of Animal Research (March 2008) v.42 (1)

Present study indicated that overall nutritional status of local milch cows were deficient in DM, DCP and TDN (−3.79, -62.28 and -0.26% respectively). The supply of DM was surplus in crossbred milch cows (+5.76%) but they were deficient in DCP and TDN (−35.78 and -2.72%) respectively. Hence, it was concluded that the crossbred milch cows had better nutritional status than the local milch cows. The overall nutritional status of dry cows indicated that local as well as crossbred cows were deficient in DM (−17.99 and -20.80% respectively) and DCP supply (−73.42 and -69.64% respectively) but both the categories were surplus in TDN supply (+3.80 and + 2.51% respectively). The crossbred dry cows had better supply of DCP and TDN than local dry cows.

150 Gaikwad, R.K.; Patil, R.A.; Karanjkar, L.M.; Jadhav, V.S. (Marathwada Agricultural University, Parbhani (India) Department of Animal Husbandry and Dairy Science) Associative efficiency of dietary cereals and oilseed byproducts for broiler performance. Indian Journal of Animal Research (March 2008) v.42 (1)

To explore the possibility of utilization of locally available teed material like sorghum, bajra and safflower cake, an experiment was conducted on 240 day-old *Vencob* broiler chicks for 6 weeks by distributing them randomly in eight uniform groups with three replications of ten chicks each. The maize of control diet was replaced by equal proportion of jowar and bajra each at 33% levels. The soybean meal and GNC were replaced at 3.5 and 7.0% and at 5.0 and 8.0% level, respectively by safflower cake. The iso-caloric and iso-nitrogenous starter and finisher rations were formulated. The weekly body weights and feed consumption by the birds fed with replacement of maize by jowar and bajra each at 33% levels and SBM as sole protein source were significantly more ($P < 0.05$) than other treatments including control. However, feed efficiency ratio was not efficient with sole GNC and without maize feeding. The proximate composition revealed that CP was more in sorghum and bajra than maize diets whereas CF, NFE and ME were higher in maize.

151 Divya**;** Tiwari D P**;** Anil Kumar **(**Govind Ballabh Pant University of Agriculture and Technology, Pantnagar **(**India)) Effect of different levels of undegradable dietary protein and plane of nutrition on the performance of growing crossbred heifers. Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 498–503. Key words: Body weight**,** weight gain, Crossbred**s,** heifers, Plane of nutrition, Rumen degradable protein

Crossbred heifers (16), 15 to 19-month-old, divided into 4 groups of 4 animals each in a 2 × 2 factorial completely randomized design, were fed 4 dietary treatments for 116 days to assess the effect of 2 levels of UDP (RDP: UDP ratios 50: 50 and 60: 40) at 2 planes of nutrition (100 and 115% of NRC 1989) on growth and nutrient utilization. The heifers in treatment groups 1, 2, 3 and 4, respectively, were fed concentrate mixture 1 containing 50: 50 RDP: UDP ratio (high UDP based on cottonseed cake/linseed cake and maize) at normal plane (HUDP at NP), concentrate mixture 2 containing 60: 40 RDP: UDP ratio (low UDP based on mustard cake and wheat grain) at normal plane (LUDP at NP), concentrate mixture 1 containing 50: 50 RDP: UDP ratio (high UDP) at higher plane (HUDP at HP) and concentrate mixture 2 containing 60: 40 RDP: UDP ratio (low UDP) at higher plane (LUDP at HP). The mixed green oats and oat hay served as sole roughage to all the animals. The average daily dry matter consumption in the heifers ranged from 2.72 to 2.78 kg/100 kg body weight and 101.25 to 104.84 g/kg $W^{0.75}$ in different

groups of heifers and did not differ significantly among different groups. The digestibilities of dry matter, organic matter, crude protein, crude fibre and nitrogen-free extract differed significantly amongst the different groups being highest in group 4 (LUDP at HP). The heifers fed low UDP ration had significantly higher digestibilities of dry matter, organic matter, crude protein, crude fibre and nitrogen-free extract and higher nitrogen retention as percentage of nitrogen intake and also as percentage of nitrogen absorbed than heifers fed high UDP ration. The heifers fed at a higher plane of nutrition (HP) had significantly higher digestibilities of crude protein, ether extract and nitrogen-free extract than heifers fed at normal plane of nutrition (NP). Nitrogen retention also increased due to higher plane of nutrition. The average daily body weight gains in the heifers of groups 1 (HUDP at NP), 2 (LUDP at NP), 3 (HUDP at HP) and 4 (LUDP at HP) were 0.67, 0.59, 0.80 and 0.75 kg, respectively, whereas the values for feed efficiency in corresponding groups were 0.13, 0.12, 0.14 and 0.13, respectively. There was significant difference in body weight gain and feed efficiency among different groups of animals. The heifers fed high UDP ration gained 10.45% higher weight gain than heifers fed low UDP ration. Heifers fed high UDP ration (0.13) had significantly higher feed efficiency than the heifers fed low UDP ration (0.12). The body weight gain and feed efficiency in heifers fed at a higher plane (115%) of nutrition (0.78 kg/day and 0.14, respectively) were significantly greater than the heifers fed at normal plane (100%) of nutrition (0.63 kg/day and 0.12, respectively). Thus there was synergistic effect of increased UDP level and plane of nutrition on improvement of body weight gain and feed efficiency. From the present study it was concluded that at later stage of growth, the crossbred heifers must be provided high UDP ration (RDP: UDP ratio of 50: 50) and 15% additional nutrients as recommended in NRC (1989) feeding standards for better growth and feed efficiency as also being cost effective.

152 Devi, A A; Hemant Singh, Kumar; R N ; Singh, S K (Birsa Agricultural University, Ranchi (India) Effect of different processed soybean meal as a source of animal protein on feed conversion efficiency and economics of pig farming. Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 507–510 Keywords: Pigs, Swine, Fish meal, Feed Conversion Efficiency

The present study was carried out on 215 crossbred piglets belonging to 30 sows maintained at Pig Breeding Farm of Ranchi Veterinary College, Birsa Agricultural University, Ranchi (Jharkhand). They were randomly divided into 5 groups having 6 sows in each and allotted to 5 treatment groups. T_1 was control diet where fish meal of T_1 was replaced by 50 and 100% heat treated soybean meal in T_2 and T_4 diets, respectively. Similarly, fish meal of T_1 was replaced by 50 and 100% raw soybean meal in T_3 and T_5 diets, respectively. The cost of feed per kg gain in live weight over an experimental period of 32 weeks of age were 32.94, 30.11, 29.17, 28.19 and 30.00, respectively. The most economic ration was T_4 (00% replacement of fish meal by roasted soybean meal) followed by T_3, T_5, T_2 and T_1 groups. It is inferred that toasting of soybean had a positive effect in eliminating the ant nutritional factors of raw soybean. Hence, roasted soybean can be incorporated at 8% levels as a substitute for fish meal in a composite pig diets (w/w) without having any adverse effects on the performance of starter, grower and finisher pigs

153 R Anil Kumar, Thiruvenkadan, A K; Iyue ,M (Sheep Breeding Research Station, Sandynallah (India)) Influence of feeding regimes from lambhood on productive and reproductive performance of Sandyno ewes**.** Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 511–513. Key words: Growth rate, Animal feeding, Reproductive performance, Ewes, Sheep
Ewe lambs (25) each of Sandyno sheep (age group: 11–12 months) were allotted to 2 treatment groups to study the effect of level of concentrate feed on production and reproduction characters. Each member of the first group was supplemented with 300 g of concentrate feed per day as against 150 g of concentrate feed given to each member of the second treatment group. Both the groups were provided 7–8 h of grazing in addition to the supplementary feeding. The body weight of the group I ewes were significantly heavier by 10.75 kg at 2 years of age. Similarly in group I ewes, a marked improvement was recorded in all the reproductive traits, viz. tupping percentage lambing percentage, twinning percentage and number of lambs weaned. The mean age at first service and first lambing were significantly lower than those in group 2 ewes. The study revealed that a higher level of feeding had a marked influence on the growth rate and reproductive performance in ewes, thereby increasing the overall production efficiency of the sheep flock.

154 Ghosh, M.K.; Konwar, P.; Basumatary, R.; Bandyopadhyay, S.; Sarkar, M.; Bhattacharya, M. (National Research Centre on Yak, Dirang (India)). Mineral profile of local tree fodders and grasses of Meghalaya. Indian Veterinary Journal (January 2008) v. 85 (1) p. 105-106
From the present study it has been found that the tree leaves and grasses of Jayantia hills contained comparatively less amount of Cu, Mg, Mn and Zn. The above deficient minerals should be supplemented for better animal production and reproduction. Moreover, Co content of all and K content of some of the fodder samples could not be detected. Hence, these should also be provided as supplement along with the feeds to the livestock particularly to the ruminants.

155 Ghosh, M.K.; Atreja, P.; Bandyopadhyay, S. (National Dairy Research Institute, Karnal (India) Division of Dairy Cattle Division) Effect Of Leucaena Leaf Meal Feeding In Karan Fries Crossbred Calves. Indian Veterinary Journal (January 2008) v. 85 (1) p. 44-46.
Three one year old Karan Fries crossbred (Holstein Friesian X Tharparkar) calves were fed increasing Dry Matter (DM) levels i.e. 25, 50, 75 and 100% through Leucaena leaf meal (LLM) starting in week 1, 2, 3 and 6 respectively. The mimosine, content in LLM was measured through High Performance Liquid Chromatography (HPLC). DM intake was 2.29, 2.14, 1.83, 1.51, 1.46 and 0.71% of live weight through 1st to 6th weeks respectively. Feeding of LLM resulted in drastic reduction of T3 and T4 and significant elevation of serum AST and ALT activities within a week. The adverse effects of LLM feeding were attributed to mimosine and DHP which is also accountable for reduction in body weight.

156 Konwar, P.; Konwar, B. K.; Ahmed, H.F.; Nath N.C.; Ghosh, M.K. (Assam Agricultural University, Guwahati (India) College of Veterinary Science) Effect of feeding silkworm pupae meal with enzyme supplementation on growth performance of broilers. Indian Veterinary Journal (January 2008) v. 85 (1) p. 47-49.

Incorporation of enzyme along with the silkworm pupae meal in the ration improves growth performance and reduces feed consumption in broilers. Hence, it can be suggested that silkworm pupae meal, with or without enzyme supplementation, can be incorporated in the diet of commercial broiler replacing fish meal upto 100% (10 Kg/ 100Kg) level without any adverse affect. However, broiler fed equal proportion of silkworm pupae meal and fish meal (50:50) with enzyme supplementation had better performance.

157 Pawar, M M; Pattanaik, A K; Sharma, K (Indian Veterinary Research Institute, Izatnagar (India)). Effect of optimizing nutrient profile of homemade diet on nutrient utilization, hind gut fermentation and immune response in Spitz pups. Indian Journal of Animal Sciences (March 2009) v.79 (3) p. 331–334 Key words: Dogs, Digestibility, Immune response
Spitz pups (10) were divided into 2 groups to assess the effect of optimizing the nutrient profile of homemade diet on their nutrient utilization, hind gut fermentation and immune response. The control (CON) group was fed on a commonly used rice-milk based homemade diet while the second (BAL) group fed the same basal diet balanced to optimize the nutrient profile as per the AAFCO (1994) recommendation for period of 150 days. Results suggested that optimizing of nutrient profile of rice-milk based homemade diet induces positive effects on growth, gut health indices and humoral immune response of Spitz pups.

158 Pawar, M M; Pattanaik, A K (Indian Veterinary Research Institute, Izatnagar (India)). Comparative Evaluation Of Soya Nuggets And Soybean Meal As Protein Source In Homemade Diet Of Adult Spitz Dogs. Indian Journal of Animal Sciences (March 2009) v.79 (3) p. 335–338 Key words: Dogs, Protein source, Soybean meal, Soya nuggets
Four adult Spitz dogs were used in a complete switchover design to assess the comparative nutritive value of soya nuggets and soybean meal as protein source in homemade diets. There was no variation in feed intake and palatability score between the 2 groups. Digestibility of crude protein and ether extract were significantly higher on SN diet than SBM diet. Faecal score was similar between the 2 diets. However, faecal ammonia concentration showed propensity to be lower on SN diet as compared to SBM diet. Faecal concentration of acetate, propionate and total short chain fatty acids increased significantly upon SBM inclusion in place of SN in the diet. Blood metabolic profile of dogs on the 2 diets was without any significant variation. Soybean meal could replace soy nuggets in the homemade diet of adult Spitz dogs without any significant effects in nutrient utilization and blood metabolic profile

159 Manoj Singh; Chauhan, S.S.; Puneet Kumar (College of Veterinary and Animal Science, GBPUA&T, Pantnagar (India) Department of Animal Nutrition) Effect of supplementation of diets with BMD and Virginiamycin on the growth performance, carcass characteristics and bacterial population in broiler chickens. Veterinary World (May 2008) v.1(5) p.141-143 Keywords : Broiler Chickens ,Growth rate, carcass characteristics
Broiler chicks of a commercial strain were fed diets containing Bacitracin Methylene Disalicylate @150 g and 200 g/MT and Virginiamycin 500g/MT feed upto 6 weeks of age to evaluate their effects on growth, feed efficiency, carcass characteristics and bacterial population (Salmonella and E. coli). Both BMD and virginiamycin significantly increased ($P<0.01$) the body weight gains as compare to the control and also improve the feed conversion ratio. The carcass

characteristics showed the highest edible weight was recorded in treatment IV where virginiamycin @ 500g/MT feed was incorporated (76.86%), followed by treatment III (71.92%), treatment II (71.41%) and the lowest (70.68) in control (T-I). The sample of excreta collected during II, IV and VI week of experiment did not show any incidences of Salmonella in any treatment groups, however, the excreta of six week in all the treatment groups showed the incidences of E. coli.

L10 Animal Genetics and Breeding

160 Mahendra Singh; Chauhan, A. (Banasthali Vidyapith, Banasthali (India) Krishi Vigyan Kendra) Factors Affecting Reproductive Performance Of Bovines In Rural Rajasthan. Indian Journal of Animal Sciences (March 2009) v.79 (3) p. 243-246 Keywords: Reproductive performance, Bovines

The study was conducted to examine the factors affecting reproductive performance of bovines in rural Rajasthan. In identified two districts, 720 respondents equally belonging to small, medium and large categories were randomly selected from 40 villages. All the respondents were interviewed with the help of specially designed questionnaire. The average age at first calving (AFC), service period (SP), dry period (DP) and calving interval (CI) in buffaloes were 51.93±0.19, 6.87±0.11, 5.56±0.07 and 16.84±0.11 months respectively. The size of land holding, level of education and caste had positive relationship while increase in herd size showed negative influence on reproductive performance of buffaloes. The average age at first calving, service period, dry period and calving interval in cows were 53.46±0.23, 7.73±0.11, 6.41±0.09 and 16.61±0.13 months respectively. The level of education, caste and family size had no significant effect while land holding of respondents had positive relationship with reproductive performance of cows. On the contrary herd size and age of respondents showed negative influence on reproductive performance. Our results revealed that the reproductive performance of bovines in the state fall below the expected standards

161 Mutha Rao, M; Umamahesh, Y; Venugopal Naidu, K; Babu Rao, K; Misra , A K (S V Veterinary University, Guntur (India)) Ovarian superstimulation after ablation and steroid induced follicular wave synchronization in zebu cattle. Indian Journal of Animal Sciences (March 2009) v.79 (3) p. 247–250. Keywords: Bos indicus, Embryo, Follicular wave, Superstimulation

The study was undertaken to determine if superovulation (Sov) subsequent to induction of follicular wave emergence could be used as an alternative to conventional protocol in Ongole cows. The donors were randomly placed in group 1 (control group, n=15), Sov was initiated on day 10 (day zero, day of estrus) of the estrous cycle; group 2 (ablation group, n=13) cows, the dominant follicle (DF) was ablated on day 8 of the cycle followed by Sov 48h later; group 3 (steroid group, n = 17), donors received a progestational implant 4 days before the start of Sov treatment. Superovulation treatment involved administration of 200 mg NIH-FSH-b1 twice daily in a descending dose schedule for 4 days and induction of luteolysis at 48h (PGF1) and 60h (PGF2) after initiating treatment. In Group 3 cows the implant was removed 12h after PGF1. Non-surgical embryo collection was performed on day 7 after superestrus. The ovulation rate

was significantly higher in ablation group (15.08±1.5) over steroid group (10.37±0.82). However, no significant difference was observed in ovulation rate between control group (13.53±1.80) and other 2 groups. In spite of low ovulation rate in steroid group, a high percentage of total embryo recovery (83.13%) and proportionately higher viable embryo yield (76.81%) in this group resulted in a nonsignificant difference in total and viable embryos recovery among the 3 groups. The total embryo recovery in the 3 groups, respectively, was 9.4±2.04, 10.17±1.78 and 8.63±0.88 and the viable embryo recovery 6.8±1.74, 7.25±1.40 and 6.63±0.82. Similarly, there was no significant difference in fertilization rate as well as number of grade I embryos among the groups. The study demonstrated that induction of follicular wave emergence prior to superovulation both by physical (ablation) and hormonal (steroid) methods can be safely used in zebu donors, and had no adverse effect on fertilization rate and viable embryo yield.

162 Akela, A; Barua, P M; Das, P K; Biswas, R K; Deka, B C (Assam Agricultural University, Guwahati (India)) Cold shock resistance index and acrosomal changes in Assam local and Beetal buck Indian Journal of Animal Sciences (March 2009) v.79 (3) p. 283–285 Key words: Acrosome, Buck, shock, Cold Stress, Seasons, Semen.
A study was undertaken to investigate cold shock resistance index and morphological changes of acrosome in Assam local and Beetal bucks during different seasons in Assam. Cold shock resistance index was significantly higher during post-monsoon season irrespective of breed. The highest overall mean incidence of swollen, separating, entirely lost acrosome and total acrosomal abnormalities was registered in pre-monsoon season. Superior quality of semen was obtained in both Assam local and Beetal bucks during post-monsoon season that coincided with the breeding season in goat.

163 Verma, A. K.; Joshi, C G; Koringa, P G; Nauriyal, D S (Anand Agricultural University, Anand (India)). Defensin gene polymorphism analysis in bovine intramammary infections of cattle and buffaloes of Gujarat. Indian Journal of Animal Sciences (March 2009) v. 79 (3) p. 300–302. Key words: Cattle, Genotypes, Genetic polymorphism, Mastitis
A study was carried out to identify polymorphism at defensin gene loci, responsible for expression of defensin secretion against infection of mammary gland. For this, blood samples were collected from Kankrej, triple cross, Holstein Friesian and buffaloes. From each category of cows and buffaloes, 6 samples were collected each from animals with clinical mastitis, subclinical mastitis and healthy udder. PCR-RFLP was carried out from the extracted genomic DNA. Four polymorphic patterns of combined defensin genotypes (CDG) were obtained. No significant correlation was observed between these groups of animals. Similarly, no breed correlation was recorded between animals with clinical and subclinical mastitis and healthy udder. It may be concluded that the indigenous Kankrej cattle and buffaloes located in Gujarat are genetically closer to each other than exotic and crossbred animals.

164 Panigrahi, Manjit; Kumar Subodh; Deb, S.M; Mitra ,Abhijit; Sharma ,Arjava; Bujarbaruah, K.M. (Indian Veterinary Research Institute, Izatnagar (India)). Lack of Polymorphism in Partial Insulin Like Growth Factor 1 (IGF1) and Insulin Like Growth Factor Binding Protein 3 (IGFBP3) Genes of Mithun. Journal of Applied Animal Research (September2009) v. 36(1)

A 396 bp fragment encompassing exon 5 of Insulin like growth factor 1 (IGF1) gene and 652 bp fragment encompassing exon 2–3 of Insulin like growth factor binding protein 3 (IGFBP3) gene were digested by *Hind*III and *Nla*III restriction enzymes, respectively, in 90 mithun *(Bos frontalis)*. The PCR–RFLP analysis showed the absence of polymorphism in these fragments in the animals screened. *Hind*III restriction enzyme produced two fragments of 269 and 127 bp in exon-5 of IGF1. Similarly *Nla*III restriction enzyme produced two fragments of 551 and 101 bp in exon 2–3 of IGFBP3 gene. Two single nucleotide differences in IGF1 while six such differences in IGFBP3 gene existed in mithun sequences when compared to cattle. The sequence of the amplicons, which were the first reports on these genes in mithun, were submitted to GenBank (Accession numbers EF686016 and EF686017, respectively).

165 Ulemale, A.H.; Kulkarni, M.D.; Karkeli , M.S.; Borikar, S.T. (Mahatma Phule Krishna Vidyapeeth, Rahuri (India) Research - cum - Development Project on Cattle) Effect of genetic and non-genetic factors on birth-weight of crossbred calves. Indian Veterinary Journal (January 2008) v. 85 (1) p. 103-104

The proper birth weight of calf indicates a good health. The growth rate, lifetime expectancy of productive and reproductive traits depends on birth weight of calf. This study on genetic and nongenetic factors affecting birth weight of crossbred calf was undertaken to facilitate the selection criteria at early age and to avoid economic losses on management

166 Anilkumar, K.; Raghunandanan, K.V.; Aravindakshan, T.V. (Kerala Agricultural University, Thrissur (India) College of Veterinary and Animal Sciences, Centre for Advanced Studies in Animal Genetics and Breeding) RAPD markers in parentage determination in cattle. Indian Veterinary Journal (January 2008) v. 85 (1) p. 28-30.

Twelve RAPD primers were used to study the offspring, dam and sire combinatinos of crossbred cattle population of Kerala. Three of these primers namely OPA 14, PRG 1 and ILO 526 did not produce any non parent bands in offspring. But the percentage of non parent bands in offspring from 2 to 13.6 for the other nine primers. It was concluded that RAPD - PCR technique cannot be the method of choice for parentage verification because of presence of non parent bands in offspring.

167 Aravindakshan, T. V.; James, Smitha P. (Kerala Agricultural University, Thrissur (India) Centre for Advanced Studies in Animal Genetics and Breeding). Kappa caesin gene polymorphism in vechur and kasargode cattle. Indian Veterinary Journal (January 2008) v. 85 (1) p. 31-36.

The DNA sequence variations at the K-casein (K-CN) gene locus in Vechur and Kasargode cattle were investigated by the PCR-RFLP and DNA sequencing methods. A 0.9 kb region of the K - CN gene, enclosing the nucleotide substitutions diagnostic of A or B allele, was amplified by PCR and separately digested with four restriction enzymes namely, HindIII, PstI, Rsal and Taql. The frequencies of AA, AB and BB genotypes were 0.75, 0.23 and 0.02 for Vechur and 0.76, 0.21 and 0.03 for Kasargode cattle. The frequencies of A and B alleles were 0.86 and 0.14 in both the genetic groups tested. There were no differences in the sequences of A and B alleles between Vechur and Kasargode cattle. The two alleles differed at eight positions out of which four have

been reported earlier. The additional variations reported in this study may facilitate more accurate typing and may offer more flexibility in the selection of enzymes for genotyping K - CN locus.

168 Banerjee, Sandip (G.B. Pant University of Agriculture and Technology, Pantnagar (India) Department of Animal Science) Selection indices in holstein friesian x Sahiwal crossbreds. Indian Veterinary Journal (January 2008) v. 85 (1) p. 84-85

Crossbreeding projects in dairy cattle were initiated to improve milk production potential of indigenous cattle breeds. However, productivity of the animal depends upon various genetic and non-genetic factors. The present study was undertaken to construct the selection indices incorporating the body weights at 12 months of age (W12), body weight at calving (WC) and first lactation milk yield (LMY). The indices were constructed to determine their effectiveness as regards to the breeding worth of the crossbred animals of ¼ Holstein Friesian (HF) and ¾ Sahiwal (S) cattle being reared at two different Military Farms of North India.

169 Kataktalware, M.A.; Pourouchottamane, R. B.; Borah, K.D.; Saikia, P.; Borah, S.; Deka, B.C.; Sarkar, M. (National Research Centre on Yak, Dirang (India)) Sexual behavior of yak bulls. Indian Veterinary Journal (January 2008) v. 85 (1) p. 95-96
Several factors like age, season, sex of dummy, handling of bull etc. affects the sexual behaviour of the bulls. The results obtained in the present study can be considered as a baseline reference for selection of yak bulls for semen collection.

170 Swain, D K; Kundu, A K; Rath, A; Mohapatra, A P K (Orissa University of Agriculture and Technology, Bhubaneshwar (India)). Effect of addition of antioxidants on post-thaw semen quality of cryopreserved bull sperm**.** Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 470–472 Keywords: Antioxidants, semen, Freezing, Biological preservation, Semen preservation,
The effects of adding different antioxidants on cryopreserved bull sperm motility, livability, abnormal spermatozoa, acrosomal integrity were studied in 6 Red Sindhi–Jersey crossbreed bulls with respect to standard EYTG extender. Overall 36 ejaculates were collected. The standard EYTG was taken as control and 3 extenders were taken for study i.e. EYTG +vitamin C (10mM/ml), EYTG+vitamin E (10mM/ml), EYTG + glutathione (10mM/ml). Extended semen samples with antioxidants were cryopreserved in liquid nitrogen. The results obtained revealed a significant increase in post-thaw livability, motility, intact acrosome and reduction in the number of abnormal sperms. A significant difference was marked between control and all the 3 extenders with antioxidants. No significant difference between antioxidants in increasing individual motility was found. Significant difference was found between vitamin C and E, vit C and glutathione, vit E and glutathione on live count of sperm. Vitamin E was showing better result on post thaw livability. Significant difference between vitamin C and glutathione on abnormal spermatozoa was found. Glutathione was giving a better result as compared to vitamin C and E. Significant difference between vitamin C and E, vitamin E and glutathione and vitamin C and glutathione on acrosomal integrity was found. Vitamin E was giving a comparative

better result. One way of overcoming of this post-thaw loss of sperm motility induced by ROS (reactive oxygen species) can be achieved by adding antioxidants to the freezing extender.

171 Bachchu Singh; Tailor, S P (Livestock Research Station, Udaipur (India)).Genetic evaluation of surti sires for part and complete lactation milk yield**.** Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 522–524. Keywords: water buffaloes, milk yield, lactation, sire evaluation.
First lactation records (1976-2004) of 554 farm bred, Surti buffaloes were utilized for the study. The average initial milk yield in first month was 151.61±1.56 kg. The peak monthly milk yield was observed in second month, thereafter it declined. The coefficient of variation showed increasing trend from first to fifth month. Period and season of calving had significant effect on monthly milk yields. Sire effect was also significant on monthly milk yield traits under study. The heritability estimates for MMY_3 to MMY_5 were moderate and significant. Genetic and phenotypic correlations among monthly milk yields were positive and significant. The genetic and phenotypic correlations of MMY_1 with TMY and 305 FLMY ranged between moderate to high. Product moment correlation between breeding value of sires for 305 FLMY and part lactation milk yield (MMY_2 and MMY_3) were 0.900 and 0.936 respectively. The corresponding rank correlations were 0.881 and 0.913. Initial selection may be made on the basis of part lactation milk yield (MMY_2 and MMY_3) and final on the basis of first lactation milk yield where complete records are available.

172 Singh, Satyendra Pal; Ravi Kumar, Gvpps; Brah, G S (Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (India)) Genetic diversity analysis in egg type chickens using microsatellite markers**.** Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 519–521 Keywords: Broiler chickens, Genetic diversity, Microsatellite markers
The microsatellite based genetic diversity was studied in 3 populations, White Leghorn (PL2), Rhode Island Red (RIR-B) and their cross using 14 microsatellite marke loci. Marker MCW-104 showed highest polymorphism across all populations with the observed average number of alleles being 14,while MCW-111 showed least polymorphism with only 3 alleles. Expected heterozygosity across the populations ranged from 0.62 (MCW-111) to 0.91 (MCW-104).The populations were not in Hardy Weinberg equilibrium for allele frequencies, which indicated that the allele frequencies are under influence of some force. The Nei's genetic distance and the dendrogram showing the genetic diversity among these populations, grouped PL2 and cross PL2 %× RIR-B% under cluster 1 and RIR-B under cluster 2.

173 Chander Ramesh; Singh Didar; Dalal ,D.S.; Malik, Z.S.; Dixit, S.P. (CCS Haryana Agricultural University, Hisar (India) Department of Animal Breeding). Genetic studies on components of first lactation and lifetime traits in Sahiwal cattle. Indian Journal of Animal Research (March 2008) v.42 (1)
Data on 413 Sahiwal cows maintained at Government Livestock Farm, Hisar during 1977–96 were used. Heritability estimates for age at first calving, first lactation milk yield, first lactation length, first service period, first dry period, first calving interval and first peak yield were 0.49±0.18, 0.13±0.09, 0.47±0.18, 0.25±0.17, 0.46±0.19 and 0.42±0.16, respectively. Heritability estimates for lifetime performance traits were found to be high and ranged from 0.40±0.19 (no

of days in milk) to 0.91±0.25 (lifetime milk yield). FLMY had high positive genetic correlations with FLL, FSP, FCI, and FPY but negative with FDP. The corresponding Phenotypic correlations were also significant and positive with FLL, FSP, FCI and FPY whereas, significant and negative with FDP. First lactation milk yield and first peak yield had positive genetic correlation with lifetime traits. These results suggested that selection based on FLMY and FPY individually or in combination would improve lifetime production.

174 Singh Vikram; Tailor, S.P.; Jain , L.S. (Maharana Pratap University of Agriculture & Technology, Udaipur (India) Department of Animal Production) Genetic study of body conformation traits in a synthetic broiler strain. Indian Journal of Animal Research (March 2008) v.42 (1)
615 chicks were taken in the three hatches using the progeny of 96 females and 16 males as parents. The means for conformation traits were 8.60±0.02, 10.64±0.10 cm for keel length at 6 weeks and 8 weeks of age, respectively. The shank length at 6 and 8 weeks of age was 6.62±0.01 and 8.72±0.03 cm respectively. The breast angle at 6 and 8 weeks of age was 71.43±0.15 and 79.53±0.15. The effect of hatch was found to be highly significant on body conformation traits. The heritability estimates for keel length and shank length both at 6 weeks of age was found to be 0.436±0.174 and 0.575±0.210, respectively. The genetic correlations of keel length at 6 weeks with 8 weeks and shank length at 6 weeks were positive and high. Positive and high association was observed between breast angle at 6 and 8 weeks of age.

175 Dhaware, S.A.; Deshpande, K.S.; Thombre, B.M.; Deshmukhand, D.S.; Chauhan ,D.S. (College of Veterinary and Animal Sciences, Udgir (India)) Factors affecting productive and reproductive traits in khillar breed of cattle in Maharashtra. Indian Journal of Animal Research (March 2008) v.42 (1)
The Least Square Means (LSM) for Lactation Milk Yield (LMY), Lactation Period (LP), Dry Period (DP) and Inter-calving Period (ICP) in Khillar Cows were 531.22±19.86, 231.68±8.00, 221.90±15.54 and 467.33±15.86 days, respectively. The season showed significant ($p<0.01$) influence on LMY and LP whereas it was non significant on DP and ICP. The period of calving has highly significant ($p<0.01$) influence on all the traits under study except DP. The influence of parity was highly significant ($p<0.01$) on DP and ICP and was non significant on LP effect in Khillar breed of cattle.

176 Singh, P.K.; Banik, S.; Ganai, T.A.S.; Sarkar, T.K. (Sher-e-Kashmir University of Agricultural Sciences & Technology of Kashmir, Srinagar (India) Sheep Research Station Faculty of Veterinary Sciences and Animal Husbandry) Comparative performance of different breeds of sheep on wool production and quality traits in Kashmir valley. Indian Journal of Animal Research (March 2008) v.42 (1)
Performance of three exotic (Corriedale, Poll Dorset and South Down) and one crossbred (Local X Corriedale) sheep in respect to greasy fleece yield and quality attributes *viz.* staple length, crimps per cm, fiber diameter, and scouring yield (%) were evaluated in a organized farm of Kashmir valley. The overall mean for the traits were observed as 0.97±0.20 kg, 4.41±0.31cm, 3.00±0.08 per cm, 25.76±0.46µ and 79.41±0.80%, respectively. The investigation showed that Corriedale breed had performed better than other two exotic breeds.

177 Sachin Singh; Avtar Singh (National Dairy Research Institute, Karnal (India) Dairy Cattle Breeding Division)Genetic and Environmental Factors Influencing Cumulative Part Lactation and 305-Day Milk Production in Karan Fries Cattle. Indian Journal of Dairy Science (Sept-Oct 2007) v. 60 (5). Keywords: cattle, Genetic correlations lactation, milk yield
The first lactation records of 340 Karan Fries cows sired by 38 bulls maintained at National Dairy Research Institute, Karnal from 1990 to 2004 (15 years) were utilized to study the effect of various genetic and non-genetic factors on cumulative part lactation and 305-day milk production. The effect of seasons was highly significant for mid-part of the lactation whereas the early (30-day milk yield) and later parts of the lactation were not influenced significantly by seasonal variation. The effect of periods on first lactation cumulative part lactation milk yields and 305-day milk yield was highly significant ($P<0.01$). The regression of part lactation cumulative milk yields up to 240-days on age at first calving was highly significant ($P<0.01$) and for 270-day partial milk yield and 305-day standard lactation milk yield was significant ($P<0.05$). The heritability estimates of successive cumulative yields registered an increasing trend with an increase in lactation stage. The h2 estimate was lowest (0.14 ± 0.13) for 30-day milk yield and highest (0.45 ± 0.18) for 305-day milk yield. The phenotypic and genetic correlations among cumulative partial milk yields and with 305-day milk yield were quite high, positive and highly significant ($P<0.01$) suggesting that the merit of the cows for milk production could be assessed effectively in early or mid stages of lactation. Relatively high phenotypic and genetic correlations among the adjacent cumulative partial yields were observed compared to the distant part yields.

178 Gunasekaran, M.; Charan Singh; Gupta, A.K. (National Dairy Research Institute, Karnal (India) Dairy Cattle Breeding Division) Effect of Oestrus Behaviour on Fertilityin Murrah Buffaloes. Indian Journal of Dairy Science (Sept-Oct 2007) v. 60 (5). Keywords: Water Buffaloes, Oestrus cycle, Fertility,
The observations on oestrus symptoms and fertility were recorded on 71 Murrah buffaloes. Standing to mount, restlessness and bellowing in order were the characteristic oestrous symptoms. The type of oestrus was weak in 73.24%, moderate in 25.35% and intense in 1.41% of the buffaloes. The 45 days non-return rate was 50.78% but the conception rate was only 29.58%. The parity, onset of oestrus and oestrus signs had no significant association with conception. The conception was directly proportional to the degree of tonicity of uterus.

L40 Animal Structure

179 Lucy, K.M.; Harshan K.R.; Chungath , J.J.; Ashok N (College of Veterinary and Animal Sciences, Mannuthy (India) Department of Veterinary Anatomy and Histology) Prenatal development of the cranial meninges in goats. Indian Journal of Animal Research (March 2008) v.42 (1)
Prenatal development of the cranial meninges in goats was studied using 52 foetuses with a Crown Rump Length (CRL) ranging from 1.4cm (24 days of gestation) to 41.5cm (full term). The

meninges arose as condensation of the neighbouring mesenchyme. The pia mater started differentiating by 24 days of gestational age and the dura at 40 days. Cartilaginous cranial vault also appeared by 40 days. The arachnoid developed at 48 days of age. The dura was generally thicker in the ventral aspect of brain when compared to the sides and top. Arachnoid, the thinnest of the three, followed the infoldings of the dura. It did not follow the sulci of cerebrum and cerebellum but bridged over them. From the arachnoid, strands of fibres formed a loose reticulum across the subarachnoid space. Pia was highly vascularised and extended deep into the sulci. Depending on the vascularity, thickness of the pia mater varied over different regions and at different ages. In the brainstem and cerebellum, thickness was maximum towards the end of second month. But on the cerebral surface it showed maximum development during fifth month. Pia-arachnoid gave a strong positive reaction for alkaline phosphatase.

180 Hole M.B.; Bhosle, N.S.; Kapadnis, P.J. (MAFSU, Parbhani (India) College of Veterinary and Animal Sciences) Histological study of skin epidermis in red kandhari cows. Indian Journal of Animal Research (March 2008) v.42 (1)
The present study was conducted on 15(fifteen) female red kandhari breed of cattle. Epidermis was the outermost layer of the skin and composed of four layers *viz* stratum corneum, strantum granulosum, stratum spinosum and stratum basale. The melanocytes were more in number in lactating cow as compared with a non lactating and pregnant cow.

181 Anurag; Sethi R S ;, Saigal، R P; Opinder Singh (Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (India)) Histomorphological and histoenzymological study on age related postnatal changes in the ampullary gland of buffalo**.** Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 489–493. Keywords: Water Buffaloes, Animal Morphology,
The ampullary glands of buffalo appeared as short tubular epithelial invaginations into the propria-submucosa at 6 months of age and extended as simple branched tubular glands deeper into propria-submucosa in prepubertal animals. In the pubertal animals the glands differentiated into branched tubulo-acinar type of gland and characteristically expanded end pieces were frequently observed on the periphery of the glands. In adult the deep branched or unbranched recesses enclosed by the anastomoses of branching folds were oftenly seen between groups of folds and crypts. The epithelium lining the surface and the glands varied from cuboidal to columnar. The activity of alkaline phosphatase and adenosine triphosphatase were observed in blood vessels only and acetylcholinsterase activity was associated with nerve fibres surrounding the glands. Enzymes, viz. acid phosphatase, succinic dehydrogenase, lactic dehydrogenase, glucose-6 phosphate dehydrogenase, and nicotinamide adenine dinucleotide (reduced) diaphorase were demonstrated in parenchymatous cells. The relative intensity of all enzymes in tubular and acinar epithelia increased with age except lactic dehydrogenase activity, which was maximum in prepubertal animals. The surface epithelium exhibited comparatively weaker reactions as compared to tubular and acinar epithelia for all the enzymes.

182 Indu, V.R; Chungath, J.J.; Harshan, K.R.; Ashok,N.; Lucy, K.M.; Biju S. (College of Veterinary and Animal Sciences, Mannuthy (India) Department of Veterinary Anatomy) Gross

and histological studies on the spleen of white pekin ducks. Indian Veterinary Journal (January 2008) v. 85 (1) p. 61-63.
The Spleen collected from 10 apparently healthy four month old White Pekin ducks were used for the present study. The spleen was enclosed in a thin connective tissue capsule. From the capsule, trabeculae carrying blood vessels were noticed extending into the interior of spleen. The parenchyma could be differentiated into red and white pulp. But sharply distinguished areas of red and white pulp as in the mammalian spleen were not seen in ducks. The white pulp was seen as diffuse areas of lymphoid tissue enveloping central arteries. Germinal centers were present. The red pulp was composed of loose spongy tissue arranged into anastomosing splenic cords separated by venous sinuses. Within the cell cords lymphocytes, macrophages and blood cells were present.

183 Bhosle, N.S.; Shindatgire, R.K.; Kapadnis, P.J. (MAFSU, Parbani (India) College of Veterinary and Animal Sciences, Department of Veterinary Anatomy) Microscopic Anatomy of The Bulbourethral Gland In Cattle. Indian Veterinary Journal (January 2008) v. 85 (1) p. 64-66.
Histological observations on bulbourethral glands in uncasterated and casterated cattle is described.

184 Das, G.C.; Deori, S.; Das, B.K.; Goswami, R.N. (College of Veterinary Science, Khanapara, (India) Dept. of Animal Genetics and Breeding) Morphological studies on foetal membranes in swamp buffaloes. Indian Veterinary Journal (January 2008) v. 85 (1) p. 97-98
The present study was designed to provide baseline information on expulsion time, weight, size and number of cotyledons of the foetal membranes in Swamp buffaloes

185 Suri, Shalini; Sudhakar, L S; Bhardwaj, R L (CSK Himachal Pradesh Krishi Vishwa Vidyalaya, Palampur (India)). Anatomical studies of the prostate gland of Gaddi goat and sheep. Indian Journal of Animal Sciences (March 2009) v. 79 (3) p. 294–296. Key words: Goat, Prostate gland, Sheep
Adult animals (24) of each species (Gaddi goat and sheep) were utilized for recording gross parameters and histomorphology of prostate gland. In Gaddi goat and sheep the prostate gland comprised only disseminate portion. The structure resembling the body of prostate was found in 2 Gaddi sheep. In Gaddi goat pelvic urethra containing pars disseminata as 5.90±0.19 cm in length, 1.30±0.07 cm in width and 1.20±0.00 cm in thickness. In Gaddi sheep it measured 5.65±0.16 cm in length, 1.30±0.04 cm in breadth and 1.10±0.04 cm in thickness. Pars disseminata was a lobulated, compound tubulo-alveolar gland, consisted of solid or luminated secretory end-pieces in the wall of the pelvic urethra enclosed by a fibro muscular capsule. The mucous end-pieces were lined by tall columnar epithelium with basally placed round or ovval nuclei. The serous end-pieces were lined with cuboidal epithelium with rounded nuclei. The excretory ducts contained wide lumen and lined with epithelium similar to that lining the secretory end pieces, which became transitional near the urethral opening. Lymphoid follicles were observed in subepithelial region, close to urethral lumen in both species.

L50 Animal Physiology and Biochemistry

186 Kumar, R.; Sharma, K.B.; Sharma , M.; Sharma, R. (CSK Himachal Pradesh Krishi Vishwavidyalaya, Palampur (India) College of Veterinary & Animal Sciences, Department of Veterinary Physiology). Mineral status of livestock of shivalik hill zone of Himachal Pradesh. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 253-257. Keywords: Livestock, Minerals, Blood composition, Feeds.
The present study was conducted to assess the mineral status of the livestock of Amb and Gagret blocks of district Una representing agroclimatic zone I of Himachal Pradesh. The blood samples were collected randomly from local and crossbred animals and were analyzed for various macro and micro minerals. Results indicated high levels of K in the blood plasma of the animals of both Amb and Gagret blocks. Ca level was deficient in animals of Amb (8.68±0.29 mg/dl) and Gagret (8.17±0.35 mg/dl) blocks, whereas, P was found to be marginally higher in Gagret block (6.57±0.23 mg/dl). Among micro minerals, Zn was found to be deficient in the animals of both Amb (0.42±0.04ppm) and Gagret (0.61±0.09 ppm) blocks, whereas, marginally lower values of Cu were recorded in both the blocks. However, Fe concentration in Amb and Gagret blocks were 1.64±0.10 and 1.69±0.11 ppm, respectively. Significantly lower values ($P<0.05$) of Na and P were observed in Amb block as compared to Gagret block. Zn was also found to be significantly lower ($P<0.05$) in Amb block in comparison to Gagret block. Analysis of feed and fodder samples indicated that all the minerals were within normal range except Cu which was found to be lower in both the blocks. All minerals were in sufficient amount in feed and fodder samples except copper which was below the normal critical range in both the blocks, thus indicating the need for calcium and copper supplementation to the animals of this area.

187 Dhok, A.P.; Rekhate, D.H. (Post Graduate Institute of Veterinary and Animal Sciences, Akola (India) Department of Animal Nutrition) Trace elements in goats of Akola region. Indian Journal of Animal Research (March 2008) v.42 (1)
The study was conducted to know the trace elements status in goats of Akola region. Estimation of 126 serum samples from male, female and kids indicated the average zinc content 23.04 ± 1.38 µg/100 ml, iron 117.06 ± 4.30 µg/100 ml, copper 124.91 ± 6.67 µg/100 ml and manganese 84.29 ± 2.95 µg/100 ml. The goats were deficient in iron, zinc and need the supplementation.

188 Raja, R. ; Jagatheesan, P.N. Richard; Sivakumar, K.; Saravanakumar, V. Ramesh (Veterinary College and Research Institute, Namakkal (India) Department of Livestock Production and Management) Effect of heat ameliorative measures on blood biochemical profile in broiler rabbits. Indian Veterinary Journal (January 2008) v. 85 (1) p. 50-53.
An experiment was conducted with 24 weaned rabbits each in White Giant (WG) and Soviet Chinchilla (SC) breeds of rabbits consisting of four treatment groups having six animals in each breed namely control, provision of cool drinking water, electrolyte supplementation and water spraying to record the influence of heat ameliorative measures on blood biochemical profile. The higher values of most of the blood metabolitics namely total protein, albumin, globulin due to heat ameliorative measures adopted in T3 and T4 group rabbits indicated that electrolyte

supplementation and water spraying had improved the blood biochemical profile in WG and SC rabbits.

189 Krishnamoorthy, P.; Sakthivelan, S.M.; Balachandran, C.; Murali Manohar , B. (Madras Veterinary College,Chennai (India) Department of Veterinary Pathology). Serum copper and zinc concentrations in dogs. Indian Veterinary Journal (January 2008) v. 85 (1) p. 101-102
The overall mean serum copper and zinc concentrations irrespective of age, sex and breed were found to be 0.55 ± 0.23 mg/ ml and 0.52 ± 0.19 mg/ml respectively . The mean serum copper concentrations for male and female dogs were 0.63 ± 0.25 and 0.51 ± 0.20 mg/ml; serum zinc concentrations with respect to male and female dogs were 0.50 ± 0.19 and 0.56 ± 0.18 mg/ml respectively and showed no significant difference between sexes.

190 Jayathangaraj, M.G.; Senthilkumar, A.; Subramanian, K.S.; Ramesh, S.; Bhakyalakshmi V. (Madras Veterinary College, Chennai (India) Dept. of Wildlife Science) Chemical immobilization of common langur. Indian Veterinary Journal (January 2008) v. 85 (1) p. 107
Immobilization of non-human primates is to be carried out with much care and caution, for the purpose of routine clinical examination and blood collection. This paper represents the chemical immobilization of common langur (Presbytis entellus). Ketamine may be used even at the dose of 15-20 mg/Kg body weight for immobilization effect to persist for a longer time.

191 Bhullar, Preetinder; Nayyar, Shashi; Sangha, S P S (Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (India)) Antioxidant status and metabolic profile of buffalo during different growth stages. Indian Journal of Animal Sciences (March 2009) v.79 (3) p. 251–254. Key words: Antioxidants, Water Buffaloes, Enzymes, Vitamins
The metabolic profile and the erythrocytic levels of lipid peroxidation, glutathione peroxidase and superoxide dismutase activities were determined along with the plasma levels of vitamin E, ß-carotene and vitamin E in different growth stages of female buffalo, viz. calves (neonatal, transitional and ruminant), heifers (prepubertal and pubertal), pregnant (early, mid and late), postpartum lactating and dry buffaloes. The lipid peroxidation level decreased with age and increased during pregnancy. The superoxide dismutase activity was higher during late pregnancy than early pregnancy. The levels of ß-carotene, vitamin E, vitamin C, cholesterol and HDL-cholesterol were higher in heifers than the calves. During pregnancy, ß-carotene and vitamin E levels decreased whereas lipid peroxidation increased.

192 Nisha, A R ; Chandrasekharan Nair , A M ; Gopakumar , N; Joy, A D (Kerala Agricultural University, Vellanikkara (India)) Cadmium levels in biological samples and its effects on blood parameters of cattle in Eloor industrial area. Indian Journal of Animal Sciences (March 2009) v.79 (3) p. 269 –271
A study was under taken to assess the impact of environmental pollution with cadmium (Cd) in cattle of Eloor industrial belt of Kerala state. The samples were estimated for cadmium content. Cd content (ppm) in blood, serum, dung, urine and milk from cattle of Alupuram, Binanipuram, Eloor south, Eloor north were significantly higher than control values. A significant reduction

was noticed in total erythrocyte count, haemoglobin and packed cell volume of the animals in the affected area. Total leukocyte count, differential leucocyte count, mean corpuscular volume, mean corpuscular hemoglobin and mean corpuscular haemoglobin concentration did not show any significant difference. Total serum protein and albumin values from cattle of Alupuram, Binanipuram, Eloor south, and Eloor North were significantly lower than control values. An increase in the serum aspartate amino transferase, serum alanine amino transferase and serum alkaline phosphates were noticed in cattle from all test areas than controls. Key words: Biological samples, Cadmium, Field samples, Industrial area

193 Choudhary, V.; Pushpendra Kumar; Bhattacharya,T.K.; Bhushan, B.; Sahoo1, N. R.; Sharma, A. (Indian Veterinary Research Institute, Izatnagar (India) Animal Genetics Division). Leptin in Animal Production — A Review. Indian Journal of Dairy Science (Sept-Oct 2007) v. 60 (5). Keywords: livestock, Blood Proteins, Weight gain

Leptin is a 16 kDa protein produced by the obesity (OB) gene, believed to be involved in regulation and deposition of fat. In ruminants, as in other species studied, leptin is secreted predominantly by adipose tissue. Plasma leptin level increases linearly with increased body fat mass. Leptin reduces feed intake in rodents, chicken, pig, sheep and other species of livestock and also plays a role in energy expenditure. The physiological properties support leptin as a strong candidate gene for evaluation of genetic polymorphisms. If a polymorphic genetic marker for the leptin gene is identified, it may be used for selection of animals with desired traits, ultimately MAS. In this paper leptin synthesis/ secretion, leptin receptors and its resistance have been reviewed. Besides this, the role of leptin in feed intake, metabolic rate, reproduction, fetal development and animal production systems has also been critically reviewed.

L51 Animal physiology – Nutrition

194 Yasothai, R; Mohan B; Ravi, R. (Veterinary College and Research Institute, Namakkal (India) Department of Animal Nutrition) Chemical composition, metabolizable energy and protein efficiency ratio of sesame oil cake (Sesamum indicum L.) for chicken. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 167-173. Keywords: Broiler chickens, oilseed cakes, Chemical composition, Energy value, Protein efficiency ratio, Nutritive value

Chemical composition of sesame oil cake (n=20) were analyzed and the true and apparent metabolizable energy content was estimated in cockerels. The protein efficiency ratio and net protein ratio values of sesame oil cake were estimated and compared with those of other protein sources in broiler chicks by conducting chick growth assay. The sesame oil cake contained (%) 92.6 DM, 32.0 CP, 7.46 CF, 10.1 EE, 38.7 NFE, 12.0 total ash and 2.4 acid insoluble ash. The calcium, phosphorus, sodium chloride, lysine, methionine, free fatty acid, oxalate and aflatoxin B_1 content in sesame oil cake were 2.09%, 0.86%, 1.08%, 2.24 (g/16g N), 2.72 (g/16g N), 2.15%, 3.90% and 2.1 ppb, respectively. The true and apparent metabolizable energy content in sesame oil cake were 2955.2 and 2688.9 kcal/kg, respectively. The protein efficiency ratio and net protein ratio values in broilers fed various vegetable and animal protein feedstuffs

infers that the fish meal (5.2 and 3.7) is the superior protein feedstuff for broilers followed by soyabean meal (4.2 and 2.5), sunflower deoiled cake (3.3 and 1.5), groundnut deoiled cake (2.9 and 0.9), sesame oil cake (2.3 and 0.1) and meat and bone meal (2.3 and – 0.5).

195 Prakash, B; Dhali, A.; Das, K.C.; Rathore, S.S.; Hazarika , H.; Rajkhowa, C. (National Research Centre on Mithun, Jharnapani (India)) Nutrient composition and in situ degradability of forest foliages consumed by mithun (Bos frontalis). Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 175-183. Keywords: Bovinae, foliage, Nutritive value, In vitro experimentation

The present investigation was carried out to determine the nutrient composition, macro and micro mineral content and nutritive values of foliages consumed by mithun. Crude protein (CP), ether extract (EE), acid detergent fibre (ADF), neutral detergent fibre (NDF) and ash content of foliages were found to be very between 11.8 to 26.4, 1.91 to 2.81, 19.4 to 28.0, 25 to 38 and 5.1 to 8.9 percent, respectively. The foliages contained 1.62 to 3.32, 0.22 to 0.84 percent of Ca and Mg respectively, but Na content of all the selected foliages was low (less than 0.015%). Phosphorous was mostly within the range of 0.22 to 0.47 percent. Trace minerals, like Cu, Fe, Mn and Zn contents were found to be 6.3 to 19.2, 132.2 to 594.7, 36.6 to 206 and 51.3 to 424.5 mg/kg, respectively, on DM basis. The mean value of the effective degradability of DM and CP calculated from the rumen out flow rates (5% h^{-1}, as average) were 29.9 to 38.7 and 35.3 to 40.2 percent respectively. Degradation of DM ($r = -0.50$) and CP ($r = -0.28$)were negatively correlated with NDF content. The selected foliages indicated that the mineral concentrations were within the normal range. Nevertheless, Na was deficient in all the foliages. It is concluded that among different foliages, *Ficus dalhousiae, Callicarpa vestita, Melia azadiracta, Trema orientalis* and *Lagerstroemia speciosa* could be used as moderate energy and rumen undegradable protein source.

196 Kore , K.B.; Pattanaik , A.K.; Das, A.; Sharma , K. (Indian Veterinary Research Institute, Izatnagar (India). Centre of Advanced Studies in Animal Nutrition, Clinical & Pet Nutrition Laboratory) Nutritional and metabolic response of adult spitz dogs fed pearl millet (Pennisetum typhoides) based diets to exogenous enzyme supplementation. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 193-202. Keywords: Dogs, Digestibility, Animal feeding, Pennisetum glaucum

An experiment was conducted to study the effect of exogenous multi-enzyme supplementation to pearl millet (*Pennisetum typhoides*) based homemade diet for dogs. The experiment was carried out in a complete crossover design having two periods of 14 days each using five adult Spitz dogs. A commercial multi-enzyme (containing amylase, cellulase, phytase, xylanase, β-glucanase, pectinase and protease) was supplemented at 0.75 g/kg feed. The results indicated that the of total tract digestibility of DM, protein, fat, fibre and carbohydrates were without any significant ($P>0.05$) difference between the two groups. The mean faecal concentrations of acetate ($P=0.146$) and propionate ($P=0.067$) tended to increase upon enzyme supplementation, resulting in a trend of greater ($P=0.112$) total short-chain fatty acids compared to control. The molar proportion between acetate, propionate and butyrate, however, did not show any influence of the dietary intervention. There was no influence of enzyme supplementation on most of the plasma metabolites except for alkaline phosphatase, which tended ($P=0.090$) to be

higher in the enzyme supplemented group than the control. The mean plasma values of creatinine ($P<0.05$) was reduced significantly upon enzyme supplementation while that of plasma sodium and potassium were higher ($P<0.05$) in enzyme-supplemented group than the control. The study reveled that although there are subtle changes in the indices for hind gut fermentation, supplementation of enzyme at 0.75 g/kg of pearl millet based homemade diet had no apparent influence on the nutrient digestibility.

197 Bugalia ,H.L.; Chaudhary, J.L; Gupta, L. (Maharana Pratap University of Agriculture and Technology, Udaipur (India) Livestock Research Station) Effect of feeding formaldehyde treated sesame (Sesamum Indicum L.) cake on reproductive efficiency and physiological responses of crossbred cows. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 219-226. Keywords: Cows, Crossbreds, Sesame, Oilseed cakes , Reproductive performance, Digestibility
An experiment was conducted on 15 crossbred (Holstein Friesian x Tharparkar) cows (BW 393.80±16.15 kg) to study the effect of feeding formaldehyde treated sesame cake on reproductive efficiency and physiological responses. The animals were randomly divided into three equal groups and allotted to three dietary treatments viz., T_1: green berseem and concentrate containing untreated sesame cake (control); T_2: green berseem and concentrate containing 1.0% formaldehyde treated (1.0 g FA/100g CP) sesame cake and T_3: green berseem and concentrate containing 1.5% formaldehyde treated (1.5 g FA/100g CP) sesame cake. Sorghum stover was fed *ad libitum* in all the groups. The CP and TDN contents of the three diets did not vary significantly among the diets. The DM intake (%BW) was significantly ($P<0.05$) higher in T_3 (3.14±0.02) followed by T_2 (2.70±0.10) and T_1 (2.63±0.06). There was significant ($P<0.05$) difference between the treatments for mean daily intake of CP and TDN, which was higher in T_3 than T_2 and T_1. The digestibility coefficients of CF and EE were significantly ($P<0.05$) higher in T_3 than T_2 and T_1. The indices of post partum reproductive efficiency were higher in T_3 as compared to T_2 and T_1. The number of services per conception did not differ significantly among groups, though the values were lower in T_3 group. It may be concluded that the feeding of protected protein in the form of 1.5% formaldehyde treated sesame cake showed a significant improvement in the over all reproductive performance of the crossbred cows.

198 Bolu , S.A.; Olakotan, S.; Elkanah, A. ; Soyemi, F. (University of Ilorin, Ilorin, (Nigeria) Department of Animal Production) Response of broiler chicks to supplementation of a commercial growth promoter-cum-immunomodulator. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 237-244. Keywords: Chicks, Animal growth promoters , Animal Performance.
A study was conducted to investigate the effect of graded supplementation levels of Livelong (a commercial growth promoter and immunomodulator) on the performance, specific serum biochemistry, haematology, histology of broiler chicks. Supplemental Livelong tended to significantly increase ($P>0.05$) voluntary feed intake, improve weight gain and efficiency of feed conversion. Broiler chicks fed the control diet recorded the lowest values for these criteria. Mortality was also highest for birds in the control group. Serum biochemical indices and haematology were improved with various levels of supplementation with Livelong. Nutrient retention values for broiler chicks supplemented with Livelong were significantly higher ($P>0.05$) than the control group. Liver histology was not affected by supplementation levels of

Livelong studied. Broiler chicks supplemented with Livelong at 40 ml/L drinking water recorded the highest overall performance.

199 Chaudhary, U.B.; Gupta, V.K.; Monika Singh (Central Institute for Research on Goats**,** Makhdoom, (India)) Comparative evaluation of different dna extraction methods from rumen fungi. Indian Veterinary Journal (January 2008) v. 85 (1) p. 4-7. Keywords: Rumen, Fungi, DNA
Under the present communication five different protocols were compared in relation to recovery of pure DNA in optimum concentration. Result indicated varied concentration and purity of DNA under five protocols on account of rigid cell wall of rumen fungi. Pure yield and optimum concentration of DNA was obtained following the 2nd and 4th protocol of this study as confirmed by gel electrophoresis analysis.

200 Dutta, T K; Singh, N P (Central Institute for Research on Goats, Makhdoom (India)) Voluntary feed intake, growth, rumen fermentation and nutrient utilization in different breeds of Indian goats reared under intensive system. Indian Journal of Animal Sciences (March 2009) v. 79 (3) p. 311–315 Key words: Goats, Growth, Kids, Nutrient utilization, rumen fermentation
Weaned male kids (24) of Barbari (T1, 111.38±2.40 days, 10.80±0.32 kg BW), Jamunapari (T2, 110.87±1.11 days, 11.04±0.50 kg BW) and Marwari (T3, 109.00±1.57days, 11.56±0.71 kg BW) breeds were randomly divided into 3 treatment groups to investigate the response of feed based on agro-industrial by-products and new feed resources [Albizia lebbec (siras) pod-with seed and Vigna sinensis (cowpea) pod-without seed] on growth, rumen fermentation, nutrient utilization and economics of feeding. Concentrate mixture and dry fodder mixture (pigeon pea straw 78.34%, cowpea pods-without seeds 8.33%, coarsely ground siras pod-with seeds 13.33%) were mixed in the ratio of 40:60 and offered ad lib. to the kids under the 3 groups. Limited quantity (300 g/h/d) of available green fodder (lucerne fodder) and berseem hay (100 g/h/d) was offered to all the kids irrespective of treatment groups. DM intake/kg W0.75 was higher in T2 than other 2 groups. ADG and FCE% (gain/DMI) were statistically insignificant among groups. VFA concentation was similar in the breeds during middle and last stage of growth. NH3–N concentration (mg/dl SRL) was significantly higher in T1 and T3 breeds than T2 breed during last stage of growth, whereas, it was similar among the 3 breeds during mid collection. TDN and DCP intake/kg W0.75 varied in different treatment groups. Growth rate in Barbari kids was normal under this feeding regimen, whereas, Jamunapari and Marwari kids grew lower under the same feeding schedule due to lower intake of TDN and DCP. The variations in nitrogen balance and nitrogen balance/kg W0.75 were statistically insignificant among the 3 groups. Therefore, it may be concluded that rations prepared with agro-industrial by-products and new feed resources (siras pod-with seed and cowpea pod-without seed) were effective in Barbari kids, whereas, Jamunapari and Marwari kids grew at lower rate.

201 Saini, N; Singh, G.P.; Nagpal, A.K. (National Research Centre on Camel, Bikaner (India)) Nutrient Utilization from Clusterbean Straw, supplemented with Urea and Prosopis cineraria Leaves in Growing Camel. Indian Journal of Dairy Science (Sept-Oct 2007) v. 60 (5). Keywords: straw, Prosopis cineraria, Feed legumes, Camels

A study was conducted in completely randomized design on 9 growing male camels to study the effect of supplementation of 2% urea (DM basis) and leaves of Prosopis cineraria (khejri) on iso nitrogenously to clusterbean straw (Cyamopsis tetragonoloba) fed respectively, to group II and III and straw only to group (I) as a sole feed. Total dry matter intake and digestibility of CF were significantly higher in group III than other groups. However, digestibility of DM, OM, CP and values of blood urea and total protein were similar and significantly ($P<0.05$) higher in group II and III compared to group I. Calculated cost of feed in corresponding groups was 12, 13.56 and16.77 Rs/d/animal. Significantly lower cost of feed was observed in group I fed clusterbean straw whereas cost of available nutrients was significantly ($P<0.05$) lower in urea supplement group.

L52 Animal physiology - Growth and development

202 Tandle, M.K.; Honnappagol, S.S.; Ramachandra, S. G.; Nadoor, Prakash (KVAFSU, Veterinary College, Bidar (India) Department of Animal Reproduction, Gynecology and Obstetrics) Effect of HCG supplementation on progesterone level and fertility in deccani sheep. Indian Veterinary Journal (January 2008) v. 85 (1) p. 26-27. Keywords: Ewes, harmones, Progesterone, Reproductive performance

Twelve ewes of Deccani breed in 1-3 parity were randomly divided into treatment and control groups (6 each). The ewes of treatment group received hCG on day 12 following natural breeding. The pregnant ewes of treatment group exhibited higher level of progesterone on the days 11, 13 and 23 of the cycle in relation to the animals of the same group that did not conceive. The mean plasma progesterone levels on the day of estrus in the ewes of control group was 0.45 ± 0.11 ng / ml which gradually went on increasing with the advancement of cycle and the peak level of 1.38 ± 0.07 ng/ml was encountered on day 23 of the cycle. The ewes of treatment group that received hCG registered considerably higher lambing percentage of 66.67 while the none of the ewe of the control group conceived.

L53 Animal physiology – Reproduction

203 Goel, A K Kharche, S D ; Jindal S K (Central Institute for Research on Goats, Makhdoom (India)) Efficacy of progestin implants - eCG to increase kidding rate in post -partum anoestrus Jakhrana goats. Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 473–475. Keywords: Goats, Reproductive performance , Perinatal period , Oestrous cycle, Ultrasonics, , Echography

Post-partum oestrus interval is of comparatively longer duration in Indian goat breeds. Considering the possibilities to shorten it, a study was conducted in 25 adult post-partum anoestrus (7 to 14 weeks) Jakhrana goats by using hormonal preparations. Additionally 12 cyclic Jakhrana goats (control) were not administered hormones and mated at natural oestrus to record conception and kidding rates. Prior to start of treatment blood samples of all goats were collected to monitor luteal activity by estimating circulating progesterone (P_4). Each goat was implanted half Crestar implant subcutaneously and left *in situ* for 12 days. Concurrently, 1 ml of Crestar solution (1.5 mg norgestomet and 2.5 mg oestradiol valerate) was administered to each

goat by intramuscular route. An amount of 300 - 400 IU eCG was given intramuscularly to each goat on 10^{th} day to stimulate follicular growth. A luteolytic dose of lutalyse (10mg) was intramuscularly injected to each goat on 11^{th} day to regress any functional corpus luteum. At the time of induced oestrus each goat was administered 2 ml Receptal to enhance ovulation. Responded goats were naturally mated twice at 10–12 h intervals by fertile bucks. All responded (24) goats (96.00%) exhibited behavioral oestrus of varying intensity. Time taken for induction and synchronization of oestrus averaged 20.25±1.69 h (12 - 36 h). Its duration averaged 30.0±1.91 h (24–60 hours). The mean (±SEM) serum progesterone prior to start of hormone therapy was at basal level ($p<1.0$ ng/ml). Pregnancy was confirmed in 17 goats (71.00%) at 40 – 60 days of gestation by B-mode ultrasonography. Twenty-eight kids (2 aborted) were born from 17 kidded does giving a kidding rate of 1.58. On the contrary conception and kidding rates in control animals were 66.60% and 1.25, respectively. Study showed the possibility of augmentation in kidding rate in goats during early post-partum anoestrus period by hormonal interventions.

204 Goel, A K; Kharche, S D; Jindal, S K (Central Institute For Research On Goats, Makhdoom (India)). Determination of early pregnancy and embryonic development by transrectal ultrasonography in goats**.** Indian Journal Of Animal Sciences (May 2009) v. 79 (5) p. 476–478. Keywords: Embryonic development, Goats, Pregnancy, Ultrasonics, , Echography
The present study was undertaken to characterize non–pregnant and pregnant uterus of indigenous goats to diagnose pregnancy and assess early embryonic/foetal development by applying B–mode real time ultrasonography. Goats (75) were scanned to characterize non-pregnant uterus of 5 cyclic Jamunapari and 70 mated Jamunapari and Sirohi goats using ultrasound scanner. The non-pregnant uterus was visualized in the form of homogenous coarsely granular echo immediately cranial to the urinary bladder. On day 28 of gestation, anechoic fluid pocket (black) along with an elongated foetal streak (white) extending more than half of foetal fluid was identified. Scanning of 2 anechoic fluid pockets indicated twin pregnancy. On day 35 of gestation, echo dense foetuses were captured on a single ultrasonic image. At this stage foetus started budding and clearly imaged into head and trunk regions. Foetal heart beat was visible in one part of the developing foetus in trunk region (50% animals). Amniotic membrane encircled the developing conceptus as distinct hyperechoic dotted line (65% animals). With advancing gestation, half moon and bowl shaped placentomes started appearing in scanned images. It is concluded that B–mode real time ultrasonography can be effectively used for early pregnancy (4 week of gestation) and also to study early embryonic / foetal development in goats.

205 Pravesh Kumar; Madhumeet Singh; Vasishta, N K (CSK Himachal Pradesh Agricultural University, Palampur (India)) Effect of progesterone supplementation on conception rate following artificial insemination in normal cows. Indian Journal of Animal Sciences (March 2009) v.79 (3) p. 286–287 Key words: Artificial insemination, Reproductive performance, Cows, Progesterone
Normal cows (262) presented for insemination were used to study effect of progesterone supplementation on conception rate following artificial insemination in normal cows. In all the

treatment group cows 500 mg hydroxyprogesterone caproate was injected intramuscularly whereas no treatment was given to the control group cows. The animals included in progesterone treatment group were sub-divided into 3 groups, viz. the progesterone administration simultaneous to AI (group 1, n=50), insemination and exogenous administration of progesterone on third day post AI (group 2, n=54)) and insemination and administration of progesterone on fifth day post AI (group 3, n=47). Whereas, 111 normal cows inseminated without progesterone (group 4) were treated as normal control. The CR in normal cows receiving progesterone treatment on days 0, 3 and 5 were 42.0, 55.56 and 46.81%, respectively. In normal control cows, it was 55.85%.

206 Uppal, Varinder; Roy, K S; Bansal, Neelam (Guru Angad Dev Veterinary and Animal Science University, Ludhiana (India)). Histoenzymic localization of phosphatases and esterases in the uterus of buffalo during prenatal life. Indian Journal of Animal Sciences (March 2009) v. 79 (3) p. 297–299. Key words: Water Buffaloes, Histoenzymes, Uterus, Perinatal period
Histoenzymic localization of phosphatase and esterases was studied in the uterus of 12 buffalo foetii of different gestational age. The foetii were divided into 3 groups based on their CVR length with approximate age of group 1 up to 118 days, group 2 up to 163 days, and group 3 up to 289 days. The study revealed a weak localization of AKPase, ACPase, ATPase and G-6-Pase in group 1 whereas in groups 2 and 3 the different enzymes were better localized. The non-specific esterases and acetyl cholinesterase were observed in the blood vessels and nerve fibres. The localization of these enzymes has been correlated with their functional activity and physiological status of the organ during fetal life.

207 Sharma, R K; Inderjeet Singh; Singh, J K (Central Institute For Research On Buffaloes, Hisar (India)). Growth and regression of ovarian follicles and corpus luteum in subestrus murrah heifers undergoing prostaglandin induced luteolysis. Indian Journal of Animal Sciences (March 2009) v. 79 (3) p. 290–291. Key words: Buffalo, Prostaglandin, Corpus luteum, Follicles
Patterns of corpus luteum regression and follicular growth were studied in subestrus Murrah heifers (n=15), undergoing prostaglandin (PG) induced luteolysis during winter. All heifers, receiving 750 µg tiaprost intramuscularly, returned to estrus after mean interval of 4.13±0.69 days. Majority of heifers (66.7%) ovulated the largest dominant follicle, present at the time of PG injection; while remaining 33.3% ovulated the second largest follicle. The ovulatory follicle grew @ 0.88±0.14 mm/day and reached a diameter of 11.25±0.35 mm on the day of estrus. Whereas, corpus luteum regressed @ 46.9±4.9 mm2/day and declined from 237.6±12.5 mm2 at treatment to 79.9±7.9 mm2 on the day of estrus. Pregnancy rate at estrus following treatment was 46.7% (7/15). Administration of PG causes rapid luteolysis, accompanied by accelerated growth of dominant or the second largest follicle, which culminates into ovulation and acceptable fertility in subestrus buffaloes.

208 Bansal, Neelam; Saigal, R P (Guru Angad Dev Veterinary and Animal Science University, Ludhiana (India)). Surface count and histological distribution ratio of ovarian follicles in buffalo. Indian Journal of Animal Sciences (March 2009) v. 79 (3) p. 292–293. Key words: Water Buffaloes, Animal Histology, Ovarian follicles

The present study was conducted on 18 ovaries of adult buffaloes, 3.5–15 year-old, during different phases of reproductive cycle to observe the distribution of different categories of follicles present on the surface and in histological sections of ovaries. Small size follicles (1 to < 2 mm) were mainly found embedded in the cortex and only few follicles appeared on the surface of ovary. The number of such follicles in the histological sections was 33, 33.67, 2.70 and 6.50 times higher than the number of follicles that were counted on the surface during follicular, early luteal, mid luteal and late luteal phase of the reproductive cycle, respectively. As the size of follicles increased, distribution followed a reverse pattern, i.e. the number of follicles counted on surface increased and those which appeared histo-morphologically decreased. The phase-wise distribution of follicles showed that ratio of surface to histomorphological count was minimum (1:1.54) in mid-luteal phase, which increased to 1:2.44 in late luteal, 1:4.48 in follicular and maximum of 1:7.86 in early luteal phase. From these observations it may be stated that only the large size follicles appeared on the surface of ovary and the small size follicles remained buried in the ovarian cortex, which leads to an underestimation (on surface count) of total follicles present in ovaries of buffaloes may be related to the lower reproductive efficiency.

209 Krishnakumar, K.; Sivakumar, P.; Muthuramalingam, M.; Sasikumar, M; Chandrahasan, C. (Veterinary College and Research Institute, Namakkal (India) Department of Animal Reproduction, Gynaecology and Obstetrics) Induction of Estrus with Follicular Fluid in Anestrus Buffaloes. Indian Journal of Dairy Science (Sept-Oct 2007) v. 60 (5). Keywords: Water Buffaloes, Ovarian follicles, Anestrum, Induced ovulation, Reproductive performance
The study was conducted on buffaloes which were brought to the Gynaecological unit of Veterinary College and Research Institute Hospital, Namakkal, Tamilnadu. Ten numbers of buffaloes, failed to exhibit estrus signs even after six months of parturition and had no palpable structures on their ovaries were given 5 ml of bovine follicular fluid, intramuscularly. Ten numbers of healthy, normal and cyclical buffaloes, after 60 days post-partum were utilized as control. The overall incidence of anestrus was 15.87 per cent from April 1998 to March 2002. Out of ten, 9 (90%) buffaloes exhibited estrus with 5 ml of follicular fluid administered, intramuscularly. The time taken for the onset of estrus was 10.78±2.65 days and the mean duration of estrus was 25.20±1.41 and 33.56±3.09 h in control and induced groups, respectively. The intense, intermediate and weak estrus were 50.00, 50.00 and 0.00 per cent in control group and 44.44, 33.33 and 22.22 per cent in induced group, respectively. The conception rate was 70.00 and 66.66 per cent in control and induced group, respectively, which did not differ significantly.

L70 Veterinary science and hygiene

210 Shinde, H.; Pawar, V.; Ghangale, G. (Bombay Veterinary College, Bombay (India). Role of Veterinarian in Rural Development of Khed Taluka of Pune District of Maharashtra State. Veterinary World (May 2008) v.1(5) p.133-135 Keywords: Veterinarian, Rural Development, Farmers, Veterinary Services

A study was carried out to determine the role of veterinarian in rural development in Khed taluka of Pune district. The survey was carried out in 19 villages of 4 subdivisions of Khed taluka by personnel interview and 210 farmers were screened. The study revealed that accessibility of veterinarian for 21.05 % (4) villages was below average, 73.68% (11) villages were average and 5.26% (1) villages were above average. The availability of veterinarian for 31.58 (6) villages was above average and rest 68.42% (13) were below average. The role in rural development of veterinarian was above average for 21.05% (4) villages, 36.84% (7) villages were average and rest 42.11% (8) villages were below average. The study also showed that 15.79% (3) villages were good, 42.12% (8) villages were average and 42.12% (8) villages were below average when total ranking of villages was done by block level veterinary service index.

211 Akhtar, A.; Kshirsagar, P.M.; Chikhale, M.V.; Deshmukh, A.A.; Surwase, S.P. (Maharashtra Animal and Fisheries Science University, Nagpur (India) College of Veterinary and Animal Sciences, Department of Pharmacology and Toxicology). The Rise of In-Vitro Toxicity Testing. Veterinary World (May 2008) v.1(5) p. 150-151

The concept of alternative techniques is now widespread throughout the scientific community. This is due largely to regulations and standards which require consideration and support to alternatives. However, the field of alternative study particularly in vitro toxicology has evolved into a respected discipline and is attracting competent and motivated scientists around the world. Although the normal rate of progression of any scientific discipline is determined by progress within the scientific community, some areas have received more encouragement than others. Specifically, the public objections and disapproval of animal testing have forced academic institutions, industrial concerns, and regulatory agencies to direct research initiatives toward the development of alternative methods of toxicity testing.

212 Paithanpagare, Y.M.; Tank, P.H.; Mankad, M.Y.; Shirodkar, Kshama ; Derashri, H. J. (Anand Agricultural University,Anand (India) College of Veterinary Science and Animal Husbandry, Department of Veterinary Surgery and Radiology) Myelography in dogs Veterinary World, (May 2008) v.1(5) p. 152-154

Myelography is radiography following opacification of the sub-arachnoid space. Iohexol and Iopamidol are commonly used contrast media. Contrast filling of spinal column is observed to be dose dependent. Concentration of these dyes at 300-350 mg I2/ml is commonly chosen. Recommended volumes of contrast media for myelography in dogs are generally accepted to be 0.3-0.4 ml/kg. Contrast media distribution in the sub- arachnoid space may be improved by creating turbulence during injection of contrast medium, warming of contrast medium to minimize its viscosity, using an appropriate volume of contrast medium and tilting the animal to promote contrast medium flow. Opacification time is about 5-10 mins and diagnostic myelograms can be obtained upto 60 mins. Cisternal puncture should be preferred to delineate cervical lesions whereas lumbar puncture should be used for compressive lesions of thoraco-lumbar region. Lateral myelograms are of comparatively better diagnostic quality than ventro lateral views for different regions of spinal cord, however in cases of intervertebral disc prolapse, additional ventro-dorsal view can be helpful.

213 Savalia, C.V. , Sindhi, S.H. (AAU, Anand (India) College of Veterinary Science and Animal Husbandry, Department of Veterinary Public Health) Threat and Stretegic control of Dengue infection in Man. Veterinary World (May 2008) v.1(5) p. 155-156
Strategic measures useful in prevention and control of dengue infection have been discussed.

214 Verma, Sheetal; Ahmad ,A.H; Rahal, Anu; Singh, K.P. (G.B. Pant University of Agriculture & Technology, Pantnagar (India) College of Veterinary & Animal Sciences, Department of Pharmacology and Toxicology) Pharmacokinetics of Florfenicol Following Single Dose Intravenous and Intramuscular Administration in Goats. Journal of Applied Animal Research (September2009) v. 36(1). Keywords: Pharmacokinetics, goats
Pharmacokinetics of florfenicol following intravenous (i.v.) and intramuscular (i.m.) administration (20 $mg.kg^{-1}$) was studied in healthy goats. Based on pharmacokinetic data, an i.v. and i.m. dosage regimen of florfenicol in goats was calculated to be 14.38 and 15.08 $mg.kg^{-1}$, respectively, at 12 h interval.

215 Maiti, S.K.; Khimta, S.; Bhadane, B.; Kumar, N.; Sharma, A.K. (Indian Veterinary Research Institute, Izatnagar (India) Division of Surgery) Therapeutic Evaluation of Herbal "ImmuPlus" with or without Doxorubicin in the Management of Canine Mammary Tumours. Journal of Applied Animal Research (September2009) v. 36(1) Keywords: mammary Glands: Carcinoma, Dogs, Chemotherapy
Spontaneously occurred canine mammary tumours (70) were treated with chemotherapy (doxorubicin), immunotherapy (ImmuPlus), adjuvant chemotherapy and by surgical therapy. In chemotherapy group the Hb and TEC values reduced significantly ($P<0.05$) from the base line value at 2^{nd} week of therapy. Histologically, benign and malignant mixed tumours were predominant. Doxorubicin and herbal drug "ImmuPlus" were found effective in the treatment of canine mammary tumours. ImmuPlus has been found as good immunomodulatory drug in cancer chemotherapy.

216 Roy, S.; Ghosh, G.L.; Moulik, N.; Datta, U. State Animal Health Center, Kolkata (India) Govt. of West Bengal) Surgical management of intestinal obstruction in a dog. Indian Veterinary Journal (January 2008) v. 85 (1) p. 75-76
Successful surgical management of distal intestinal obstruction in a Golden Retriever dog is presented and discussed

217 Mahesh, V.; Vasanth, M.S. (KVAFSU, Bangalore (India) Veterinary College, Department of Surgery and Radiology) Evaluation of lendectomy with and without limbal sutures for cataract in dogs. Indian Veterinary Journal (January 2008) v. 85 (1) p. 79-81
Extraction of cataractous lens by limbal approach was studied with and without suturing. The Non-suturing of the Limbal incision was found to provide good clinical results as compared to suturing the limbus after extraction of cataract lens in dogs.

218 Gupta, Neelu; Katiyar, A.K.; Swamy, Madhu (College of Veterinary Science and A.H., Durg, (India) Department of Pathology) Vascular response to staphylococcus epidermidis induced inflammation in buffalo. Indian Veterinary Journal (January 2008) v. 85 (1) p. 88-89

Various type of local injury in permeability response which differ in the time of their appearance, their duration and their susceptibility to pharmacological agents. The vascular response to experimentally induced inflammation in the buffalo is presented in this report. Visually, bluing was not noticed in normal saline injected skin sites at any time intervals. However, quantitatively 0.46 ± 0.05 mg of dye had exuded in 0-2 min lesion in saline injected site. The values at subsequent time interval had gradually decreased. The bluing at Steph. epidermidis injected sites was not noticeable at 0-2 min time interval. However, a gradual increase was noticed and maximal bluing was noticed at 3 hr time interval. The permeability registered a sudden decrease at 6 hr and then the decrease was gradual upto 48 hrs. The pattern of increased vascular permeability in the calves was immediate and prolonged type. The contrasting pattern of permeability response in buffalo calf and chicken skin induced by bacteria may be ascribed to the difference in species and pathogenicity of the bacteria used.

L72 Pests of Animals

219 Chavhan, P.B.; Khan, L.A.; Raut, P.A.; Maske, D.K.; Rahman, Shafiqur; Podchalwar, K.S.; Siddiqui, M.F.M.F. (Nagpur Veterinary College, Nagpur (India)) Prevalence of Nematode parasites of Ruminants at Nagpur Veterinary World (May 2008) v.1(5) p.140 Keywords :- Ruminants, Nematodiasis, Morbidity

In a year round study, two villages, viz. Chicholi and Bodala of Nagpur district were selected for assessment of prevalence of nematode parasites of ruminants. Out of 615 animals examined 242 were positive (39.34%) for nematode infection. The infection rate in buffalo, cattle and goat was 41.63, 32.18 and 51.94%, respectively. Higher infection was recorded during monsoon (63.07%) followed by winter (32.22%) and summer (21.33%). The percentage of animals infected with Haemoncchus sp., Toxocara sp., Trichuris sp., Strongyloides sp. and mixed infection was found to be 38.01, 27.68, 14.87, 11.98 and 7.43%, respectively.

220 Dixit, S K; Tuteja, F C; Sena , D S (National Research Centre On Camel, Bikaner (India)) Sarcopticosis in dromedary camel—Clinical observations and its therapeutic management. Indian Journal Of Animal Sciences (March 2009) v. **79** (3) p. 239-242. **Key words**: Camels, Indigenous formulation, Sarcopoticosis, Mange

The present study was undertaken to record clinical findings and evaluate therapeutic efficacy of an indigenous formulation for sarcopoticosis in dromedary camel. The characteristic skin lesions included excoriation, erythema, cracks, bleeding, thickening and wrinkling, alopecia and hypermelanosis. In camels nostrils, lips, orbit, brisket, pre- and post-scapular and femoral region, brisket, sternum, thighs, tail, perineum, knee and hock joints were mostly affected. Local application of indigenous formulation resulted in clinical and parasitic cure within 10 days and the cure rate was cent percent. Reversible trend of eosinophilia, hypoproteinemia, hypoalbuminemia and A/G ratio was recorded in treated animals.

L73 Animal Diseases

221 Singh, S V; Singh, A V; Singh, P K; Sohal, J S (Central Institute For Research On Goats, Makhdoom (India)) Prevalence of juvenile capri-paratuberculosis and geno-typing of *Mycobacterium avium* subspecies *paratuberculosis* recovered from postnatal kids. Indian Journal of Animal Sciences (March 2009)v. **79** (3) p. 235 –238 Key words: ELISA, kids, PCR, paratuberculosis

To investigate the prevalence of juvenile capri-paratuberculosis (JCP) in postnatal kids, 71 fecal and serum samples (30 from government and 15 from private farms and 26 from farmers' herd) were screened by fecal culture and indigenous ELISA kit. OD values were transformed to S/P ratio and kids were categorised as: negative, suspected, low positive, positive and strong positives. Cumulatively, 69.0 and 47.8% kids were positive by ELISA and fecal culture, respectively. Individually, 73.3, 80.0 and 57.6% kids were positive by ELISA (type II sero-reactors) from government and private farms and farmers' herd, respectively. On the other hand in culture, 40.0, 66.6 and 46.1% kids were positive from government and private farms and farmers' herd, respectively. The isolates were primarily characterized on the basis of cultural characteristics, acid fastness, slow growth and mycobactin J dependency and were finally confirmed by specific IS900 PCR. Representative 12 MAP isolates were further genotyped using IS1311 PCR–RE analysis and all were 'Bison type'. Study reports high prevalence (culture, 47.8% and ELISA, 69.0%) of MAP, and 'Bison type' was predominant geno-type in young kids from farm and farmer's herds. Potential of indigenous ELISA kit for the diagnosis of JCP has been discussed.

222 Sohal, J S; Singh, S V; Singh, A V; Singh, P K (Central Institute For Research On Goats, Makhdoom (India)). Interspecies sharing of 'indian bison type' mycobacterium avium subspecies paratuberculosis as revealed by 'short sequence repeat' typing. Indian Journal of Animal Sciences (March 2009) v.79 (3) p. 272-274 Key words: Ruminants, Interspecies transmission, Mycobacterium avium paratuberculosis, Short Sequence Repeat typing, Wild ruminants

Johne's disease (JD) is extremely difficult to control and vaccination also does not prevent the infection completely. Knowledge of diversity within Mycobacterium avium sub sp. paratuberculosis (MAP) strains is important for the better understanding of molecular epidemiology of infection and guiding national disease control programmes. Study estimated degree of diversity within Indian 'Bison type' MAP isolates using recently described 'short sequence repeat' typing. Results revealed that there was no allelic variation among 'Indian Bison type' MAP strains indicating the interspecies transmission of 'Indian Bison type' MAP in cattle, goat, sheep, buffalo and blue bulls.

223 Verma, A K; Nauriyal, D S (Anand Agricultural University, Anand (India)) Therapeutic Potential of A Topical Herbal Gel Against Bovine Subclinical Mastitis. Indian Journal Of Animal Sciences (March 2009) V.79 (3) P. 275-277 Key Words: Mastitis, Drug Therapy

A study was undertaken to evaluate efficacy of a topical herbal gel for the treatment of bovine subclinical mastitis. Lactating cows (18) were included in the study. The result of the trial

showed that the topical herbal gel could eliminate udder infections caused by coagulase-negative staphylococci (CNS), coagulase-positive staphylococci (CPS), Micrococcus spp., Streptococcus agalactiae, and Escherichia coli.

224 Pathak, A.K. and S. Pal (College of Veterinary Science & A.H., Durg (India) Seasonal Prevalence of Gastrointestinal Parasites in Goats from Durg District of Chhattisgarh. Veterinary World (May 2008) v.1(5) p.136-137 Keywords: Gastro-intestinal parasites, goats, Durg, Seasonal prevalence

Systemic studies on the prevalence of gastrointestinal parasites in goats revealed that the percentage of overall prevalence of infection was 85.22%. The prevalence of different parasites encountered were Paramphistomum spp. (80.68%), Cotylophoron spp. (45.45%), Moniezia spp. (17.04%), Avitellina spp. (3.40%), Haemonchus sp. (26.13%), Trichostrongylus spp (5.68%), Cooperia spp. (3.40%), Oesophagostomum spp. (30.68%), Bunostomum sp. (5.68%) and Trichuris sp. (27.27%). Seasonal prevalence was highest in monsoon (94.60%), moderate in summer (87.50%) and lowest in winter (63.15%).

225 Deb, R.; Gowsami, P.P (Indian Veterinary research Institute (IVRI), Izatnagar (India) Division of Biotechnology) Molecular Biology: A Field of Great Contribution in Paratuberculosis Research. Veterinary World (May 2008) v.1(5) p. 157-158 Keywords: Paratuberculosis, Ruminants; **Molecular biology**

With advances of molecular biology, it has been possible to study the structural components of Mycobacterium avium subspp. paratuberculosis (Map) which is the main causative agent of John's disease in cattle and other ruminants. Molecular biology has opened a door to study various significant pathogenic structure of Map, which ultimately can keep a significant impact in the field of paratuberculosis diagnosis and has been instrumental in the development of specific and sensitive diagnosis tests.

226 Malik , Praveen; Kalra, S K (National Research Centre on Equines, Hisar (India**))** Prevalence of group C streptococci amongst equines in India**.** Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 459–465 Key words: Antibiotics, Equines, GCS, Pathogenicity, *Streptococcus equi, Streptococcus zooepidemicus*

The present study was undertaken to study the prevalence of group C streptococci amongst equines in India. To achieve the objectives, various field samples were collected from apparently healthy and clinically affected equines. Of the total 311 samples collected, 35 streptococcal isolates were obtained including *Streptococcus equi* (6), *S. zooepidemicus* (16) and *S. equisimilis* (13). Of the total samples, 185 were collected from apparently normal equines, which yielded 16 isolates, while 126 samples from clinically affected equines yielded 19 isolates. Of 262 samples originated from organized farms, 25 yielded streptococci, while 49 from unorganized sector, 10 isolates were recovered. All the streptococcal cultures, except 6 *S. equisimilis* isolates, were pathogenic to mice. Antibiotic sensitivity indicated that 33 were sensitive to lincomycin while 31 were resistant to nalidixic acid. Colistin showed resistant in only 12 isolates.

227 Malik , Praveen; Kalra, S K (National Research Centre on Equines, Hisar (India**))** Variability and protective efficacy of M protein of streptococci of equine origin**.** Indian Journal of Animal

Sciences (May 2009) v. 79 (5) p. 466–469 Keywords: Equines, Immunogenetics, *Streptococcus equi, Streptococcus zooepidemicus*, Variability
The present study was undertaken to study the variability of M protein among Indian isolates of *Streptococcus zooepidemicus* and its protective value *vis a vis Streptococcus equi*. Variability among profiles of crude extracts and M proteins of *S. zooepidemicus* were noticed, while those of *S. equi* were found to be almost homogenous. One isolate of *S. equi* was however showing a slightly different pattern in crude enzyme extract and immunoblot developed by convalescent horse serum. Immunogens of ~ 35 kD showed variations in *S. zooepidemicus*. RE profiles were not so clear, though the profiles indicate variability among the various isolates. Immunoblot studies indicated a common protein of ~ 30 kD, detectable by anti-*S. zooepidemicus* hyperimmune serum raised in rabbit, whereas anti- *S. equi* hyperimmune rabbit serum showed variability in ~35 kD proteins of *S. zooepidemicus*. Anti-*S. equi* horse serum reacted with ~60 kD protein with little reactions at 30–35 kD range proteins. Results on *in vivo* mouse protection assay indicated the protective ability of *S. zooepidemicus* M-protein against homologous challenge. However, it was not found protective against infection with *S. equi*. *In vitro* bactericidal assay also indicated the reduction in number of bacterial cells by homologous antiserum, both in *S. zooepidemicus* and *S. equi* systems, with not as much of reduction in heterologous systems. Results suggested a protective and opsonogenic value of M protein of *S. zooepidemicus* against homologous infection and not against *S. equi*.

228 Manya, Priti; Sinha, S.R.P.; Sinha, Sucheta; Sharma,S.K.; Sadarao, Bharat L.; Verma, S.B. (Bihar Veterinary College, Patna (India) Department of Veterinary Parasitology) Therapeutic efficacy of coximar and fazole against bovine coccidiosis. Indian Veterinary Journal (January 2008) v. 85 (1) p. 82-83
Therapeutic efficacies of two drugs Coximar @ 100 mg/kg b.wt for 7 days and Fazole @ 1 bolus / 50 kg b.wt. b.i.d. for 5 days was evaluated in naturally infected calves with clinical coccidiosis. There was no significant difference between these two drugs on OPG on different periods studied. Both these drugs were observed to be quite efficacious for the treatment of clinical bovine coccidiosis.

229 Vijayanand, V.; Prasad, A. A.; Rajasundaram R.C. (Veterinary University Peripheral Hospital, Chennai (India)). Tetanus in a pup. Indian Veterinary Journal (January 2008) v. 85 (1) p. 92
Tetanus is caused by the action of a potent neurotoxin produced in the host by Clostridium tetani, an anaerobic gram positive bacteria. A case of tetanus in a six month old Dobermann pup is reported

230 Prameela, D. Rani; Subba Rao, M.V. (College of Veterinary Science, Tirupati (India) Dept. of Microbiology) Comparison of ELISA, DIA AND COAI with HI in detection of antibodies to eds-76 virus. Indian Veterinary Journal (January 2008) v. 85 (1) p. 1- 3 Keywords: ELISA, Diagnosis, Microbiological analysis
The efficacy of ELISA, DIA, COAI were compared with HI test for detection of antibodies to EDS-76 virus. The results of the comparison indicated that ELISA and DIA were 100 percent sensitive and specific. Similarly, for COAI the sensitivity was 100 percent but the specificity was 80 percent. There was a positive correlation between ELISA, DIA and COAI with HI.

231 Thirunavukkarasu, M.; Kathiravan, G. (Madras Veterinary College, Chennai (India) Department of Animal Husbandry,Statistics and Computer Applications) Monetary Losses Due to reproductive Failures in FMD Affected Bovines. Keywords: Foot and mouth disease, bovinae, reproductive performance, losses
This study was conducted to estimate the monetary losses arising due to reproductive failures in FMD affected bovines in four districts of the Cauvery delta zone of Tamil Nadu where there were 213 FMD outbreaks during November 2002-January 2003. A sample of 75 outbreaks was randomly selected and relevant data gathered, analysed. Prevalence of FMD was 16.51 per cent in cattle and 11.01 per cent in buffaloes. Of 76 abortions resulting due to FMD, 70 were in cattle and 6 in buffaloes. Average number of days of abortion from conception was 198 in cattle and 170 in buffaloes. The total value of lost milk was found to be Rs. 582600 in aborted bovines. Value of calves, which would have been born, was found to be Rs. 67200. Total loss due to abortions in FMD affected bovines was calculated to be Rs. 649800. Besides, a total number of 457 female bovines became infertile or repeat breeders. Average number of days an animal remained unconceived after the FMD attack was 413 and 462 in cattle and buffaloes, respectively. The loss due to the value of calves that could have been born was estimated to be Rs. 2.28 lakhs. The estimated value of milk lost due to repeat breeding was found to be Rs. 8.68 lakhs. The loss due to abortion and extended calving interval/infertility was Rs. 6.50 lakhs (37.23 per cent) and 10.96 lakhs (62.77 per cent), respectively (totaling to Rs. 17.46 lakhs) in the chosen 75 outbreaks. Extrapolating this loss to all the 213 outbreaks, the loss could have been Rs. 49.59 lakhs, a significant loss to the farm families.

L74 Miscellaneous Animal Disorders

232 Gahlod, B.M.; Raut, B.M.; Raghuwanshi, D.S.; Dhakate, M.S.; Upadhye, S.V.; Sharma, A.; Wankhade, P.R. (Nagpur veterinary college, Nagpur (India) Department of Veterinary Surgery). Congenital Umbilical defect in kid with intestinal evisceration. Veterinary World (May 2008) v.1(5) p.147. Keywords: goats, Kids,hernia.
Umbilical hernia occurred more often in the females than the males. The incidence of umbilical hernia in the goat was 28.57%. Gender only had an effect the incidence of hernia. Protrusion of abdominal viscera through a congenital defect in umbilical opening may primary hereditary in origin due to dominant gene with low penetration, aoutosomal recessive. Faulty closure of the abdominal opening in the prenatal life results in the protrusion of parts of the abdominal viscera with its serous sac. Such condition can be corrected successfully, provided it should be done immediately to avoid contamination and injury to abdominal viscera.

233 Khan,L.A.; Utage,S.G.; Sontakke, H.S.; Shaikh, A.R.; Khan, K.M.; Qazi M.M.; Siddiqui, Ziyaullah (Nagpur Veterinary College, Nagpur (India)) Male Pseudohermaphroditism in a non-descript calf. Veterinary World (May 2008) v.1(5) p. 148 . Keywords: Calves; Reproductive dirorder

The case was diagnosed as a typical male Pseudohermaphroditism. Teratogenic defects of genitalia in a male calf & proposed that it is due to arrest of genital tubercle in the embryonic or foetal life resulting in lack of complete prolongation of pelvic & penile part of penis .

234 Yadav, G.U.; Thorat, M.G.; Somwanshi, A.G.; Talekar, M.J.(Veterinary College, Udgir (India) Teaching Veterinary Clinical Complex) Thoracic Oesophageal obstruction in a Marathwadi Buffalo. Veterinary World (May 2008) v.1(5) p. 149
The choking was observed by ingestion of leather piece may be due to pica or indiscrimate feeding habit of the animal. The choke may be observed due to ingestion of pieces of leather and plastic which may lodge into thoracic part of oesophagus. The symptoms observed in present case i.e. anorexia, salivation, tympany, regurgitation might be due to obstruction of thoracic part of oesophagus by pieces of leather

235 Dhonde, S. N.; Rasal, T.D.; Chavan, V. V.; Digraskar S. U.; Londhe, S.V. (M.A.F.S.U., Parbhani (India) College of Veterinary & Animal Sciences) Clinico-therapeutic management of Dimethoate-30% (Rogor) poisoning in a non-descript bullock. Veterinary World (June 2008) v.1(6) p. 178-179 Key words: poisoning, bullocks, Dimethoate
A non-descript bullock suffering from dimethoate-30%(Rogor) poisoning was treated using Inj. Dexamethasone, Inj. 2-PAM, Inj. B-complex and Sodium Bicarbonate alongwith fluid therapy, the bullock responded well to the therapy and survived.

236 Bodkhe, A.M.; Khan, L.A.; Raut, P.A.; Chavhan, P.B.; Nakade, M.K.; Pawshe, M.D.; Vyavahare, S.S. (Maharashtra Animal and Fishery Sciences University, Nagpur. (India) Nagpur Veterinary College, Department of Veterinary Clinical Medicine). Parturient Paresis in Crossbreed Cow. Veterinary World (June 2008) v.1(6) p. 181. Keywords: Cows, Digestive Disorder
Parturient paresis is a metabolic disease occurring most commonly within the first 2 or 3 days after calving in dairy cows. It is manifested by tonic and clonic spasms changes in mentation, generalized paresis, and circulatory collapse. The uncomplicated clinical case responds to calcium therapy. However, the cases which are unable to rise after 24 hr and after two treatments are classified as ‘ downers’.

237 Pradhan, M. S.; Waghaye, U, G.; Jadhave, S. G. (Maharashtra Animal and Fishery sciences university, Nagpur (India) Nagpur Veterinary College, Deparment of Veterinary Medicine) Paralytic ileus in a cattle. Veterinary World (June 2008) v.1(6) p. 180
Paralytic ileus is common in cow in late pregnancy or in 1st two week after parturition. It is a state of functional obstruction of intestine was tone and motility of intestine lossed. It occurs as result of reflex inhibition of alimentary tract tone and movement in acute peritonitis. The present report records the case of paralytic ileus in cattle with its successful treatment.

238 Sharma, Shweta; Madhumeet Singh; Vasishta, N K (CSK Himachal Pradesh Agricultural University, Palampur (India)). Isolation and antimicrobial susceptibility of aerobic bacteria recovered from the uteri of dairy cows suffering from endometritis. Indian Journal of Animal

Sciences (March 2009) v.79 (3) p. 278–282 Key words: Aerobic bacteria, Chemotherapeutic agents, Cows, Endometritis, Drugs
Turbid uterine discharges from 238 endometritic cows at estrus, that had failed to conceive despite repeated inseminations, were collected for aerobic bacterial isolations and identification. The isolates were then tested for their sensitivity to various chemotherapeutic agents. Out of 238 uterine discharge samples, bacterial isolates were recorded in 147 (61.76%), while 91 (38.24%) were bereft of bacteria. Out of 147 isolates, 124 (84.4%) were recorded as pure cultures and 23 (15.6%) as mixed infections. Gentamicin and ciprofloxacin were equally efficacious with highest percentage sensitivity recorded as 91.8% each. The % sensitivity to other antibiotics in descending order was: enrofloxacin (83.6), tetracycline (76.8), amoxicillin (70.7), cloxacillin (66.6), streptomycin (55.1) and penicillin (53.7).

239 Rose, M K; Puri, J P; Gupta, M; Goyal, R L; Arya, Suresh Chander; Kar, D (CCS Haryana Agricultural University, Hisar (India))Plasma enzyme profiles in female buffaloes suffering from diaphragmatic hernia and traumatic reticuloperitonitis. Indian Journal of Animal Sciences (March 2009) v.79 (3) p.288–289 Key words: Water Buffaloes, Diaphragmatic hernia, Enzymes, Traumatic reticuloperitonitis
Studies were conducted on buffaloes suffering from diaphragmatic hernia (DH) and traumatic reticuloperitonitis (TRP) with the aim to investigate the effect of these diseases on plasma enzymes. The blood plasma was used to measure AST, ALT, LDH, CK, ALP and ACP enzymes. In the animals suffering from diaphragmatic hernia the AST (P£0.05) and CK (P£0.01) were significantly higher than control animals. The levels of LDH also increased in the diseased cases but the increase was statistically nonsignificant. There was no significant change in the levels of ALP and ACP enzymes. Though the values of AST and LDH and CK enzymes increased in buffaloes suffering from TRP but the increase was statistically nonsignificant. These findings suggest that disturbed metabolism in DH and TRP cases have altered various plasma enzymes. These findings may be useful in diagnosis and possible supportive remedial measures in these disorders.

240 Ghuman, G S; Singh, D V (Guru Angad Dev Veterinary And Animal Sciences University, Ludhiana (India)) Haemodynamics of hypertonic saline and dexamethasone administration during endotoxic shock in buffalo calves. Indian Journal of Animal Sciences (March 2009) v.79 (3) p. 255–257. Key words: Water Buffaloes, Calves, Dexamethasone, Endotoxemia, Hemodynamics, Hypertonic saline
Endotoxic shock was produced in 5 apparently healthy buffalo calves aged between 4 months to 1 year, by i/v infusion of Escherichia coli endotoxin @ 5 mg/kg BW/h for 3h. The endotoxin infusion lead to the development of clinical symptoms of restlessness, respiratory distress, diarrhoea and profuse salivation. The animals closed their eyes and struggled intermittently with the progression of the endotoxin infusion. A highly significant fall in mean systolic, diastolic, pulse, mean arterial pressure (MAP), central venous pressure (CVP), hematocrit and hemoglobin was observed till the end of endotoxin infusion. All the endotoxemic buffalo calves were infused i/v hypertonic saline solution (7.2% NaCl acq.) @4 ml/kg BW in 6.5 min followed by dexamethasone @ 4 mg/kg BW as one time infusion.While CVP returned to normal levels after treatment but at the end of the observation period, it was slightly below normal. The body

temperature varied nonsignificantly during and after endotoxin infusion and the treatment but the respiratory rate increased significantly at 6 and 7 h of observation. The infusion of hypertonic saline and dexamethasone effectively restore the various hemodynamic parameters to normal pre-infusion values although respiration rate remained unaffected.

241 Vijayalakshmi, B; Chandrasekhar, M (Kancheepuram Meenakshi University, Chennai (India) Meenakshi Medical College and Research Institute) Biological effects of oxidants and antioxidants in clinical diagnosis of diseases: A review Indian Journal of Animal Sciences (March 2009) v.79 (3) p. 258–268. Key words: Antioxidants, Free radical, Oxidative stress

Oxidative stress is commonly defined as an imbalance between oxidants and reductants (antioxidants) at the cellular or individual level. Oxidative damage is result of such an imbalance and includes oxidative modification of cellular macromolecules, cell death by apoptosis or necrosis, as well as structural tissue damage. The imbalance can result from a lack of antioxidant capacity caused by disturbance in production, distribution, or by an overabundance of ROS from an environmental or behavioral stress. If not regulated properly, the excess ROS damages polyunsaturated fatty acids found in the cellular membranes, nucleotides in the DNA, and sulfhydril bonds in proteins. Nearly every organ system can be found to have an oxidative stress. Certain organ systems are predisposed to greater levels of oxidative stress. Those organ systems most susceptible to damage are the pulmonary system (exposed to high levels of oxygen), the brain (exhibits intense metabolic activity yet has lower levels of endogenous antioxidants), the eye (constantly exposed to damaging UV light), circulatory system (victim to fluctuating oxygen and nitric oxide levels) and reproductive systems (at risk from the intense metabolic activity of sperm cells). Oxidative damage causes a net stress on the normal body functions and may result in many specific diseases. It also appears to contribute to the general decline in the optimum body functions that is commonly believed to occur as a result of aging process. So, there is a need to continuously monitor the level of oxidants and antioxidants in the body to overcome the oxidative stress. This paper reviews on oxidative stress, counter action of antioxidants, and methods to monitor the oxidants and antioxidants.

242 Gomathinyagam, S.; Jayathangaraj, M.G.; Raman, M.; Bhakyalakshmi, V.; Senthilkumar, K.S. (Madras Veterinary College, Chennai (India) Department of Wildlife Science) Prevalence of haemogregarine species in a rat snake (*Ptyas Mucosus*). Indian Journal of Animal Research (March 2008) v.42 (1)

A few reports on internal parasites particularly the blood parasites in serpentines are available. Presence of haemogregarines in the blood smear from Guindy Snake Park Trust, Tamilnadu is reported. The morphological characters of haemogregarines encountered and the need for routine examination of blood samples of serpentine species are emphasized.

243 Ajeet Kumar; Ghuman, S P S ; Honparkhe, M (Guru Angad Dev Veterinary And Animal Sciences University, Ludhiana (India)) Effect of oral fluid therapy in combination with intravenous extran-40 and hypertonic saline solution on plasma and blood volume in dystocia

affected buffaloes. Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 479–482. Keywords: Water Buffaloes, Dystocia
The present study aimed at improving the hemodynamic status of dystocia affected buffaloes following administration of small volume of hypertonic saline (hss) and dextran-40 through intravenous route combined with large volume of freshwater through oral route. Depending upon the fluid therapy given to dystocia affected buffaloes following fetal delivery, the animals were divided into group 1 (normal saline solution, nss 5 l, n=4), group 2 (7.2% hss @ 4 ml/kg + oral fluid 25 l, n=6) and group 3 (7.2% hss @ 4 ml/kg + dextran-40 @10 ml/kg + oral fluid 25 l, n=11). Blood samples were collected at the arrival of dystocia case, at the start of fluid therapy, at the end of fluid therapy (0 h) and at the 6 and 15 h after the end of fluid therapy. Compared to nss group, administration of oral fluid and hss significantly increased plasma and blood volume, however, with addition of dextran-40 significant increase in plasma and blood volume was sustained till 15 h post-fluid therapy. In summary, administration of freshwater through oral route and hss and dextran-40 through intravenous route could be a quicker, practical, easy and effective method for resuscitating the dystocia affected buffaloes suffering from variable degree of toxaemia and hypovolemia.

244 Roychoudhury, P; Dutta, T K (Central Agricultural University, Aizawl (India)) Prevalence and antibiotic sensitivity pattern of bacteria from bovine mastitis in Mizoram Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 483–485. Key words: Cattle, Drug resistance, Mastitis
Bacterial species (256) were isolated and identified from 140 clinical and subclinical mastitic milk samples from cattle in Mizoram. *Staphylococci* (116) was predominant causal agent followed by *Streptococci* (12), *Proteus* (7), *E. coli* (4), *Micrococci* (3) and *Pseudomonas* (2). A majority of the isolates were non-pathogenic anthracoides (112). Gentamicin and enfrofloxacin were the most effective antibiotics followed by streptomycin, tetracyclin, amikacin, norfloxacin, cloxacilin, carbenicilin and kanamycin in descending orders. Most of the isolates exhibited a high level resistance against other antibiotics.

245 Nath, R. (AAU, North Lakhimpur (India) Lakhimpur College of Veterinary Science, Department of Animal Physiology and Biochemistry) Changes in the serum enzymes during experimental aflatoxicosis in broiler chicken. Indian Veterinary Journal (January 2008) v. 85 (1) p. 10-12. Keywords: Broiler Chickens, Aflatoxicosis
Feeding aflatoxin at the rate of 2ppm to a day old chicks till 60 days, increased the activities of AST, ALT, ALP and LDH significantly ($P < 0.05$) at all the age groups. ACP activity was significant only on the 15th day while AchE activity did not increase significantly. It is concluded that estimation of enzyme activity may help in the early diagnosis of aflatoxicosis in birds

246 Tiwari, S.K.; Sharda, Raju; Mishra, U.K. College of Veterinary Science and A.H., Durg (India) Department of Veterinary Surgery and Radiology). Intestinal obstruction due to rectolith in a Daschund dog. Indian Veterinary Journal (January 2008) v. 85 (1) p. 73-74. Keywords: Dogs, intestinal Obstruction
A rare case of rectolith in a ten year old Daschund male dog and its successful surgical management has been reported.

247 Singh, R.S.; Chand, N.; Sidhu, S.S. (Guru Angad Dev Veterinary and Animal Science University, Ludhiana (India) Department of Veterinary Services Complex) Cholecystitis in a dog. Indian Veterinary Journal (January 2008) v. 85 (1) p. 77-78
Cholecystitis is inflammation of gall bladder usually accompanied by Cholangitis or cholangiohepatitis. It is caused by bacteria ascending from the intestine via the common bile duct or by hematogenous seeding. Present communication reports a case of cholecystitis in a dog and its successful treatment.

248 Gupta, Kuldip; Prahlad Singh; Amarjit Singh; Singla, V.K.; Sood, Neeraj; Goyal, Dimple; Bineesh, P.P.; Sood, N.K. (Guru Angad Dev. Veterinary Animal Sciences University, Ludhiana (India) College of Veterinary Science, Department of Veterinary Pathology) Leiomyoma of the vagina with recurrent vaginal prolapse in a cow. Indian Veterinary Journal (January 2008) v. 85 (1) p. 93-94.
Leiomyomas are the common tumors of tubular genitalia of bitches (Jones et al., 1997), but occur rather occasionally in the genital tract of other species including cattle. The present communication reports a rare case of leiomyoma in the vagina of a cow resulting in vaginal prolapse.

M12 Aquaculture Production and Management

249 Johal, M S ; Rawal Y K (Panjab University, Chandigarh (India)) Reliability of sagittae of an endangered Himalayan sport fish *Tor putitora* (Hamilton) for age determination employing SEM technique. Indian Journal of Animal Sciences (May 2009) v. 79 (5) p. 534–537 Keywords: Tor putitora Age, Morphometry, SEM,
The sagitta, one of the ear ossicles of the Himalayan mahseer *Tor putitora* (Hamilton) has been studied using optical and Scanning Electron Microscope (SEM) to ascertain its use in age determination. It has been found that it is possible to distinguish focus region, larval mark, winter mark, false mark and the annulus by employing the above technique. Methods to measure the annuli present on the sagitta for the determination of the back calculated lengths has been suggested.

250 Shanju, S.; Geraldine, P. (Bharathidasan University, Tiruchirapalli (India) Department of Animal Science). Immunological Identification of Site of Vitellin Synthesis in Freshwater Prawn Macrobrachium malcolmsonii .Journal of Applied Animal Research (September2009) v. 36(1)
The site of vitellin synthesis in the freshwater prawn, *Macrobrachium malcolmsonii*, was examined immunologically using the antibodies raised against the vitellin purified from mature ovaries of *M. malcolmsonii*. In double diffusion test, single precipitin lines were found between center well containing immune serum and peripheral wells containing purified vitellin, ovarian homogenate, female hepatopancreas and female hemolymph. The precipitin lines were continuous suggesting that immune serum precipitated the proteins of complete identitiy.

Immunoelectrophoretic and immunoblotting studies reveal positive reaction in ovary, egg, female hemolymph and female hepatopancreas but not in male hemolymph, male hepatpancreas, gill and muscle. These results suggest hepatopancreas as possible site of yolk protein synthesis in freshwater prawn *M. malcolmsonii*.

Q01 Food Science and Technology

251 Padghan, P.V.; Joglekar, N.V.; Thombre, B.M.; Khandare, N.O.; Jinturkar, A.S. (Marathwada Agricultural University, Parbhani (India) Department of Animal Husbandry and Dairying). Comparative studies on physico-chemical properties of marathwadi buffalo milk. Indian Journal of Animal Research (March 2008) v.42 (1)
The Marathwadi buffaloes inhabit Marathwada region particularly the district of Parbhani, Beed, Jalna and part of adjoining districts of Maharashtra State. Marathwadi buffaloes on account of the sizable population contributes significantly to the economy of the farmers. The studies on physicochemical properties of Marathwadi buffalo milk recorded the mean values for specific gravity, acidity and pH at 1.031 + 0.001, 0.154 + 0.001 and 6.544 + 0.007, respectively. Highly significant correlation coefficients existed for the specific gravity and acidity. The comparative differences in these parameters with those of Nagpuri buffalo milk were minimum.

252 Subramanian, P.; Ora, Pavan Kumar (Maharana Pratap University of Agriculture and Technology), Udaipur (India) College of Dairy & Food Science Technology, Department of Dairy and Food Microbiology) Biochemical Characterization of Leuconostoc Spp. Isolated From Raw Milk. Indian Journal of Dairy Science (Sept-Oct 2007) v. 60 (5). Keywords: Milk, Leuconostoc, biochemical tests
Sixty five strains of Leuconostoc spp. of dairy origin were isolated from raw milk samples. Physiological and biochemical traits of each isolate were studied and characterized. Special attention was given to those Leuconostoc isolates that could metabolize citrate, produce dextran or ferment selected carbohydrates. Leuconostoc species identified were L. dextranicum, L. mesenteroides, L. paramesenteroides, L. lactis and L. cremoris.

Q02 Food Processing and Preservation

253 Ghosh, Bikash C.; Jayaraj Rao, K.; Balasubramanyam, B. V.; Kulkarni, Satish (National Dairy Research Institute, Bangalore (India) Dairy Technology Section). Process Standardization and Shelf life Evaluation of Chhana Podo. Indian Journal of Dairy Science (Sept-Oct 2007) v. 60 (5). Keywords: Milk products, baking , preservatives, Keeping quality
Chhana podo is an indigenous milk based sweet prepared by baking . The product is commonly prepared in Orissa by using chhana, maida/suji and sugar. It has pleasant cooked flavour and rich taste with cake like body & texture. Attempts were made to standardize the production of chhana podo. Between the two binding agents used at 5 or 10% (based on chhana), suji at 5% level was adjudged most suitable for podo production. Baking temperature of 2000 C for 65

min. in an aluminum tray with dough thickness of 2 - 2.5 cm resulted in a uniformly baked product. The optimum sugar level was found to be 30% of chhana for the desired sweetness. About 12-15% of moisture evaporated during baking. Chhana podo packed in polyethylene pouches recorded a shelf life up to 4 and 30 days at 370C and refrigerated temperatures, respectively. Vacuum packaging increased the shelf life by 2-3 days at 370C. Incorporation of 0.1% potassium metabisulphite and potassium sorbate in the dough increased the shelf life up to 8 days at 37oC. Spoilage of podo was observed to be due to the white, green and black mould growth on the surface.

Q03 Food Contamination and Toxicology

254 Choudhary, P.L.; Sahu, Chandrahas; Kushal, Sandey (I.G.A.U., Raipur (India) College of Dairy Technology, Department of Dairy Chemistry) Aflatoxin M1 in Milk and Milk Products in Different Localities of Chhattisgarh. Indian Journal of Dairy Science (Sept-Oct 2007) v. 60 (5). Keywords: Aflatoxins, Milk, HPLC, Milk Products

Five hundred and sixty seven milk samples collected from 17 localities and 543 milk products collected randomly from 13 districts of the Chhattisgarh State during the period of January 2000 to November 2002 were analyzed for aflatoxin M1 (AFM1). The study revealed that 72% of the samples were contaminated with AFM1 with an average level of 0.9986 mg/L (ranging from 0.0103-3.3094 mg/L). Out of the 17 localities, in ten localities less than 75% of samples were contaminated with AFM1 and in seven localities more than 75% samples were contaminated with AFM1. All the samples of milk products were contaminated with Aflatoxin M1 with values more than the limit given by FDA (0.50 mg/kg).

255 Aurora, Ritu ;Alka Prakash; Sant Prakash(Dayalbagh Educational Institute, Agra (India) Department of Zoology)A Comparative Study of Conventional Culture and PCR Method for the etection of Listeria monocytogenes From Artificially Inoculated Milk. Indian Journal of Dairy Science (Sept-Oct 2007) v. 60 (5). Keywords: Listeria monocytogenes, Bacterial toxins ,Milk, PCR,CellCulture

A comparative study of the conventional culture and PCR method for the detection of artificially inoculated Listeria monocytogenes from milk was conducted. Sensitivity increased appreciably after enrichment in modified University of Vermont Medium-2 (MUVM-2) by both the methods. However, conventional culture method was found to be more sensitive than PCR as it could detect a milk sample having L. monocytogenes count as low as 30 CFU/ml whereas PCR could detect a milk sample having a cell count only upto 3x103 CFU/ml after 24 hours of enrichment. PCR could detect as low as 7-8 bacteria per reaction based on the reaction volume used. Thus, PCR may be a preferable method for the detection of L. monocytogenes while screening a large number of samples, as it is rapid, less laborious, quite economical and reliable.

Q52 Feed Processing And Preservation

256 Behura, N.C.; Dehuri, P.K.; Mishra , S.K.; Samal, P.C. (Orissa University of Agriculture and Technology, Bhubaneswar (India) Faculty of Veterinary Science and Animal Husbandry, Department of Animal Nutrition). Processing of simaruba (Simarouba glauca) oil cake for detoxification and its evaluation in broiler chicken. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 245-252 Keywords: Quassia, Simaroubaceae, oilseed cakes, Detoxification, Broiler, Feeding

Ten physical, chemical and physico chemical methods were tried to detoxify the Simaruba oilcake (SOC) which is a very rich source of protein and contains a bitter toxic constituent known as quassinoids making it unsuitable for livestock and poultry feeding. The crude protein and crude fibre contents of the processed samples were 49.5 and 18.45, 47 and 18.85, 48.02 and 16.49, 61.98 and 7.59, 62.34 and 7.34, 42 and 18.51, 46 and 19.23, 40.20 and 12.12, 59 and 12.45 and 62.8 and 7.83 percent, respectively, for the soaking, fermentation, boiling, roasting, autoclaving, HCl treatment, acetic acid treatment, NaOH treatment, methanol extraction and roasting following ammonia treatment. Treatment with acids, alkali as well as water resulted in loss of dry matter, reduction in protein content and increases in crude fibre content of the SOC. The processed oilcakes were evaluated through a biological trial by incorporating it at 10% level in broiler diet. The growth, feed efficiency and mortality were compared with the control. The average sixth week body weight of the T_1 (control), T_2 (SOC), T_3 (soaked SOC), T_4 (fermented SOC), T_5 (boiled SOC), T_6 (roasted SOC), T_7 (autoclaved SOC), T_8 (HCl treated SOC), T_9 (acetic acid treated SOC), T_{10} (NaOH treated SOC), T_{11} (alcohol extracted SOC), and T_{12} (NH_3 treated and roasted SOC) groups were 1944, 198, 496, 604, 399, 1203, 367, 681, 916, 412, 775 and 1681 g, respectively. The FCR and mortality of the T_{12} group was comparable with the control though the 6^{th} week body weight of all the treatments differed significantly from the control. It was concluded that ammonia treatment followed by roasting of the oilcake was found to be a suitable method of detoxification of the oilcake without much adverse effect on its nutrient composition

257 Parminder Singh; Gupta, V.K.; Sikka , S.S.; Sethi, A.P.S.; Chawla , J.S. (Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (India) Department of Animal Nutrition) Studies on improvement in the nutritive value of poultry droppings by fungal fermentation. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 265-272. Keywords : Broiler chickens, **Faeces**, fermentation, Nutritive value.

An attempt was made to reduce the uric acid of poultry droppings by solid state fermentation using Alternaria sp-1 and 2, Aspergilus sp-1 (AP-1), Coprinus sp, Fusarium moniliformis, Pencillium sp, Rhizopus sp, Trichoderma reesei (TR-9123 and TR-9414) fungal species. TR–9414 and Alternaria sp-1 had maximum growth and penetration. Fermentation reduced crude fibre and uric acid. AP–1 fermented droppings had minimum uric acid. Fermentation with AP–1, Fusarium moniliformis and TR– 9414 increased crude protein. Screening of AP–1, TR–9123 and TR–9414 further indicated that AP-1 had significantly ($P<0.05$) less organic matter but TR–9414 had significantly ($P<0.05$) more ether extract. Crude fibre in AP-1 fermented droppings was significantly ($P<0.05$) less than TR–9123. Similarly TR–9123 had significantly ($P<0.05$) less crude

protein. However AP-1 had significantly (P<0.05) more true protein. Fermentation time significantly (P<0.05) affected the nutrient contents. Pepsin-trypsin digestibility in TR–9414 fermented droppings was significantly (P<0.05) more than in AP-1 fermented poultry dropping. Irrespective of the fungi fermentation time significantly (P<0.05) affected in-vitro digestibilities. Pepsin-trypsin digestibility was significantly (P<0.05) more in TR–9414 than AP-1 fermented poultry droppings. It was concluded that fermentation for ten days significantly (P<0.05) decreased crude fibre and uric acid with increase in true protein and nitrogen free extract of poultry droppings.

T01 Pollution

258 Roy, Debashis; Mani, Veena; Kaur Harjit; Kewalramani, Neelam (National Dairy Research Institute, Karnal (India) Dairy Cattle Nutrition Division) Status of arsenic and mercury in different sources of water in Haryana. Animal Nutrition and Feed Technology (July 2008) v.8 (2) p. 273-278 Keywords : Mercury, Arsenic, Water, Haryana.

To assess As and Hg status in water samples in Haryana, 163 samples from different sources were collected randomly from different locations from all the 19 districts covering industrial and nonindustrial areas. The data obtained was classified into two zones as per agro-climatic conditions of different districts. The As content in hand pump and tube well samples in different districts averaged 4.39±0.21 and 4.18±0.31 ppb in zone I and 4.66±0.51 and 4.27±0.19 ppb in zone II respectively, showing no significant difference between the two zones. There was no difference in the arsenic content of water samples collected from industrial and non industrial areas. Arsenic content in all the water samples (except 2 samples) was below maximum contamination level (MCL) of 10 ppb. The mean concentration of Hg in hand pump and tube well water samples was 2.19±0.57 and 2.33±1.04 ppb in zone I and 1.17±0.23 and 1.47±0.19 ppb in zone II, respectively, showing significantly (P<0.05) higher levels in zone I in both the sources of water. The level of Hg was higher than MCL in industrial areas. It can be concluded from the present survey that arsenic content was within the safe limits in almost all the water samples, but, mercury content in water samples collected from various sources in some of the industrial districts was higher than MCL.