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L01 Animal Husbandry

001 Singh, M. (Krishi Vigyan Kendra, Banasthali Vidyapith (India)); Chauhan. A. (Janta Vedic College, Baraut (India) Department of Dairy Science and Technology); Subhash Chand (Krishi Vigyan Kendra, Bikaner (India)); Garg, M.K (Krishi Vigyan Kendra, Anta (India)). Identifying existing breeding and feeding practices as followed by the dairy owners in Rajasthan. Indian Journal of Animal Research (Mar 2007) v. 41 (1) Keywords: Dairy farms; Animal husbandry methods

The study on status of breeding and feeding practices followed by the dairy owners in Rajasthan was conducted in Tonk and Jhunjhunu districts. 720 respondents equally divided in both the districts constituted the total sample size. It was observed that majority of the farmers preferred natural method of mating and did not prefer pregnancy diagnosis and treatment of repeater and anestrus animals by veterinarian. In respect of feeding, majority of the farmers fed home prepared ration in soaked form, followed supplementary feeding during advance stage of pregnancy. It is astonishing to note that 61, 91 and 51 per cent sampled families did not follow feeding common salt, mineral mixture and optimum quantity of concentrates in that order.

002 Korde, J.P.; Kumar, A.; Patel, M.; Rastogi, S.K. (G.B. Pant University of Agriculture and Technology, Pantnagar (India) Department of Veterinary Physiology) Effect of light source and photoperiods on growth and health performance in broilers. Indian Journal of Animal Research, (Mar 2007) v. 41 (1) Keywords: Broiler chickens; growth performance; photoperiods

The present study was conducted to observe the effect of light source and different photoperiods on the growth rate and feed efficiency in broiler chicks during February to March at Pantnagar. Initially, the day old chicks in group "A" (n= 288) were exposed to fluorescent light of 30–40 Lux and chicks in group "B" (n= 283) were exposed to incandescent light of 120–150 Lux for 24 h continuous light during first week of experiment. In the 2nd and 3rd week, they were exposed to 23 h Light (LL) and 1 h Dark (DD) (LL 23: DD 1). In the 4th and 5th week, birds from group "A" were divided into four groups (n= 65 each) and exposed to LL 23: DD 1, LL 20: DD 4, LL 18: DD 6 at 15–20 Lux and natural photoperiod of LL 13: DD 11 at 50–70 Lux. The results indicated that the fluorescent light of 30–40 Lux during first three weeks of experiment showed significant increment in growth rate and improve feed conversion efficiency compared to the birds maintained in the incandescent light of 120–150 Lux. The last three weeks experiment indicated that, the 4–6 h of dark phase helps to improve the production performance in birds compared to 1 h or 11 h dark phase.

003 Mondal, B.; Loganandhan, N.; Channabasappa, K. (Central Soil and Water Conservation Research and Training Institute, Research Centre, Bellary (India)) Economic aspects of livestock

enterprise in a semi-arid watershed. Indian Journal of Animal Research, (Mar 2007) v. 41 (1)
Keywords: Animal production; Farms; Economic analysis; Semiarid zones

Study was conducted in a semi-arid watershed with the objective to analyse the economic aspects of livestock enterprise. The study revealed that expenditure on feed and fodder and family labour formed the chunk among the different cost components. Average maintenance cost and returns from buffalo was highest compared to other type of animals. Labour use pattern reveals that the human labour input in livestock rearing was mostly family labour. The gross income per animal during a year was Rs. 4195.31 from cow and Rs. 6276.67 from buffalo inside watershed and the same was Rs. 4229.50 and Rs. 6412.00 outside the watershed. The results showed that there was little influence of watershed management programme over the yield and costing aspects of livestock enterprise.

004 Bainwad, D.V.; Deshmukh, B.R.; Chauhan, D.S.; Thombre, B.M. (College of Agriculture, Latur (India) Department of Animal Husbandry and Dairying). Study on udder characteristics of buffaloes with socio-economic status of owners in Marathwada. Indian Journal of Animal Research, (Mar 2007) v. 41 (1) Keywords: Water buffaloes; Mammary glands; Animal health; Farms

The survey was conducted under watershed area for 200 dairy farmers rearing Marathwadi, Pandharpuri and Surti buffaloes by personal interviews and judging the udder, teat and milk vein characteristics of buffaloes. The results indicated that most of the farmers are young and hard working (38.50 per cent). Marathwadi (44.04 per cent) and Pandharpuri (43.24 per cent) breed has predominantly bowl and Surti pendulous (41.18 per cent) shape of udder, respectively. Medium size fore udder (66.00 per cent) and large size rear udder (56.50 per cent) was recorded maximum in all buffaloes. The cylindrical teat shape (53.50 per cent), wide placement of teat at back (52.50 per cent) and medium size milk veins (61.50 per cent) were mostly recorded in all breeds of buffaloes. In the surveyed area Marathwadi buffaloes (54.50 per cent) population was higher as compared to Pimdluirpuri (37.00 per cent) and Surti (8.50 per cent).

005 Raju, D. Thammi; Rao, B.S.; Gupta, B.R. (Acharya N. G. Ranga Agricultural University, Hyderabad (India) College of Veterinary Science). Knowledge level of commercial poultry farmers. Indian Journal of Animal Research, (Mar 2007) v. 41 (1) Keywords: Poultry farming; Farmers

An ex-post facto research design was adopted to study the knowledge level of commercial poultry farmers and the factors influencing the same. It was revealed from the data collected from 70 commercial poultry farmers (layer + broiler) of Rangareddy district of Andhra Pradesh that majority of the layer and total farmers had high knowledge, while majority of broiler farmers had medium knowledge on poultry production. The factors such as scientific orientation in case of layer farmers; education, economic motivation, computer awareness in case of broiler farmers; poultry farm size, income and computer awareness in case of total farmers, were found to be significantly related to the knowledge level. The step down regression analysis revealed that urban contact and scientific orientation in case of layer

farmers; education occupation, rationality in decision making, computer awareness in case of broiler farmers; urban contact, scientific orientation and computer awareness in case of total farmers had accounted for maximum variation in the knowledge level. Hence these factors are to be exploited in increasing the knowledge level of poultry farmers.

006 Tanwar, P.S.; Vaishanava, C.S.; Jain, L.S. (Rajasthan College of Agriculture, Udaipur (India) Department of Animal Production) Studies on housing and breeding management practices adopted by goat owners in tribal area of Udaipur district. Indian Journal of Animal Research, (Mar 2007) v. 41 (1) Keywords: Goats; Animal husbandry methods

Study was conducted in 6 villages of Udaipur district of Rajasthan. Personal interview schedule was constructed on randomly selected 120 goat owners from two tribal tehsil i.e. Mavli and Jhadol. Data were collected and analysed. The profile of the sample respondents in the study revealed that majority of the respondents were belonged to Schedule Tribe, illiterate and medium size of family. Goats housed near dwelling, loose housing as well as open yard is common housing practices adopted by respondents. Bellowing is main symptom known by respondents for heat detection. Mounting on other goats and frequent urination is less known. Flock mating is adopted, non-descript community buck was used for breeding purpose. Animal come in heat generally during monsoon season. Single birth was common and placenta was disposed off either by throwing or by burying in heap of dirt.

007 Sampath, K T; Chandrasekharaiah, M; Praveen, U S (National Institute of Animal Nutrition and Physiology, Bangalore (India)).Improving production performance of dairy animals in the villages by strategic supplementation – On farm trial. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 522 –526. Keywords: Maize grain, Milk yield, Milk composition, On-farm trial, Strategic supplementation

Two on-farm lactation trials of 8 months duration each were conducted in villages, Anagalpura and Menesi, respectively of Doddaballapura taluk of Bangalore district in Karnataka state to study the effect of strategic supplementation on the basal diet in lactating crossbred cows. On-farm trials in each village were divided into 2 phases based on the availability of basal roughage (phase 1: local green grass + finger millet straw; phase 2: local green grass alone). Phase 1 lasted for 5 months followed by phase 2 continuously for 3 months duration. Crossbred cows (22) yielding 8 to 10 litres of milk/day, were divided into 2 groups (control and experimental) of 11 each in Anagalpura village and 16 crossbred cows (8 to 10 litres milk/day) were divided into 8 each in Menesi village based on lactation number, milk yield and days after calving. In both the villages, the cows in control group were fed with supplements of groundnut cake and wheat bran as practised by the farmers in phase 1 and 2. Animals in experimental group (in both the phases) were fed supplements, viz. groundnut cake, wheat bran and maize grain by replacing part of wheat bran in this group. The animals in both the groups were fed the basal roughage as mentioned in phase 2 and 1. The average milk yield/day in experimental group was significantly higher than those in control group in Anagalpura and Menesi villages. Milk fat, total solids and SNF were significantly higher in experimental group than that in control group irrespective of the phases in both the villages. The farmers income increased by Rs 15.73 and Rs

11.59/cow/day respectively, in phase 1 and 2 in Anagalpura and Rs 8.95 and Rs. 16.98/cow/day respectively, in phase 1 and 2 in Menesi villages by improved method of feeding. The study indicated that strategic supplementation of limiting nutrients i.e. energy through maize grain to the local available basal diets increased milk yield and had a positive effect on milk composition. Hence it was demonstrated that with minimum alternation in the existing feeding practices by scientific intervention, the farmers income can be increased through enhanced milk production.

008 Das, A.K.; Gopal Dass; Singh, N P (Central Institute for Research on Goats, Makhdoom (India)) Growth, carcass characteristics and meat quality of Muzaffarnagari lambs at various stages under intensive and semi-intensive management. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 541–546 Key words: Age, Carcass traits, Growth, Lambs, Meat quality, Management system

Male Muzaffarnagari lambs (28) were reared under intensive and semi-intensive management system, to assess their growth attributes, carcass characteristics and meat quality. Average daily weight gains were significantly higher in the intensive management system in the age group of 2–6, 6–9 and 2–9 months, respectively. Lambs reared under intensive system attained 35.27 kg slaughter weight as against 22.52 kg at 6 months of age leading to 56.62% increase in slaughter weight, whereas at 9 months of age, it was 44.22%. Hot carcass weight and dressing% were significantly higher in lambs managed under intensive system in both the age groups. Carcass measurements including breast fat and back fat thickness, GR measurement, leg circumference and loin eye area were also different between the management systems in both the age groups. Similarly the depot fat weight was significantly higher under intensive management system in both the age groups. Percentage of separated lean and fat significantly increased and bone% declined significantly in the carcass of intensively managed lambs for 6 months compared to semi-intensively commensurating with significantly higher back fat and breast fat thickness in the carcass of former group. Meat physico-chemical qualities pH, water holding capacity and cooking loss were not significantly different between management systems and in both the age groups. The meat of intensively managed lambs had significantly lower moisture and higher fat content but similar protein and ash contents compared to meat of semi-intensively managed lambs in both the age groups. Carcass chemical fat (CCF), total body fat (TBF) and fat free carcass weight were significantly higher in meat of lambs managed under intensive system at 6 months of age, whereas at 9 months of age, CCF, TBF and fat free carcass weight were still higher in meat of intensively managed lambs. It was concluded that Muzaffarnagari sheep are more suitable for quantity and quality mutton production at 6 months of age and targeting for production of heavier weight carcass for more meat production would be uneconomical.

009 Surendra Singh; Bhar, L M; Paul, A K (Indian Agriculture statistical Research Institute, New Delhi (India)) Growth pattern of crossbred cattle under homoscedastic and heteroscedastic error variance condition. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 560–564 Keywords: Double cross, Growth models, Heteroscedasticity, Homoscedasticity

Different growth models are fitted in growth data for Friesian×Sahiwal breed at Agra station. Gompertz model gave better fit than Logistic model. The GLS estimates are found to be more precise than OLS estimates for both Logistic as well as Gompertz model under heteroscedastic error condition.

010 Shine, S.B.; Jagtap, D.Z.; Dhane, Y.H. (College of Agriculture, Pune (India)) Studies on lifetime production traits at year basis in phule triveni crossbred cattle. Journal of Maharashtra Agricultural Universities. (Jan. 2004). p. 078-081 KEYWORDS : CROSSBREDS; AGE; PRODUCTION; CATTLE; STATISTICAL METHODS

The least square means of milk yield at 6 years of age (MYA6Yr), milk yield at 8 years of age (MYA8Yr), milk yield at 10 years of age MYA10Yr), were 10009.98 kg, 16211.00kg and 22006.97 kg, respectively. The period of calving significantly influenced milk yield at 6 years (MYA6Yr) and milk yield at 8 years (MYA8Yr). Non significantly effect of season of calving and weight at first calving group were observed on all the lifetime production traits, which were taken under the investigation. The correlation between weight at first calving with all reproduction traits were negative and regression of age at first calving on milk yield at 6 years of age was significant.

011 Das, S.K.; Tripathi, Hema (Indian Veterinary Research Institute, Izatnagar (India) Krishi Vigyan Kendra) Livestock feeds and feeding practices in rural Sundarbans Delta of India . Animal Nutrition and Feed Technology (Jan 2008) v.8(1) Keywords: Livestock; Feeds; animal Feeding

The aim of the study was to explore, understand and document livestock feeds and feedings practices traditionally followed by the rural people in Sundarbans delta of India A qualitative participatory case study design was used for the present study with an anthropological approach to field research in the four identified villages. Various tools of participatory rural appraisal like semi-structured interview, micro-environment mapping, listing, on-site observation, seasonal analysis, and photography were applied for generation, collection, and documentation of various issues from local people's perspectives. The study reveals that livestock feeding mainly consists of grazing complemented and supplemented with stall feeding. Grazing or tethering contributed bulk of the feed. Stall feeds mainly comprised of paddy and its byproducts. Grazing practices varied with the sowing and harvesting time of paddy, and also with the intensity of cropping. Grazing starts freely in the agricultural field after harvesting of wet paddy (November to January) and continued until sowing (May to July). Tethering starts from sowing and continued till harvesting. Movement of domestic fowls was restricted mainly at the time of wet paddy sowing. The study provided valuable information that may be taken into consideration while planning an extension intervention in order to improve the situation. Many locally available grasses and plants can effectively and efficiently be utilized as valuable livestock feeds which presently remain unutilized. Seasonality of feed scarcity may be overcome to some extent by adopting the practice of hay feeding.

L02 Animal Feeding

012 Raj Kumar; Sharma, B.K.; Sharma, L.L. (Maharana Pratap University of Agriculture and Technology, Udaipur (India) Rajasthan College of Agriculture, Department of Limnology and Fisheries). Impact of *Glycyrrhiza glabra* linn. as growth promoter in the supplementary feed of an indian major carp *Cirrhinus mrigala* (Ham.). Indian Journal of Animal Research, (Mar 2007) v. 41 (1) Keywords: **Cirrhinus mrigala; Glycyrrhiza glabra; Plant growth substances; Supplementary feeding**

In this experiment, the roots of a herb mulethi (*Glycyrrhiza glabra* Linn.) were mixed with the supplementary diet (groundnut oil cake and rice bran in 1:1) of fish at three different levels and fed to the fingerlings of an Indian major carp *Cirrhinus mrigala* (Ham.) in the glass aquaria. Mulethi was mixed with the conventional diet @ 0.1% (T₁), 0.2% (T₂) and 0.3% (T₃) and control diet was kept without mulethi. Experimental diets including control were fed @ 2 per cent body wt. of fish per day for 60 days. The fingerlings fed with diet T₃ (containing mulethi @ 0.3%) gave the highest growth (weight gain) of 24% where as fingerlings fed with diet T₁, T₂ and C (control) diets showed the weight gain of 18.52%, 20.37% and 12.77%, respectively. Analysis of variance indicated that the growth per day in per cent body weight, average wt. gain, food conversion ratio (FCR), gross conversion efficiency (GCE) and specific growth rate (SGR) were significantly higher (P<0.05) in all the three treatments as compared to control.

013 Gupta, A.K.; Singh, C. (Maharana Pratap University of Agriculture and Technology, Udaipur (India) College of Fisheries, Department of Aquaculture). Efficacy of copper as a micronutrient for the fingerlings of *Heteropneustes fossilis* (Bloch) .). Indian Journal of Animal Research, (Mar 2007) v. 41 (1) Keywords: **Heteropneustes fossilis; micronutrients**

Dietary copper requirement for the fingerlings of *Heteropneustes fossilis* was evaluated using isocaloric purified diet, supplemented with graded levels of copper {i.e. 0 (control), 1, 3, 5, 7 and 9 mg/kg}. Significant growth parameters, viz., weight gain, specific growth rate (SGR) and gross conversion efficiency (GCE) were noted with lowest food conversion ratio (FCR) at a level of 3 mg Cu/kg diet. Fingerlings fed with Cu-deficient diet showed sign of sluggishness and poor growth with low specific growth rate, gross conversion efficiency and high food conversion ratio. Fingerlings fed with Cu-supplemented diets were found to improve protein, fat and carbohydrate contents. Significant RBC count in fingerlings was recorded at 3 mg Cu/kg diet.

014 Chandrasekharaiah, M; Sampath, K T; Praveen, U S (National Institute of Animal Nutrition and Physiology, Bangalore (India)). Effect of feeding bypass protein on milk production performance in crossbred cows. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 527–530. Key words: Bypass protein, Concentrate mixture, Milk yield and composition, On-farm trials

On-farm lactation trial of 4 months duration was conducted in Anagalpura and Menesi village of Doddaballapura taluk, Bangalore district in Karnataka state to study the effect of feeding bypass

protein (UDP) on the milk production performance of crossbred cows. Crossbred cows (24) yielding 8 to 10 litres of milk/day were divided into 2 comparable groups (control and experimental) of 12 each based on lactation number, milk yield and days after calving. Cows in control group were fed a concentrate mixture (CMC) which contained 37% of CP as UDP (bypass protein), while those in experimental group were fed a concentrate mixture (CME) containing 50% CP as UDP. The animals in both the groups were fed *ad lib.* local mixed grass as the major source of roughage. The average milk yield per day in experimental group was significantly higher than those in control group. The milk fat, SNF and total solids were significantly higher in experimental animals than in control group animals. The milk yield was increased by 1.07 litres, feed cost was reduced by Rs 2.20 and the overall income of the farmers was increased by Rs 12.40/cow/day in experimental group. The study indicated that feeding of bypass protein increased quantity and quality of milk in cows producing 8–10 litres milk/day on local mixed grass based diets.

015 Dutta, T K ; Kundu, S S (National Dairy Research Institute, Karnal (India)) Response of mixed viable probiotics culture on milk production and nutrient availability in crossbred mid lactating cows. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 531 –535 Key words: Cow, Intake, Milk yield, Probiotics

Effect of feeding probiotics culture in triple combination (*Saccharomyces cerevisiae*, *Lactobacillus plantarum* and *Enterococcus faecium*; ratio 6: 2: 2, total dose 10×10^9 cfu/animal) to crossbred mid lactating cows was studied to observe the lactation performance and nutrient utilization. Dry matter intake (DMI)/100 kg body weight tended to increase due to inclusion of probiotics culture and significant between control (T₁) and treatment groups (T₂) in second (P<0. 01), fourth and sixth fortnights. Crude protein intake (CPI)/100 kg body weight was not affected due to probiotics supplementation. Addition of probiotics increased milk yield (kg/day/animal) significantly from 10.16 kg in T₁ to 10.60 kg in T₂. Fat corrected milk (FCM) (kg) yield was also increased significantly due to probiotics supplementation from 9.94 kg (T₁) to 10.34 kg/day (T₂). The milk production efficiency (kg milk/kg DMI) was higher in T₂ (0.90) than T₁ (0.88). Probiotics supplementation had no impact on milk fat percentage in milk. Total milk solid, protein and milk ash per cent remained unaffected due to mixed culture supplementation. Digestible organic matter (DOM) intake and TDN intake per kgW^{0.75} were significantly higher in T₂ over T₁. Digestible crude protein (DCP) intake/W^{0.75} kg followed the same trend; 4.25 MJ extra ME and 2.24 MJ NE were consumed by probiotics supplemented animals at similar level of DMI in both the groups, which could be the reason for higher milk yield due to probiotics addition.

016 Sultan Singh; Theodorou, M K; Katiyar, D S; Prasad, S V S; Mishra, U S; Pandey, K C; Bhaskar, R B; Verma, O P S (Indian Grassland and Fodder Research Institute, Jhansi (India)). Relative intake, nutrients utilization, nitrogen balance and fermentation pattern in sheep fed stay-green and go-brown sorghum silage. Indian Journal of Animal Sciences (May 2008) v. 78

(5) p. 536–540. Key words: Fermentation pattern, Nitrogen balance, Sheep, Silage, Stay green sorghum

Based on 2 years evaluation of 6 stay green and 4 go brown sorghum cultivars for nutritional and morphological attributes, 2 promising cultivars each of stay green (M35–1 and CSV–15) and go brown sorghum (HD–20 and J Sel–10) were grown, harvested 1 month after grain collection and then conserved as silage. Silage was fed *ad lib.* to 16 crossbred sheep divided equally to silage of each cultivar. Metabolism trial was conducted to assess intake, nutrients utilization and N balance, and rumen liquor samples were collected at 0 h to determine the rumen fermentation pattern. The intake of stay green sorghum was higher than go brown. Similarly w 0.75 intake of DE, TDN and DCP was higher in sheep fed stay green sorghum silage. Sheep fed stay green sorghum silage had 4–5 units more nutrients digestibility. OM and hemicellulose digestibility was higher in animals fed stay green. N absorption and retention was higher in sheep stay green than go brown sorghum silage. DCP, TDN and DE contents of stay green sorghum were higher than go brown sorghum silage. Mean NH₃–N contents were higher in rumen liquor of sheep fed stay green than go brown sorghum silage. Results indicated that silage from stay green sorghum cultivars is more palatable and nutritious than go brown cultivars.

017 Saini , N T; Sharma; Arya, R S (Rajasthan Agricultural University, Bikaner (India)). Effect of sulphur supplementation fed wheat straw based diets on performance of sheep. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 552 –556. Keywords: Sheep, Sulphur, Supplementation, Performance

Optimum level of sulphur required for local fodder of sheep was determined by *in vitro* studies and further evaluated in 20 male Marwari sheep in completely 8ypogeal8d design. Control group (T₁) was fed wheat straw (*Triticum aestiva*), and concentrate mixture containing 10% CP whereas, group T₂ was offered wheat straw supplemented with sulphur @ 0.18% DM basis, and in group T₃, T₄ and T₅ wheat straw of T₂ was replaced with 50% groundnut straw (*Arachis hypogaea*), moth straw (*Phaseolus aconitifolius*), and sewan hay (*Lasirus indicus*), respectively. Intake, % digestibility and plane of nutrient utilization were significantly influenced by supplementation of sulphur and type of roughage. Supplementation of sulphur significantly improved clean wool yield, staple length and medullation percentage as well as total live weight gain in supplemented groups compared to control group. The study indicated that supplementation of sulphur needed for straw diet to maximize utilization of nutrients and moth straw added sulphur supplemented wheat straw diet was superior among all the experimental diets.

018 Chaudhary, J L ; Gupta, L.; Tiwari, G S; Garg, R. (Maharana Pratap University of Agriculture and Technology, Udaipur (India)). Effect of feeding different levels of energy along with groundnut straw (*Arachis 8ypogeal* L.) as a sole diet on nutrient utilization in draught camels. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 557–559. Keywords: Groundnut straw, Nutrient utilization, Draught, Camels

Experimental trials were conducted on 9 draught camels to study the effect of feeding different levels of energy on dry matter intake (DMI), digestibility coefficient of the nutrients, nutritive value of feeds and draught. The camels were divided into 3 groups of 3 animals each and fed 3 different levels of energy concentrate mixture along with groundnut straw (*Arachis hypogea* L) as a sole diet of camels. The differences for dry matter intake (kg/d) and DCP intake (g/d) were nonsignificant, but TDNI (kg/d) differed significantly among the treatments. The voluntary water intake (l) and total water intake (l) were significantly higher in T1 as compared to T3. There was nonsignificant difference for VWI and TWI between T2 and T1. The digestibility coefficients of DM and CP were significantly higher in T3 as compared to T2 and T1 but there was non-significant difference between T1 and T2 for DM and CP digestibility. Different levels of energy did not affect the digestibility of OM, CF, EE and NFE. The DCP, TDN, DE and ME values were significantly higher in T3 followed by T2 and T1. The draught (kgf) and power developed (hp) were higher in T3, which was significantly different from T1 and T2. Nutrient utilization and draught performance of camels improved by increasing the level of energy in the diet.

019 Effect of replacement of maize by sorghum grains on the growth and egg production. Journal of maharashtra agricultural universities. Gan., 2004).p. 099-100 KEYWORDS :POULTRY; FEEDS; MAIZE; SORGHUM; GRAINS; GROWTH; EGG PRODUCTION

Growth of Broilers on varying levels of neem seed cake and soybean meal. Journal of maharashtra agricultural universities.(Sep., 2004). p. 358-360 KEYWORDS :NEEM SEED EXTRACT; GROWTH; BROILER CHICKENS; WEIGHT; SOYBEAN MEAL; FEED INTAKE

020 Dey, AK; Sanyal,S. (West Bengal University of Animal and Fishery Sciences, Kolkata (India), Dept. of Veterinary Physiology.) Measurement of storage copper in different parts of the body at different molybdenum and sulphate levels in black bengal goat. Journal of interacademia. (July, 2004).p. 439-440 KEYWORDS: VILLAGES; BODY WEIGHT; LIVER; KIDNEYS; STORAGE; COPPER; SULPHATE; MOLYBDENUM; SULPHATES; GOATS

Forty (40) black Bengal goats were collected from local villages. The average body weight were 10 kg, aged about 12 months and they were sexually female. These animals used for measurement of storage copper in liver and kidney after different doses of molybdenum and sulphate treatment. Liver copper level was lower and kidney copper level was higher in the animals of high doses of molybdenum and sulphate treatment.

021 Iyengar, K; Khan, A.K.F. (Tamil Nadu Agricultural University, Coimbatore (India). Centre for Plant Breeding and Genetics) Line x tester analysis for fodder yield and quality components in multicut forage sorghum. Annals of Agricultural Research (India). (Jun 2004).v. 25(2) p. 196-199 KEYWORDS :FORAGE; ANIMAL FEEDING; FEED CROPS; HYBRIDS; GENOTYPES; QUALITY; SORGHUM; FODDER; YIELDS

Combining ability effects and variances were estimated in PI over four different environments. Significance of environments vs genotypes for all the characters except stem thickness was observed. Predominance of additive gene action was observed for plant height, number of leaves, leaf length and leaf breadth. Crude protein and green fodder yield/plot were found to be under the control of non-additive gene action. Based on the gca and high mean values, the parents IIIA, 68726, 68786 and 55032 could be identified as the best parents for developing almost all the forage characters with multicut habit. Selection based on the per se, sca and standard heterosis in relation to their parental status, four hybrids viz., IIIA x 68814, IIIA x FS 9605, IIIA x 68724 and IIIA x 68726 were selected with additive x additive type of gene action for green fodder yield/plot. The hybrids IIIA x 68786 for crude protein, and IIIA x FS 9604 for low HCN content were found to have dominance x dominance type of gene action.

022 Garg, M.R.; Bhandari, B.M.; Kumar, S.; Sathish; Sherasia, P.L. (National Dairy Development Board, Anand (India) Animal Nutrition & Feed Technology Laboratory) Macro and Micro mineral status of dairy animals in Hilly Zone of Kerala. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: Calcium, Phosphorus, Copper, Zinc, Selenium, Feeds, Feed intake, Mountain soils

A study was conducted in the hilly zone of Kerala, to assess the status of certain macro and microminerals in dairy animals, by analyzing feed and fodder samples. Paddy straw was major dry roughage available for feeding dairy animals and found to be low in Ca (0.11%), P (0.09%), S (0.11%), Cu (1.79 ppm) and Zn (11.69 ppm). Amongst green fodders, mainly local grasses and hybrid napier were available and found to be good sources of Ca (0.43%), Mg (0.34%), Cu (13.83 ppm), Mn (74.52 ppm) and Fe (1379 ppm). Azolla was subsidiary green fodder grown in stagnant water by the farmers and found to be a good source of various minerals. The feeds and fodder were found to be rich in K content (1.83%) and Fe (192–3600 ppm). Groundnut cake and copra extraction were major concentrate supplements in the surveyed area. Groundnut cake, copra extraction, rice bran and wheat bran were good sources of P (0.57–1.13%), Mg (0.25–0.45%), S (0.24–0.33%), Cu (17.82–41.22 ppm), Zn (38.40–84.12 ppm) and Mn (44.51–174.5 ppm). The Na content was lower in concentrate ingredients (0.014%) and roughages (0.06%). Se content in feeds and fodder was adequate (0.18–0.83 ppm), however, Co was found to be marginally deficient in feedstuffs (0.10–1.19 ppm). From the present study, it was apparent that in view of the feeding practices followed in the survey area, levels of certain minerals such as Ca, P, S, Zn, Cu and Co were inadequate and much below the requirement of animals yielding 8–11 kg milk (4% fat) per day. Supplementation of area specific mineral mixture with highly bio-available mineral salts could be a cost effective method to improve productive life and productivity of animals in the zone.

023 Jadhav, S.E.; Garg, A.K.; Dass, R.S. (Indian Veterinary Research Institute, Izatnagar (India) Center of Advanced Studies in Animal Nutrition) Effect of graded levels of zinc supplementation on growth and nutrient utilization in male buffalo (*Bubalus bubalis*) calves. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: calves, Supplements, Zinc, Nutrient utilization, Growth rate

Eighteen Murrah male buffalo (*Bubalus bubalis*) calves (219.2±5.76 kg body weight; 14–15 months of age) were assigned into three groups of six animals in each in a randomized block design. Experimental feeding was similar in the three groups (concentrate mixture and ad libitum wheat straw), except for the level of zinc (as zinc sulphate) supplementation, which were 0, 35 and 70 ppm in Gr. I, II and III, respectively. The study was conducted for a period of 120 days including a 6 days metabolism trial. The mean dry matter (DM) intake was comparable ($P>0.05$) at 73.83, 72.76 and 75.59 g/kgW^{0.75} in Gr. I, II and III, respectively. Intake and digestibility of organic nutrients including fibre fractions were also similar ($P>0.05$) among the three groups. Intake of N, Ca and P, their excretion through faeces and urine and balances were also similar ($P>0.05$) among the three groups. However, average daily gain of the calves was significantly ($P<0.05$) higher in Gr. III (601.4 g/d), as compared to Gr. I (547.4 g/d) and Gr. II (566.7 g/d). Feed (DM) required per unit of body weight gain was also significantly ($P<0.05$) lower in Gr. III (8.97), as compared to Gr. I (10.3). These results indicated that supplementation of 70 ppm zinc in the basal diet containing about 35 ppm zinc may improve the growth performance and feed conversion efficiency in the male buffalo calves. However, further studies with more number of animals are suggested.

024 Shivakumar, M.C.; Umakantha, B.; Hosamani, S.V. (University of Agricultural Sciences, Dharwad (India) Animal Science Division). Influence of virginiamycin on performance of broilers fed two levels of energy. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: Broiler chickens; Additives, Virginiamycin, Animal Performance

Biological trial of 42 days duration was conducted on broiler chicks to evaluate the effect of virginiamycin supplementation with two levels of energy 2900 and 2800 ME kcal/kg during starter and 2950 and 2850 ME kcal/Kg during finisher using 352, day-old chicks. Virginiamycin at the rate of 20 ppm during starter and 10 ppm during finisher was added to each test diet. Supplementation of low energy diets with virginiamycin significantly ($P<0.05$) improved the body weight over its corresponding unsupplemented group. Feed consumption remained unaffected. Feed efficiency was better in all the virginiamycin supplemented groups. Mortality rate of 1.25 and 5.00 percent was recorded in unsupplemented groups of normal energy and low energy groups respectively but no mortality was recorded in supplemented groups. Litter moisture did not differ significantly ($P<0.05$) among the groups. Litter score was significantly lower in normal energy with virginiamycin group compared to its unsupplemented control. Total bacterial and cocci counts differed significantly ($P<0.05$) between supplemented and control groups from second and fourth week onwards. Net economic returns per bird over feed cost was better in all the supplemented groups

L02

025 Garg, M.R.; Bhanderi, B.M.; Sherasia, P.L. (National Dairy Development Board, Anand (India) Animal Nutrition & Feed Technology Laboratory). Assessment of macro and micro minerals status of milch animals for developing area specific mineral mixture for Bharatpur District of Rajasthan. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: Feeds, Forage, Calcium, Phosphorus, Copper, Zinc, Selenium, water Buffaloes, Tropical zone, Rajasthan

A study was conducted in Bharatpur district (tropical zone) of Rajasthan, to assess the prevalence of macro and micro-minerals deficiency in animals, by analyzing feed and fodder samples (n=240) at random from various locations. The calcium content (0.14%) was low in concentrate ingredients, except mustard cake (0.74%). Phosphorus content (0.45%) in concentrates was higher in comparison to roughages. The average calcium content in straws (0.34%) was higher in comparison to phosphorus (0.10%). The calcium and phosphorus content in green berseem were 1.33 and 0.31 per cent, respectively. The magnesium content in feedstuffs was adequate (0.38%) to meet the requirement of large ruminants (0.20%). The feed ingredients of the surveyed area were rich in potassium content (1.55%), whereas, sodium content was consistently low in dry roughages (0.14%) and concentrate ingredients (0.064%). The sulphur content was low in crop residues (0.13%), whereas, concentrate feed ingredients (0.18%) were better source of sulphur. Cobalt was occasionally deficient in the diet of animals. However, iron and manganese contents were adequate in the diet of animals, with traditional feeding system. The average copper content was low in straws (5.40 ppm), moderate in green fodders (9.68 ppm) and concentrate ingredients (9.87 ppm). Molybdenum content in feeds was within safe limit (average level < 1.25 ppm). Selenium content in most of the feeds and fodder samples was adequate (0.61 ppm) and its supplementation in the diet was not necessary. Zinc was acutely deficient in most of the feedstuffs (average level < 26.30 ppm) and needed to be supplemented in the ration of animals for proper productive and reproductive functions. It was apparent from the present study that the feeds and fodders available in tropical zone of Rajasthan may not meet the requirements for calcium, phosphorus, sodium, sulphur, zinc, copper and cobalt in order to sustain a milk production of 8 kg/day. Hence, it is necessary to supplement these minerals in the ration by formulating area specific mineral mixture.

026 Chuadhary J.L.; Jat Hem Raj (Maharana Pratap University of Agriculture & Technology, Udaipur (India) Livestock Research Station) Effect of feeding different levels of cottonseed on the reproductive performance of surti buffaloes. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: water buffalo, Cottonseed, Milk yield, reproductive performance

Eighteen lactating Surti buffaloes in early stage of lactation were divided into three groups of six animals each on the basis of body weight (475.83 ± 13.23 kg) and milk yield (6.75 ± 0.32 kg) and were allotted to three dietary treatments viz. T1 – zero per cent cottonseed in concentrate mixture, T2 – 30 per cent cottonseed in concentrate mixture and T3 – 60 per cent cottonseed in concentrate mixture. Additionally, all groups were fed on a basal roughage consisting of 15 kg green Lucerne and ad libitum sorghum stover. The buffaloes of T3 group consumed significantly ($P < 0.05$) more DM, DCP and TDN than T1 group, but there were no significant differences were observed between T2 and T1 groups. The milk yield and fat in milk were affected ($P < 0.05$) by the level of cottonseed given to buffaloes. The average 6 per cent FCM yield 9.21, 10.16 and 11.32 kg in T1, T2 and T3 groups, respectively. Higher ($P < 0.05$) milk yield was recorded in T3 as compared to T1 group. However, there was no difference in milk yield of T2 and T1 groups. A vasectomised bull was paraded among the experimental animals daily for finding the buffaloes in heat and buffaloes showing complete estrus symptom were inseminated. The average post partum oestrus interval in T1, T2 and T3 was 142.33, 85.0 and 83.0 days, respectively. The mean service period was 292.50, 184.50 and 172.33 days, respectively in T1, T2 and T3 treatments. The numbers of services required per conception were 5.83, 3.50 and 3.00 in T1, T2 and T3,

respectively. The results showed that higher levels of cottonseed in the diet substantially improved the milk yield and post partum reproductive performance of buffaloes.

027 Nehra, R.; Purohit, G.R.; Sharma, T.; Dhuria, R.K.; Legha, R.A. (Rajasthan Agricultural University, Bikaner (India) College of Veterinary & Animal Science, Department of Animal Nutrition). Nutritional evaluation of sewan (*Lasiurus indicus*) grass hay in Marwari horses of arid region. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: horses *Lasiurus*, Feed grasses, hay, Digestibility, Arid zones

Marwari stallions (5–6 year age and 345 kg BW) were fed on a sole diet of sewan grass (*Lasiurus indicus*) hay in order to define its nutritive value for horses. The grass contained 2.45% DCP, 57.47% TDN, 1:22.46 nutritive ratio and 52.31% starch equivalent. The daily dry matter intake was recorded to be 2.77 kg/100 kg BW equivalent to 119.80 g/kg W^{0.75} indicative of its high palatability in horses. The average digestibility coefficients were found to be 52.39, 55.75, 45.46, 47.04, 67.35, 39.70, 30.66, 49.48 and 47.91 for DM, CP, CF, EE, NFE, NDF, ADF, hemicellulose and cellulose, respectively. The intake of digestible nutrients i.e. DCP (236 g/d) and DE (24.43 Mcal/d) revealed that a sole feeding of the hay is adequate to meet the maintenance requirements of mature horses at rest. It was observed from the study that horses can efficiently utilize sewan grass hay and it can serve as basal roughage source for horses in arid regions of country.

028 Vasan, P.; Dutta, Narayan; Mandal, A.B.; Sharma, K. (Indian Veterinary Research Institute, Izatnagar (India) Division of Animal Nutrition) Effect of grinding on apparent and true digestibilities of amino acids of pearl millet (*Pennisetum typhoides*) in adult roosters *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: Cockerels, *Pennisetum glaucum*, Amino acids, Digestibility

The present study was designed to determine the apparent and true digestibility of amino acids of pearl millet in adult cockerels. The test ingredient was offered as per Farrell's rapid ME method either as whole grain or as ground grain to six cockerels each. The apparent digestibilities of most of the amino acids of whole grains were significantly higher than those of broken grains. The true digestibility of cystine, lysine and histidine of whole grain was significantly ($P < 0.05$) higher than those observed in broken pearl millet grain. However, the digestibilities of remaining twelve amino acids studied were similar in whole as well as broken pearl millet grain. Overall the amino acid digestibility of pearl millet was comparable to the true digestibilities of amino acids of other cereal grains such as maize and white sorghum. The present investigation revealed that pearl millet grain can be offered as a whole rather than coarse grain, since grinding neither improves the amino acid digestibility value nor reduces the feed cost.

029 Sahoo, S.K.; Naskar, S.K.; Panda, B.K.; Mohapatra, C.M.; Padhi, M.K.; Giri, S.C.; Panda, S.K. (Central Avian Research Institute, Bhubaneswar (India) Regional Centre) Performance of the

broiler on replacement of maize with different levels of whole and peeled cassava tuber meals. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: Cassava; Broiler chickens, Animal performance, Maize.

An experiment was conducted to study the performance of broilers on replacement of maize with different levels of whole and peeled cassava tuber meals. Day old broiler chicks (n = 125) of either sex were randomly divided into five groups having equal number of chicks in each group. The control group (T1) was provided with conventional ration without any cassava tuber meal. The chicks of T2 and T3 were provided with ration by replacing maize with whole cassava tuber meal at 20 and 40%, respectively. Similarly, the T4 and T5 chicks were fed with ration replacing maize with peeled cassava meal at 20 and 40%, respectively. The body weight of birds at six weeks of age was 1571.16 ± 27.72 , 1470.17 ± 28.93 , 1426.15 ± 26.87 , 1538.59 ± 29.47 and 1653.57 ± 20.34 g in T1, T2, T3, T4 and T5, respectively, with no significant differences in the weight gain between the groups. Significantly ($P < 0.01$) higher metabolizability of protein and nitrogen balance was observed in T4 and T5 than other groups. Glucose, glutamate-oxaloacetate transaminase and glutamate-pyruvate transaminase values in the serum samples did not revealed any significant difference between the groups. Significantly ($P < 0.05$) higher percentage of breast meat was observed in control and T3 than other groups. Histopathological examination of liver and kidney showed mild hyperplasia of bile duct, congestion and focal infiltration of inflammatory cells in liver of T3. From this experiment it was concluded that cassava tuber meals could be incorporated in broiler ration by replacing maize upto 40 per cent.

030 Singh Ajaib; Gill, M.S.; Puri, K.P.; Tiwana, U.S. (Guru Angad Dev Veterinary & Animal Sciences University, Ludhiana (India). Department of Animal Nutrition) Comparative evaluation of ryegrass varieties in buffalo calves by chemical, In situ and In vivo techniques. *Animal Nutrition and Feed* Keywords: Cattle; Ryegrass, Nutritive value, Variety, Degradability; Ruminal fermentation; In vitro dry matter digestibility

The nutritive value of a new cultivar of Ryegrass variety V2 was compared with the standard variety of Punjab Ryegrass No. 1. Six male buffalo calves were divided into two equal groups. Fodder from third cut of both the varieties was offered ad lib to both the groups for 14 days followed by 5 days metabolic trial. The crude protein content was 1.5% more in Ryegrass variety V2 (15.2%) than that of Punjab Ryegrass No. 1 (13.7%) whereas the ether extract contents of both the varieties were quite similar. However, cell wall constituents were slightly higher in variety V2. The prediction of DM intake (kg/100 kg BW) was found to be slightly less than that of in vivo studies. Apparent digestibility coefficient of dry matter, crude protein, crude fibre and ether extract were found to be more in variety V2 as compared to the check variety. The nutritional quality of variety V2 in terms of % DCP and TDN (12.07 ± 0.31 , 74.53 ± 1.60) were higher as compared to the check variety (10.60 ± 0.57 , 73.09 ± 2.19). The voluntary DM intake (kg/100 kg BW) was (2.30 ± 0.04 and 2.22 ± 0.06) in two respective varieties. The results of the nutritional yield revealed that variety V2 produced more DCP and TDN (15.40 ± 0.85 and 95.1 ± 1.78 q/ha) than the check variety (11.85 ± 0.79 and 82.72 ± 2.44 q/ha). The quality parameters in terms of DCP and TDN indicated that the variety V2 has edge over the check variety Punjab Ryegrass

L10 Animal Genetics and Breeding

031 Das, S.K.; Das, A.; Goswami, S. (ICAR Research Complex for NEH Region, Umiam (India) General and specific combining ability of rabbit for different productive traits. Indian Journal of Animal Research, (Mar 2007) v. 41 (1) Keywords: Rabbits; Combining ability ; Carcass composition

The result of present study showed that among the pure breeds SC was the best in respect of carcass traits. It reveals presence of considerable additive and non-additive genetic variation. GCA of SC was best followed by GCA of NZW and GCA of LC. This indicates that SC would do better when crossed with other genetic groups. However a critical examination of SCA effects in regard of carcass traits was found indicative of LC x NZW to accrue some additional advantages by way of non-additive gene effects. It appears that both SC and NZW could be used effectively to cross with indigenous breed of Meghalaya rabbit for the improvement of germplasm.

032 Singh, V K; Singh, C V ; Kumar, D; Sharma, R J (Govind Ballabh Pant University of Agriculture and Technology, Pantnagar (India)). Genetic parameters for first lactation and lifetime performance traits in crossbred cattle. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 497–500 Key words: Animal models, Cattle, statistical methods; Heritability, Lactation

The data for the present investigation were obtained from the performance records of 1085 crossbred daughters belonging to 7 different genetic groups and by 57 of bulls maintained at Dairy Farm of G B.Pant University of Agriculture and Technology, Pantnagar, during 1974-2004 were used to estimate genetic parameters of first lactation and life time performance traits. The averages of AFC, FLMY, FLP, FDP, FCI, HL, TLL and LTMY were found as 1371.06 ± 15.49 days, 3064.74 ± 49.40 liter, 356.63 ± 5.12 days, 172.85 ± 7.23 days, 529.48 ± 8.51 days, 1653.54 ± 26.06 days, 1338.64 ± 26.50 days and 8931.46 ± 154.49 liter, respectively. The heritability estimates for the corresponding traits were 0.12 ± 0.06 , 0.12 ± 0.06 , 0.18 ± 0.07 , 0.09 ± 0.06 , 0.09 ± 0.06 , 0.10 ± 0.06 , 0.12 ± 0.06 and 0.07 ± 0.05 by LSA method and the heritability estimates of the corresponding traits found as 0.24 ± 0.08 , 0.23 ± 0.08 , 0.22 ± 0.07 , 0.12 ± 0.07 , 0.14 ± 0.07 , 0.12 ± 0.06 , 0.13 ± 0.06 and 0.14 ± 0.06 , respectively. The estimates of heritability for first lactation and lifetime traits from DFREML analysis were higher and significant than least square analysis method. These difference in h^2 estimation revealed that sire model ignores both the dams of cow (sire's mate) and relationship between females while DFREML evaluate both the sires and cows simultaneously. AFC had positive genetic correlation with all other first lactation traits except with FLP. FLMY had positive genetic and phenotypic correlations with all other first lactation traits and values varied from low to medium. These results suggested that selection on the basis of FLMY would be expected to improve lifetime performance traits.

033 Gopal Dass (Central Sheep and Wool Research Institute, Bikaner (India)). Characterization and evaluation of Pugal sheep in the home tract. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 501–504 Keywords: Sheep; Breeds (animals); Animal Performance

Pugal, a sheep breed of north-western arid and semi-arid region of the country, is mainly found in Bikaner district of Rajasthan. Animals are known for good mothering ability and adapted to harsh climate. The population of this breed has tremendously declined due to usage of breeding rams of Magra sheep of the same habitat. The least squares averages of morphometric traits viz. body length, height at withers, chest girth, ear length and tail length ranged from 32.76 ± 0.24 to 63.20 ± 0.43 , 39.36 ± 0.28 to 62.88 ± 0.31 , 35.64 ± 0.28 to 73.63 ± 0.63 , 6.35 ± 0.08 to 9.41 ± 0.20 and 12.75 ± 0.16 to 18.23 ± 0.17 cm in different sex and age groups, body weights at birth, 3, 6, 12 months and in adults were 2.62 ± 0.01 , 17.92 ± 0.07 , 23.55 ± 0.11 , 29.74 ± 0.28 and 38.88 ± 0.28 kg. The greasy fleece weights in first, second, third and total annual clips were 558, 513, 549 and 1618 g, wool quality parameters, viz. fibre diameter, hetro and hairy fibres, medullation, staple length and crimp were $34.42 \pm 0.45 \mu$, $28.19 \pm 0.67\%$, $30.94 \pm 1.22\%$, $59.14 \pm 1.37\%$, 6.07 ± 0.013 cm and $0.77 \pm 0.03/\text{cm}$. Milk production on 7th and 50th day of lactation was 249.21 ± 4.14 and 112.20 ± 11.87 g. Weight at slaughter, weight of skin, length of skin, weight of head, weight of liver, weight of kidney, weight of empty digestive tract, weight of legs, weight of carcass and dressing per cent were 22.73 ± 0.27 kg, 3.30 ± 0.08 kg, 57.03 ± 0.37 cm, 1.44 ± 0.03 kg, 354.00 ± 7.64 g, 75.17 ± 1.69 g, 1.63 ± 0.02 kg, 2.82 ± 0.05 kg, 9.97 ± 0.17 kg and $43.77 \pm 0.45\%$. The reproduction traits, viz. age at first oestrus, oestrus cycle duration, oestrus duration, age at first lambing, gestation length, service period, lambing percentage and lambing interval were 10.15 ± 0.05 month, 15.28 ± 0.05 days, 23.12 ± 0.18 h, 15.47 ± 0.07 month, 153.38 ± 0.45 days, 93.24 ± 0.88 days, $98.12 \pm 4.25\%$ and 283.13 ± 0.95 days, respectively. The breed is significantly contributing to the livelihood of the people due to its good migration capability and overall performance. Therefore, sincere efforts are needed immediately for its improvement and conservation.

034 Sharma, R.; Pandey, A K; Dinesh Kumar; Alam, S ; Ahlawat, S P S (National Bureau of Animal Genetic Resources, Karnal(India)) Genetic variability in Beetal goat breed assessed by microsatellite DNA profiling. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 505–509 Keywords: Goat; Genetic variation, DNA hybridization

Beetal, one of the important goat breeds of northern India, was investigated genetically utilizing microsatellite markers selected on the guidelines of ISAG and FAO's DADIS (Domestic Animal Diversity Information System) MoDAD programme. The allele and genotype frequencies, heterozygosities and gene diversity were estimated. The observed heterozygosity in the population varied from 0.134–0.842 with the mean of 0.469 ± 0.191 , indicating lower genetic variation in this population. Bottleneck was examined assuming all three mutation models and was found to be absent. Population displayed heterozygote deficit to the tune of 22.3%. This is the high time to formulate breeding programmes as well as effective conservation strategies for the precious goat breed.

035 Tyagi, A.; Das, S.; Singhal, K K (National Dairy Research Institute, Karnal (India)) Effect of dietary glucosinolates on nutrient utilization and growth of crossbred calves. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 510–514 Keyword: Calves, Glucosinolates, Growth rate, oilseed cakes; Nutrient utilization

Crossbred male calves (18) of similar age (8–9 months) and body weight (110–190 kg) were distributed into 3 groups of 6 each on the basis of their body weight. The calves in control group (G1) were fed on concentrate mixture containing groundnut oilcake as a sole protein supplement, which was replaced by mustard oilcake (*Brassica campestris*) (G2) and taramira oilcake (*Eruca sativa*) (G3), respectively. Wheat straw *ad lib.* and leguminous fodder (1 kg) was fed to all the calves for 90 days. Gluconapin and glucobrassica napin were the major glucosinolates of mustard oilcake, whereas, glucoerucin was the major glucosinolate in taramira oilcake. Total glucosinolates content of concentrate mixtures G1, G2 and G3 was 0, 17.59 and 17.50 mmol/g, respectively. Dry matter intake, nutrient digestibility, nitrogen balance, serum T₃ and T₄ levels and growth rate of growing calves indicated that protein supplied by groundnut oilcake in the concentrate mixture can be replaced with mustard or taramira oilcakes without affecting the growth performance and nutrient digestibility in crossbred calves. It was concluded that glucosinolates, irrespective of their source, were not harmful at 17.50 mmol/g level in concentrate mixture for the crossbred calves.

036 Murali, N; Kandasamy, N.; Panneerselvam, S. (Veterinary College and Research Institute, Namakkal (India)). Base line sister chromatid exchange frequency in *Bos indicus* and *Bos taurus* × *Bos indicus* crosses. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 547–551. Keywords: Breed difference, Cattle sister chromatid exchange

Blood samples were collected from indigenous (Kangayam and Red Sindhi; both *Bos indicus*) and crossbred [Jersey×Red Sindhi (F₁) and Friesian×Red Sindhi (F₁) crosses: both *Bos taurus*×*Bos indicus* crosses] cattle reared under similar environmental conditions to collect the information on base line sister chromatid exchange (SCE) frequency. Leucocyte cultures were set with the incorporation of BrdU (10µg per ml) after 24h and the sister chromatid differential staining of the slides revealed SCEs. The base line SCE frequencies were not normally distributed in all the 4 genetic groups; but followed Poisson distribution in Red Sindhi and Friesian×Red Sindhi (F₁) crosses. Significant differences were observed between Kangayam and Friesian×Red Sindhi cross, and Red Sindhi and Friesian×Red Sindhi cross. Reasons for the breed differences could not be elucidated, but the differences in base line SC frequency may reflect differing DNA repairing efficiencies.

037. Singh, C.B.; Jilani, M.H. (G.B. Pant University of Agriculture and Technology, Pantnagar (India). Department of Genetics and Animal Breeding). Estimation of genetic parameters for reproductive and productive traits of German Angora rabbits reared under temperate climatic conditions of Garhwal Himalayas. Pantnagar Journal of Research (India). (Jul-Dec 2007) 5(2) p.

125-127 KEYWORDS: GENETIC PARAMETERS; REPRODUCTIVE PERFORMANCE; HERITABILITY; TEMPERATE CLIMATE; HIMALAYAN REGION; RABBITS; REARING TECHNIQUES; UTTARAKHAND. The present study was conducted during 2002-2004 on 350 German Angora rabbits, maintained at rabbit research unit, G.B.P.U.A.&T., Hill campus, Ranichauri, Tehri Garhwal. Least squares means and heritability were computed to evaluate the performance of reproductive and productive traits of German Angora rabbits. The average litter size at birth, litter size at weaning, litter weight at birth, litter weight at weaning, pre-weaning mortality, wool yield at first, second, third, fourth, fifth clips and annual wool yield in adult rabbits were found as 5.30 ± 0.14 kits, 4.60 ± 0.12 kits, 254.35 ± 5.21 gm, 2745.10 ± 24.35 gm, 12.90 ± 0.70 per cent, 160.45 ± 7.85 gm, 1420.25 ± 5.20 gm, 165.35 ± 5.25 gm, 135.85 ± 6.22 gm, 142.20 ± 9.35 gm and 775.75 ± 20.45 gm, respectively. Pooled heritability estimates of the corresponding traits based on sire component of variance were 0.439 ± 0.254 , 0.491 ± 0.071 , 0.401 ± 0.101 , 0.592 ± 0.155 , 0.066 ± 0.072 , 0.442 ± 0.151 , 0.399 ± 0.198 , 0.484 ± 0.112 , 0.208 ± 0.141 , 0.255 ± 0.125 , and 0.515 ± 0.100 , respectively.

L40 Animal Structure

038 Brar, P S; Saigal, R P; Sharma, R D; Nanda, A S (Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (India)). Histology and histochemistry of broad ligaments in buffaloes. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 464–467. Keywords: Water buffaloes; Histology; ligaments

Broad ligament is the only attachment of uterus with the body of the animal and can play some role in the causation of uterine torsion, a single major cause of maternal deaths in buffaloes. The present study was undertaken to study the histomorphology and histochemistry of broad ligament in buffaloes. The tissue samples for histomorphology were collected from buffalo calves delivered dead to buffaloes suffering from dystocia, multiparous non-pregnant buffaloes, early pregnant buffalo and early pregnant cow. In general the broad ligaments consisted of double serosal folds containing in between them muscles, connective tissue, nerves and blood vessels. In 0 day-old calves the fibroblasts and muscle fibres were still to be organized. The adult non-pregnant buffaloes had well developed musculature in broad ligaments. No difference in the amount of musculature was observed in right and left broad ligament or at iliac and ovarian end of the broad ligaments. However 11% non-pregnant buffaloes had exceptionally less developed muscles. On the pregnant side the broad ligaments had relatively larger muscle fascicles with frequent syncytial appearances of muscle fibres. Moreover pregnant side had relatively larger muscle fascicles. Histochemistry indicated presence of fair amount of vicinal glycol group containing carbohydrates, glycogen and neutral mucopolysaccharides in 0– day old calves, the amount of which increased with increase in age. Overall this study revealed the basic structure of broad ligaments in buffaloes and indicated their possible involvement in causation of uterine torsion.

039 Sathyamoorthy, O R; Geetha Ramesh (Madras Veterinary College, Chennai (India)). Histogenesis of heart in pigs (*Sus domesticus*). Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 472–475. Keywords: Swine; Histocytological analysis; Heart

White Yorkshire pig embryos of 13 different gestational ages from 10 mm (20 day-old) to 270 mm (102 day-old) with 6 embryos in each group were collected from different slaughterhouses situated in and around Chennai from the present study. In 10 mm (20 day-old) pig embryos, the heart was separated from the liver by an incomplete partition, the septum transversum. The atria and ventricles were incompletely partitioned. The endocardial cushions were prominent. In 20 mm (27 day-old) pig embryos all the 3 layers of the heart were well distinguished and the myocardium was more trabecular. In 35 mm (35 day-old) pig embryos the semilunar valves, atrioventricular valves and papillary muscles were well developed. In 40 mm (38 day-old) pig embryos a valvular continuity between the semilunar and atrioventricular valves was noticed. Purkinje fibres were noticed in the ventricular subendocardium. In 55 mm (42 day-old) pig embryos ganglionated and non-ganglionated nerve plexuses were noticed in the epicardium. From 80 mm (48 day-old) pig embryos onwards until 270 mm (102 day-old) the length, thickness and circumference of the heart increased. The further structural development of these age groups of pig embryos resembled the adult pig heart.

040 Suthakar V P; Ushakumary, S; Geetha Ramesh (Tamil Nadu Veterinary and Animal Sciences University, Chennai (India)) Micro anatomical studies on primary and secondary bronchi in the lung of guinea fowl. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 493–496 Key words: guinea fowl; animal morphology; lungs; bronchi

The epithelium of the mucous folds of the primary and the secondary bronchi was made up of the pseudostratified ciliated columnar epithelium. Goblet cells were found in the surface epithelium of secondary bronchi. The epithelium of primary and secondary bronchi showed moderate reaction for acid and alkaline phosphatases. Lymphoid aggregations were seen in the lamina propria of the secondary bronchi. The layer of circularly arranged smooth muscle fibres in the secondary bronchi was apparently thicker than that of the primary bronchus.

041 Jagapathi, R.; Opinder Singh; Roy, S. (Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (India)). Gross anatomical studies on the thymus of pre- and post-natal buffalo (*Bubalus bubalis*). Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 461 –464 Keywords: Water Buffaloes; Animal morphology; Thymus

Thymus of buffalo foetuses consisted of unpaired thoracic and paired cervical and cranial parts. The thoracic part was present in the precardiac mediastinum on the dorsal half of the left side and was irregular quadrilateral in shape. The cervical thymus was the longest part and consisted of right and left limbs. It was V shaped with a point directed towards the thorax. The left limb of the cervical thymus was slightly longer than the right part. The cranial parts consisted of retroglandular and sub-basilar portion. The cervical and thoracic parts were connected by cervico -thoracic isthmus whereas cervical and cranial parts were connected by cranio-cervical isthmus. The maximum weight of thymus in post natal buffalo calves was noted

at 3 months of age and thereafter the mean weight of the thymus decreased gradually. At 5 years age whole thymus was replaced by adipose tissue in buffalo.

042 Singh, S.V.; Sharma, V.K.; Singh, H.P.; Jadon, N.S., Kumar Sarvesh (G.B. Pant University of Agriculture and Technology, Pantnagar (India) College of Veterinary and Animal Sciences, Department of Veterinary Surgery and Radiology) Histological evaluation of freeze-dried and fresh homologous tendon grafts for tenorrhaphy in buffaloes. Indian Journal of Veterinary Surgery (Jun 2008) v.29(1). Keywords: Calves; tendons; allografts

Freeze-dried and fresh tendon allografts were histologically evaluated for their regenerative property in deep digital flexor tendon defects in buffalo calves. Study was performed on 18 male buffalo calves, 18–24 months of age divided equally in two groups, A and B. In group A freeze-dried and in group B fresh tendon allografts were used to bridge one centimeter long experimentally created gap in the deep digital flexor tendon of the left foreleg. Comparatively more cellular reaction in group B and early maturation of graft in group A was observed on 45th post-transplantation day. The study revealed faster healing of tendon defect repaired with freeze-dried allograft than with fresh allograft.

L50 Animal Physiology and Biochemistry

043 Das, K.; Das, P.K.; Sanyal, S; Ghosh, P.R.; Asaithambi, P (West Bengal Univ. of Animal and Fisheries Sciences (India.) Department of Veterinary Physiology); Das B.C.(IVRI, Bareilly (India) P and C Division). Effect of bilateral adrenalectomy on metabolism of calcium, magnesium and phosphorus in black bengal goat. Indian Journal of Animal Research (Mar 2007) v. 41 (1) Keywords: Goats; Metabolism; Adrenal glands

Calcium, Magnesium and Phosphorus level were studied in bilateral adrenalectomized (BADX) goat to see the role of adrenal hormones in metabolism of those said minerals. Initially Ca level reduced significantly ($P < 0.01$) and thereafter approaching towards normal value but overall decreasing trend was found. Magnesium had the similar trend like Ca but later stages increased in erratic fashion. Phosphorus initially decreased ($P < 0.01$) but decreasing trend though erratic way was noticed at later stages.

044 Dey, AK; Sanyal, S. (West Bengal University of Animal and Fishery Science, (India), Dept. of Veterinary physiology.) Studies on activities of copper and ferroxidase-i in haemopoiesis in black bengal goats. Journal of interacademia. (Jan., 2005).p. 97-98 KEYWORDS: BLOOD SAMPLING; COPPER; FERROXIDASE; GOATS

Altogether 24 black Bengal goats (Female) were randomly selected from local market (Birohi Pasu Hata, Nadia) for study the activities of Copper and Ferroxidase I in haemoglobin synthesis. Blood samples were collected from 24 goats. Copper, Ferroxidase-I, haemoglobin

(Hb) and packed cell volume (PCV) were decreased in anaemic condition and increased after copper sulphate (CuSO₄) treatment.

045 Yawalikar, P.V.; Karanjkar, L.M.; Hanmante, A.A. (Animal husbandry and Dairy Science, Marathwada Agricultural University, Parbhani (Indi)). Comparative studies on haematological responses of indigenous and crossbred bullocks during ploughing. Journal of Maharashtra Agricultural Universities. (Jan., 2004).p. 075-078 KEYWORDS :BLOOD SUGAR; CROSSBREDS; BLOOD; LACTIC ACIDS; LAND RACES; HAEMATOLOGY; MAHARASHTRA; GLUCOSE; BULLOCKS; PLOUGHING

Utilization of male cattle as draft animals in Indian agriculture for the field operation like ploughing has yet not been replaced completely by any mechanical source. The comparative working capacity of Deoni, Red Kandhari and Holstein Frisian (HF) x Deoni crossbred bullock yoked for ploughing in two seasons was studied. Two pairs of Deoni, Red Kandhari (RK) and HF x Deoni each were yoked for ploughing continuously for 3 hours during fore- and afternoon of 5 consequent days. It was seen that the Hb (mg/dl) level reached its highest level in Cross-breds (10.78) followed by RK (10.41) and least in Deoni (10.11); the level of glucose (mg%) was least affected in RK (49.81) followed by Deoni (51.45) and drastically changed in HF x Deoni (53.22). the level of lactic acid (g%) was 7.26 in Red Kandhari, 7.53 in Deoni and 8.30 in HF x deoni. It was inferred that Red Kandhari showed least deviations in the values of Hb, glucose and lactic acid followed by Deoni. The HF x Deoni cross-bred bullock showed highest fluctuations in these values.

046. Nidhi Singh (College of Veterinary Science and Animal Husbandry Mhow (India). Department of Veterinary Medicine.); Singh, J.P. (College of Veterinary Science and Animal Husbandry Mhow (India). Department of Veterinary Medicine.); Rajput, M.K.S. (Veterinary College, Pantnagar (India). Dept. of EPM.) Hematological alterations in broiler chicks during different seasons supplemented with herbal formulations. Veterinary World (Apr 2008) v.1(4) p.110-112 KEYWORDS: CHICKS; BROILER CHICKENS; BLOOD; SUPPLEMENTS.

The study was conducted on Vencobb broiler chicks to ascertain the anti stress affects of Zist, Zeetress and a combination of Amla and Turmeric during summer, rainy and winter seasons and thereby the haematological changes of birds revealed that during all the three seasons a marked improvement in haemoglobin was encountered in all the three groups where herbal preparations were supplemented. A marked increases in the lymphocyte count occurred during summer and winter seasons in all the experimental groups of bird as compared to the control group. The heterophyl count was decreased with the supplementation of herbal formulations in the feed irrespective of the seasons encountered in the season. This observation proves the hepato-stimulatory, protective and immuno modulating effects of herbal preparations.

047. Kaple, P.M. (Veterinary College, Nagpur (India). Department of Physiology and Biochemistry.); Jagtap, D.G. (Veterinary College, Nagpur (India). Department of Physiology and Biochemistry.); Badukale, D.M. (Veterinary College, Nagpur (India). Department of Physiology and Biochemistry.); Shatpure, S.K. (Veterinary College, Nagpur (India). Department of Physiology and Biochemistry) Hematological constituents of blood of gaolao cattle. *Veterinary World* (Apr 2008) v. 1(4) p. 113-114 KEYWORDS: CATTLE; LAND RACES; BLOOD COMPOSITION; HAEMOGLOBIN.

The hematological studies of Gaolao cattle (10 animals each of calves, heifers and cows) showed that values of hemoglobin, total erythrocyte count, packed cell volume and lymphocytes were low in cows than calves and heifers while low eosinophil per cent in calves and heifers than cow were observed.

048. Patodkar, V.R. (Maharashtra Animal and Fishery Sciences University, Nagpur (India). Krantisinh Nana Patil College of Veterinary Science); Somkuwar, A.P. (Maharashtra Animal and Fishery Sciences University, Nagpur (India). Krantisinh Nana Patil College of Veterinary Science); Rahane, S.D. (Maharashtra Animal and Fishery Sciences University, Nagpur (India). Krantisinh Nana Patil College of Veterinary Science); Shejal, M.A. (Maharashtra Animal and Fishery Sciences University, Nagpur (India). Krantisinh Nana Patil College of Veterinary Science); Belhekar, D.R. (Maharashtra Animal and Fishery Sciences University, Nagpur (India). Krantisinh Nana Patil College of Veterinary Science);. Effect of sex on haematological parameters in Emu (*Dromaius novahollandiae*). *Veterinary World* (June 2008) v.1(6) p. 171-172 KEYWORDS: EMUS; SEX; BLOOD.

049. Kapale, P.M. (Nagpur Veterinary College, Nagpur (India). Department of Physiology and Biochemistry); Jagtap, D.G. (Nagpur Veterinary College, Nagpur (India). Department of Physiology and Biochemistry); Badukale, D.M. (Nagpur Veterinary College, Nagpur (India). Department of Physiology and Biochemistry); Sahatpure, S.K. (Nagpur Veterinary College, Nagpur (India). Department of Physiology and Biochemistry) Serum total proteins and serum total cholesterol levels in Gaolao cattle. *Veterinary World* (Apr 2008) v. 1(4) p. 115-116 KEYWORDS: CATTLE; LAND RACES; BLOOD COMPOSITION; BLOOD PROTEINS.

The healthy female gaolao cattle were selected and divided in three groups of ten animals each with reference to age. The blood samples were processed for clear serum collection and estimation of serum total proteins, albumin, globulin albumin and globulin ratio and serum total cholesterol. It is reported that female calves had low total proteins, albumin and globulin than the adult cows.

050. Sabapara, R.H. (Anand Agricultural University, Anand (India). College of Veterinary Science and A.H. Department of Veterinary Medicine);Jani, R.G. (Anand Agricultural University, Anand (India). College of Veterinary Science and A.H. Department of Veterinary Medicine);Bhuva, C.N.

(Anand Agricultural University, Anand (India). College of Veterinary Science and A.H. Department of Veterinary Medicine);. Haematological reference intervals for Indian Leopards (*Panthera pardus*). *Veterinary World (India)*. (Jun 2008) v. 1(6) p. 173-174 KEYWORDS: LEOPARDS; BLOOD; BLOOD COMPOSITION; INDIA.

L51 Animal physiology – Nutrition

051 Chaudhary, L C; Sahoo, A; Agarwal, Neeta; Kamra, D N; Pathak N N (Indian Veterinary Research Institute, Izatnagar (India)) Effect of direct fed microbials on nutrient utilization, rumen fermentation, immune and growth response in crossbred cattle calves. *Indian Journal of Animal Sciences* (May 2008) v. 78 (5) p. 515–521 Keywords: Probiotics, Crossbreds; Calves, Lactic acid bacteria; Bran; Nutrient utilization, rumen fermentation, immune response; growth rate

The study was conducted to test efficacy of direct fed microbials (DFM) for the improvement of performance of crossbred cattle calves reared on the diet devoid of cereal grains. Day-old calves (32) with average body weight of 23 kg, were divided into 4 groups and fed on concentrate mixture to meet 50% dry matter requirement and green fodder *ad lib*. Group 1 served as control. The 100 ml DFM culture was fed to group 2 (curd, 10^8 cfu/ml), group 3 (*Saccharomyces cerevisiae* 49, 10^6 cfu/ml) and group 4 (*Lactobacillus acidophilus* 15, 10^8 cfu/ml). The experiment lasted 52 weeks. The dry matter intake and feed conversion efficiency were not affected due to supplementation of any of the DFM. Improved body weight gain in calves by supplementation of all the 3 microbial additives was observed. The digestibility of nutrients and plane of nutrition were similar in all the 4 groups at 14 weeks and 52 weeks except a significant increase in the digestibility of ether extract and acid detergent fibres in *S. cerevisiae* fed group at 14 weeks and 52 weeks, respectively. There was no difference among the groups in the levels of lactic acid, $\text{NH}_3\text{-N}$, total and molar proportion of volatile fatty acids, ciliate protozoa count and activities of filter paper degrading enzyme, carboxymethylcellulase, xylanase, α -amylase, β -xylosidase, β -glucosidase, α -glucosidase and protease at 52 weeks of age. However, microcrystalline cellulase activity was significantly higher in *L. acidophilus* fed group. The blood biochemical characteristics (plasma glucose, serum protein, albumin and globulin) and immunological status of the calves of all the groups were similar at 52 weeks of age. It is concluded from the study that long term (from birth to one year of age) feeding of DFM improved the growth performance of crossbred cattle calves fed diet devoid of cereal grains.

052. Biradar, N. (Indian Grassland and Fodder Research Institute, Dharwad (India). Regional Sm.) Analysis of straw and stover of different crops as a livestock feed by the farmers. *Annals of Agricultural Research (India)*.(Sep 2004).v. 25(3) p. 377-3802 tables; 6 ref. KEYWORDS :ANIMAL

PHYSIOLOGY; NUTRITION; FARMERS; LIVESTOCK; ANIMAL SEEDING; CROP RESIDUES; STRAW; AGRICULTURAL WASTES; FORAGE; FEED CROPS

A PRA study was, taken up in four villages of Dharwad district to know the farmers' preferences for straw and stover" of different crops for utilizing them to feed livestock. Study revealed that kharif sorghum stover and little millet straw are preferred most as they secured first rank. Rabi SOI"ghum stover secured second rank followed by khadda, wheat straw and paddy straw. Maize stover is the least preferred one. Amongst kharif and rabi sorghum stover, former is preferred as it is superior in terms of taste, less wastage per cent, more juicy, more leafy, has soft leaf sheath and gives more energy to the livestock.

053. Pathak, A.K. (Indian Veterinary Research Institute, Izatnagar (India). Centre of Advance Studies in Animal Nutrition);. Various factors affecting microbial protein synthesis in the rumen. Veterinary World (Jun 2008) v. 1(6) p. 186-189 KEYWORDS: RUMINANTS; MICROBIAL PROTEINS; RUMEN DIGESTION; CRUDE PROTEIN; RUMEN MICROORGANISMS

L51 Animal physiology – Nutrition

054 Ramgaokar, J.S.; Verma, A.K.; Singh, P.; Mehra, U.R. (Indian Veterinary Research Institute, Izatnagar (India). Animal Nutrition Division). Effect of dietary protein levels on urinary excretion and plasma concentration of purine derivatives in crossbred bulls. Animal Nutrition and Feed Technology (Jan 2008) v.8(1) Keywords: Crossbreds, Bulls, Crude protein, Proximate composition, Purines, Digestible nitrogen

The study evaluated the effect of different levels of crude protein (CP) intake on urinary excretion and plasma concentration of purine derivatives (PD) and creatinine in crossbred bulls. In a randomized block design, 15 growing crossbred bulls were fed a mixed diet (1:1) of wheat straw and concentrate mixture (with varying levels of CP) to meet their maintenance requirement for dry matter. A metabolism trial of ten days duration was conducted after 30 days of experimental feeding. The daily urinary excretion of allantoin and other PD decreased with the reduction in CP intake while creatinine excretion remained similar in groups fed at different levels. The microbial nitrogen (MN) supply calculated from the PD excreted in total urine (55.62 to 63.97 g/d) was higher at increased levels of CP intake. The concentration of PD in plasma reflected the differences in MN supply among groups fed at different levels of CP. The glomerular filtration rate (L/d) was unaffected by dietary levels of CP in crossbred bulls. The results of this study revealed that the plasma concentration of PD can be used as an index of microbial protein supply in crossbred bulls fed at different levels of CP.

055 Prabhakar,S.K.; Sardar,P.; Das, R.C. (Central Institute of Fisheries Education, Kolkata (India)) Effect of starvation with subsequent realimentation with respect to compensatory

growth of Indian Major Carp, Rohu (*Labeo rohita* H.). *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: Starvation, *Labeo rohita*, Nutrition physiology

The aim of the present study was to determine the suitability of starvation followed by the realimentation for culture of rohu. Five different feeding schedules were tried by altering the period of starvation and realimentation of an isonitrogenous and isoenergetic diet. The control group (TCS) was fed @ 3% of body weight for 90 days trial period and other experimental groups also fed at 3% of BW, were alternatively starved and fed adopting of cycles of 3 (T1S), 7 (T2S), 15 (T3S) or 25 (T4S) days during 90 days trial period. Feed was offered to replicates of 10 fingerlings with three replicates per experimental group, twice at morning and at afternoon. Results indicated that the deprived fish of T1S and T2S groups showed compensatory growth with hyperphagia, better feed conversion ratio, specific growth rate and protein efficiency ration. However, the retention of different nutrients was almost similar among all treatment groups. Fish showed compensatory growth had still lower values of haemoglobin, haematocrit value, total erythrocytic count, total plasma protein, plasma glucose and, total plasma lipid and liver glycogen in comparison to control at the end of 90 days trial. These findings suggested that a cyclic feeding schedule with starvation for 3 to 7 days followed by realimentation for same period is promising for use in rohu culture as they result in saving of feed cost without compromising the performance of fish.

L53 Animal physiology – Reproduction

056. Kharche, S.D.; Majumdar, A.C.; Agarwal, S.K.; Sharma, G.T. (Indian Veterinary Research Institute, Izatnagar (India)). Ovarian and endocrine response following pretreatment with human chorionic gonadotrophin and estradiol valerate in PMSG treated crossbred cows. *Indian Journal of Animal Sciences* (May 2008) v. 78 (5) p. 449–452 Keywords:Cows; Superovulation; PMSG; Animal Embryos

The effect of hCG and estradiol valerate on endocrine profiles and superovulatory response of crossbred cows treated with PMSG was studied. Cyclic crossbred cows (22) were treated with a single i/m administration of prostaglandin F₂ a (2 ml prosolvin). The 18 animals that exhibited estrus within 72–96 h prostaglandin F₂ a administration were selected for the superovulatory treatments. In treatment 1, cattle (10) were administered 250 IU hCG i/m on day 9 (day 0 = estrus), 2 mg estradiol valerate on day 10, and 2000 IU PMSG on day 11 of the estrous cycle. Treatment 2 animals (8) were not pre-treated and were administered 2000 IU PMSG on day 11. Both groups were treated with PG F₂ a 48 h after PMSG treatment. The animals were exposed to a teaser bull in the morning and evening to aid detection of estrus. The interval from prostaglandin treatment to estrus was 43.5 ± 2.05 h for treatment 1 and 52.8 ± 4.22 h for treatment 2. The crossbred cows were inseminated 3 times at 12 h intervals during estrus and embryos collected non-surgically at day 8 of the superovulatory estrus. The pretreatment of hCG and estradiol valerate in a PMSG treated crossbred cows resulted in a significantly higher levels of progesterone and estradiol 24 h after administration of hCG and estradiol valerate. Treatment 1 crossbred cows also showed an increase in the number of corpora lutea, total ova and transferable embryos recovered as compared to treatment 2. The results indicated that the

pretreatment with hCG and estradiol valerate in a PMSG treated crossbred cows showed a significant increase in plasma level of progesterone and estradiol and an improvement in the yield of transferable embryos from cycling crossbred cows.

057 Talukdar, S R; Bhattacharya, M; Sarmah, B C (Assam Agricultural University, Guwahati (India)) Histoenzymic study on cervix in prepubertal and induced pubertal local Assam she goat. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 489–492 Key words: Goats; Adolescence (animals) ; Sexual maturity; Enzyme activity

The study was conducted on cervix from 21 Assam local she goats in prepubertal and exogenous hormonally induced pubertal groups. The prepubertal animals meant for induction were administered PMSG after priming, and HCG just after the onset of estrus. Cervical tissues were collected on day 3 following behavioral estrous exhibition by the animals. The histochemical reaction for Malate dehydrogenase, lactic dehydrogenase, glucose-6- phosphate dehydrogenase D⁵-3- β -hydroxysteroid dehydrogenase, 17 β -hydroxysteroid dehydrogenase and cytochrome oxidase were observed significantly in the cervical epithelium of all goats with minor variation in location of enzymes between age groups. The reaction for succinic dehydrogenase in cervical epithelia was not well pronounced in all animals. The presence of these enzymes were not well marked in lamina propria, tunica sub mucosa and tunica serosa; however, tunica muscularis exhibited weak to strong intensity of reaction at different ages

058 Mohan, N.H.; Sarmah, B.C; Tamuli, M.K.; Das, Anubrata; Bujarbaruah, K.M. (National Research Centre on Pigs, Guwahati (India)). Change in electrophoretic profile of porcine spermatozoal proteins during epididymal transit. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 446 –448 Keywords: Epididymis, Spermatozoa, goats

Mammalian spermatozoa acquire their motility and ability to fertilize during their transit through epididymis and are characterized with functional changes in sperm membrane proteins. The present study was undertaken to electrophoretically characterize proteins in epididymal and testicular sperms and cauda epididymal fluid to understand spermatozoal maturation process in porcine testes. The number of protein bands in testicular, epididymal spermatozoa and epididymal fluid were 22, 17 and 17 respectively. The proteins having molecular weight (MW) of 105, 97, 89, 79, 73, 64, 32, 29, 24, 22, 20 and 18 kilodaltons, which were present in the testicular spermatozoa could not be identified in the epididymal sperms. On the other hand, the epididymal spermatozoa expressed proteins having MW of 102, 93, 82, 66, 62, 55, 28 and 21 kilodaltons, which were absent in testicular spermatozoa. The epididymal fluid shared proteins having MW of 55, 52, 42 and 39 kilodaltons with testicular and epididymal spermatozoa. The elucidation of physiological events related to protein modification, appearance and masking require further studies.

059 Bandyopadhyay, U.K.; Chaudhuri, D.; Johari, D.C. (Central Avian Research Institute Izatinagar (India)) Evaluation of relationship between actual and predicted fertility in white

leghorn breeder cocks. Journal of interacademia.(Jan., 2005).p. 99-104 KEYWORDS: EVALUATION; FERTILITY; COCKS; SEMEN; QUALITY

The study was undertaken to evaluate the relationship among actual and predicted fertility along with other semen quality traits in selected and control strains of White Leghorn chicken. In individual fertility trial, highly significant ($P < 0.01$) correlation ($r = 0.71$ at 2-8 days and $r = 0.63$ at 2-15 days) were obtained between predicted (based on INT dye reduction test) and actual fertility at both 2-8 days and 2-15 days post insemination. Most of the semen quality traits revealed no significant correlation with actual and predicted fertilizing ability as well as between themselves. The overall results of correlation as well as rank correlation indicated predicted fertilizing ability based on INT dye reduction test < IS the single most superior trait to predict

060 Das, B.C.; Madan, M.L.; Manik, R.S.; Sarkar, M. (Embryo Biotechnology Centre National Dairy Research Institute, Karnal (India)) Efficacy of dimethyl sulfoxide in cryopreserving buffalo follicular oocytes. Journal of interacademia. (Jan. 2005).p. 91-92

A total of 131 oocytes cumulus complex (OCC) and 118 denuded oocytes (DO) were cryopreserved in liquid nitrogen to see their survival rate and thereby in vitro maturation rate. Cryoprotectant used was 2.0 M Dimethyl sulfoxide (DMSO). Percentage recovery for two types of oocytes was 84.73 and 79.66% respectively. Upon in vitro maturation two types of oocytes showed the maturation rate of 14.41 and 11.70% respectively.

061 Das, B.C.; Madan, M.L.; Sarkar, M. (Embryo Biotechnology Centre, National Dairy Research Institute Karnal (India)) In vitro maturation of buffalo follicular oocyte. Journal of interacademia.(Jan., 2005) .p. 93-96 KEYWORDS :WATER BUFFALOES; GONADSTROPINS; OVARIAN CYSTS; IN VITRO

A total of 73 oocyte cumulus complex and 66 denuded oocytes were placed for in vitro maturation. Maturation rate based on M-II stage was 72.60 and 66.6. Difference between two groups was not significant.

062 Hedao, M.K (Post Graduate Institute of Veterinary and Animal Sciences, Akola (India). Department of Animal Reproduction and Gynaecology));Khilare, K.P. (Post Graduate Institute of Veterinary and Animal Sciences, Akola (India). Department of Animal Reproduction and Gynaecology));Meshram, M.D. (Post Graduate Institute of Veterinary and Animal Sciences, Akola (India). Department of Animal Reproduction and Gynaecology));Sahatpure, S.K. (Post Graduate Institute of Veterinary and Animal Sciences, Akola (India). Department of Animal Reproduction and Gynaecology));Patil, M.G. (Post Graduate Institute of Veterinary and Animal Sciences, Akola (India). Department of Animal Reproduction and Gynaecology));. Comparative studies of certain bio-chemical constituents of normal cyclic and anoestrus surti buffaloes.

Veterinary World (India). (Apr 2008) v.1(4) p.105-106 KEYWORDS: WATER BUFFALOES; OESTROUS CYCLE; OVULATION; BLOOD COMPOSITION.

L60 Animal taxonomy and geography

063 . Mitra, B.; Parui, P.; Banerjee, D. (Diptera Section, Zoological survey of India, Kolkata (India); Sharma, RM. (High Altitude zoology field Station zoological Survey of India); Mehta, H.S. (Northern Regional Station Zoologica Survey of India Dehra dun (India)» Diptera fauna of Chandigarh Journal of Interacademia.(July, 2004).p. 393-423 KEYWORDS :INDIA; FORESTS; DIPTERA; FAUNA; CHANDIGARH

The present communication reports 72 species of 39 genera under 15 families (Tipulidae, Simuliidae, Bibionidae, Tabanidae, Asilidae, Bombyliidae, Syrphidae, Diopsidae, Tephritidae, Otitidae, Sepsidae, Ephydriidae, Muscidae, Calliphoridae and Sarcophagidae) of Diptera of which 21 species of 19 genera under 14 families are recorded for the first time from this union territory.

L70 Veterinary science and hygiene

064 Kumar M.; Baxla, S. L.; Singh, S.D.; Jayachandran, C. (Bihar Veterinary College, Patna (India) Department of Pharmacology and Toxicology). Pharmacokinetics and urinary excretion of paracetamol following intravenous administration in buffalo calves. Indian Journal of Animal Research, (Mar 2007) v. 41 (1) Keywords: Calves; Urination; Medicinal properties; Drugs

Pharmacokinetic study of paracetamol was conducted in five female buffalo calves following single i.v. injection of paracetamol @ 40 mg/kg. The drug was detected up to 2 h only in plasma, while it was detected for a longer period of 48 h in urine with a mean concentration of 1.87 ± 0.48 and 10.90 ± 1.14 mg/ml, respectively. The mean distribution half life ($t_{1/2}$) of 0.11 ± 0.01 h and elimination half life ($t_{1/2}$) of 0.77 ± 0.09 h indicated that the drug is rapidly distributed as well as eliminated quickly in buffalo calves. The rapid elimination of the drug is due to the higher values of rate constant of drug elimination from central compartment (K_{el}) of $1.471 \pm 0.089 \text{ h}^{-1}$ and total body clearance (Cl_b) of 43.67 ± 3.39 ml/kg/min. This led to the lower value of mean residential time (MRT) of 1.00 ± 0.01 h, indicating that paracetamol remained for a shorter period only in the body of buffalo calves. A higher $V_{d_{area}}$ of 2.34 ± 0.19 L/kg obtained in the present study suggested good distribution of paracetamol in body fluids and tissues which is further supported by the approximate tissue to plasma concentration ratio (T/P) of 0.59 ± 0.13 .

065 Kumar S; Ghosh, D.; Dutta, U.; Das, P.; Mukhopadhyaya, S.K.; Kundu, S. (West Bengal University of Animal and Fishery Sciences, Kolkata (India)) Wound healing potential of

spermatheca gland extract of snail (*Telescopium telescopium*) in rabbits. Indian Journal of Veterinary Surgery (Jun 2008) v.29(1). Keywords: rabbits; wound healing; *Telescopium telescopium*

The efficacy of spermatheca gland extract of snail (*Telescopium telescopium*) as wound healing promoter was studied in rabbits. Spermatheca gland extract of snail was used as a topical medicament to treat experimentally created full thickness wounds in 12 rabbits (*Oryctolagus cuniculus*). Wound healing was assessed on the basis of physical, histomorphological and histochemical observations on days 0, 3, 7 and 14 of treatment. The healing of wound was observed significantly faster ($P<0.01$) in treatment group than the control group.

066 Thakur, K. (Veterinary Hospital, Kinnaur (India)) ; Kinjavdekar, P.; Amarpal; Aithal, H.P.; Pawde, A.M.; (Indian Veterinary Research Institute, Izatnagar (India) Division of Surgery) Kushwaha, R.B. (SKUAST of Jammu, Jammu (India)); Pratap, K. (Indian Veterinary Research Institute, Izatnagar (India) Division of Surgery) Comparison of lateral and ventral approaches of tube cystostomy for the management of urethral obstruction in goats. Indian Journal of Veterinary Surgery (Jun 2008) v.29(1). Keywords: Goats; Surgical operations; urethral obstruction

The technique of tube cystostomy was compared by ventral (paramedian) (group A) and lateral (group B) approaches in 18 goats suffering from urethral obstruction. The techniques were evaluated and compared by clinical and physiological parameters. The median time taken for surgery in group A was 23 min and in group B was 27 min. The Foley's catheter was well tolerated by all the animals in both groups. Mild swelling and pain was recorded in animals of both groups. No exudation and urine leakage was noticed in both groups. In almost all the animals, the urine flow was continuous through the Foley's catheter. Physiological parameters did not show any change in both groups during the period of the study. The Foley's catheter was blocked in one animal (group B). In almost all the animals oozing of small amount of urine through the subcutaneous tunnel at the time of removal of the catheter was noticed, which stopped within a few min. It was concluded that the paramedian approach for the placement of Foley's catheter was a better technique as it was found easier with fewer complications than the lateral flank approach, though both techniques were helpful in the management of urethral obstruction.

067 Shirodkar, K.; Chariar, V.; Tank, P.H.; Mankad, M. Y; Paithanpagare, Y. M. (Anand Agricultural University, Anand (India) College of Veterinary Science and Animal Husbandry, Department of Veterinary Surgery and Radiology) Laparoscopic oophorectomy in bitches. Indian Journal of Veterinary Surgery (Jun 2008) v.29(1). Keywords: Dogs; Surgical operations

A clinical study on laparoscopic oophorectomy in bitches was conducted to compare two different modalities viz., electro-cautery (Group I; n=6) and endo-looping (Group II; n=6). The anesthetized bitches were placed on a specially designed tilting wooden table for better and easy laparoscopic manoeuvrability. Three peri-umbilical midline ports were created for lodging two 5 mm hand instruments and laparoscope following abdominal insufflation. The

electrocautery was performed using monopolar current for electro-desiccation and the endo-looping was carried out using black braded silk no. 1. The total time required to perform laparoscopic oophorectomy by electro-coagulation was comparatively lesser (31.53 ± 0.9 min) than endo-looping (34.24 ± 0.64 min). Effect of anaesthesia and bleeding during the procedures were reflected by transient reduction in total erythrocyte count, haemoglobin concentration and packed cell volume. The acute inflammatory changes following laparoscopic procedures led to increase in total leucocyte count and a compensatory fall in the numbers of lymphocytes. An early and uneventful recovery of all the animals following both the laparoscopic procedures was credited to minimum invasive nature of the procedures. The stress induced by laparoscopic procedure led to temporary increase in serum cortisol level. Both the laparoscopic oophorectomy procedures were found to be effective but endo-looping required additional precision and perfection. The electro-coagulation followed by extraction of ovary may be preferred for wider clinical use.

068 Mankad, M.Y.; Tank, P.H.; Shirodkar, K.; Sarvaiya, N.P.; Prajapati, K.S.; Paithanpagare, Y.M. (Anand Agricultural University, Anand (India)) Cryosurgical sterilization in bitches. *Indian Journal of Veterinary Surgery* (Jun 2008) v.29(1). Keywords: dogs; Surgical operations

Cryosurgical oophorectomy (Group I; n=6) and conventional surgical oophorectomy (Group II; n=6) following standard midline laparotomy were compared in a clinical trial on twelve healthy bitches. The cryosurgical oophorectomy was found bit quicker (Average 32 min) as compared to conventional surgical oophorectomy (Average 35 min). The total erythrocyte count fluctuated nonsignificantly ($P > 0.05$) within the physiological range at different time intervals. The nonsignificant ($P > 0.05$) variation total leucocyte count between the groups indicated that none of the procedures had specific influence on cellular defense mechanism. The neutrophils rose initially upto 48 hr, which then got substituted by the lymphocytes. A transient postoperative elevation in serum cortisol level following the procedures in both groups of animals with tendency to resume normalcy at later phases was suggestive of temporary pain and/or stress imposed by surgical as well as cryosurgical oophorectomy. Laparoscopic as well as histomorphological assessment of cryodamaged ovaries a month later confirmed their complete nonvitality. The cryosurgical oophorectomy using liquid nitrogen found simple, bloodless, safe and effective.

069 Laiju, M.P.; Devanand, C.B.; Sreekumar, K.P.; Amma, T. S. (Kerala Agricultural University, Thrissure (India) College of Veterinary and Animal Sciences). Influence of preoperative dextrose infusion on surgical stress in dogs after elective surgery. *Indian Journal of Veterinary Surgery* (Jun 2008) v.29(1). Keywords: Dogs; post operative care

The study to evaluate the effect of preoperative dextrose infusion in alleviating stress and to promote healing and postoperative recovery, was conducted in 12 clinically healthy non-descript bitches presented for panhysterectomy. The animals were divided into two groups (Group I and Group II) consisting of six each. In Group I, panhysterectomy was performed under general anaesthesia after overnight fasting and in Group II, panhysterectomy was performed under general anaesthesia after overnight fasting and administration of 12.5 per cent dextrose @ 5 ml/kg i.v. two hr prior to induction of anaesthesia. Plasma cortisol and glucose

concentrations were estimated before surgery, immediately after surgery and at 24 hour postoperatively. A significant ($P < 0.05$) reduction in stress in the immediate postoperative period was noted in animals infused with dextrose as indicated by lowered elevation of cortisol and glucose levels, and early anaesthetic recovery. The favourable outcome of the study recommends preoperative dextrose infusion for elective surgery as a protocol in future practices in animal surgery.

070 Jangra, S.K.; Chawla, S.K.; Peshin, P.K.; Tayal, Rishi; Singh Jit; Behl, S.M. (CCS Haryana Agricultural University, Hisar(India) College of Veterinary Sciences) Cardiopulmonary effects of midazolam in goats. Indian Journal of Veterinary Surgery (Jun 2008) v.29(1). Keywords ; goats, midazolam

The study was conducted in 5 healthy goats. Midazolam was administered 0.4 mg/kg, i.v.. There were no significant changes in heart rate, blood pressure, central venous pressure and respiratory rate. Primary T-wave changes were observed at varying time intervals after midazolam administration. The depression of ST-segment was recorded in three animals up to 5 min. No significant variations in pH, PaCO₂, HCO₃ concentration was seen. Appreciable reduction in PaO₂ and PvO₂ values were observed after midazolam administration, which did not return to normal up to the end of the observation. The oxygen extraction ratio increased significantly from 5 min after and gradually increased to 52.95±1.50% at 30 min. There was no evidence of tissue hypoxia. No significant changes in hematological and blood biochemical parameters were recorded. Mean values of cardiovascular and respiratory parameters did not show significant changes. However, few animals showed appreciable decrease in heart rate and blood pressure, hypoxaemia and desaturation of haemoglobin.

071 Singh, A.K.; Sharma, S.K.; Adarsh Kumar; Varshney A.C.; Amit Kumar (CSK Himachal Pradesh Agriculture University, Palampur (India) College of Veterinary and Animal Sciences) Atropine-medetomidine-ketamine for balanced anesthesia in neonatal calves: Cardiovascular and electroencephalographic studies. Indian Journal of Veterinary Surgery (Jun 2008) v.29(1). Keywords: calves; anesthesia; electroencephalographics

The present study was conducted on 13 apparently healthy neonatal male calves. Following atropinization, the animals were administered medetomidine HCl and ketamine HCl combination in a single syringe i.m., @ 0.015 mg/kg and 10.0 mg/kg, respectively. There was initial rise of blood pressure after the administration of atropine and a significant hypotension was recorded following medetomidine + ketamine administration. There was an overall increase in different time interval parameters and voltage parameters of ECG. However, these changes were statistically non-significant. ST-segment elevation and biphasic T-wave were observed. One animal showed atrial flutter at 75 min interval. EEG studies revealed low voltage high frequency waves changing to low voltage low frequency waves with burst suppressions indicating surgical state of anaesthesia. It was concluded that atropine-medetomidine-ketamine can safely be used in bovine neonates for achieving surgical anaesthesia in clinical practice.

072 Murmu, S.; Dass, L.L.; Sharma, A.K. (Birma Agricultural University, Ranchi (India) College of Veterinary Science and Animal husbandry, Department of Surgery and Radiology). Evaluation of bupivacaine alone and in combination with hyaluronidase for epidural analgesia in dogs. Indian Journal of Veterinary Surgery (Jun 2008) v.29(1). Keywords: dogs; Analgesics
Bupivacaine HCl (0.5%) alone and with hyaluronidase 150 I.U./100 mL of bupivacaine HCl was administered epidurally in six dogs each. Increase in rectal temperature, heart rate, respiratory rate and pulse rate were recorded at initial intervals in the animals of both groups. However, these values decreased at later intervals of observation and reached to near normal level by 120 min of observation. The decrease in clinical parameters was sharper in the animals receiving bupivacaine with hyaluronidase as compared to animals receiving bupivacaine alone. Addition of hyaluronidase significantly decreased the time of onset, duration, standing on its own and ambulation after standing. Maximum analgesia could be recorded at 15 min and 30 min, respectively after administration of bupivacaine with and without hyaluronidase. The cutaneous and pedal reflexes were absent at 60 min of observation in both groups. The extent of spread of anaesthesia was observed up to the level of T₁₃ and T₁₁ vertebrae in the animals receiving bupivacaine alone and in combination with hyaluronidase, respectively.

073 Laiju, M.P; Devanand, C.B.; Sreekumar, K.P.; Martin, K.D. John; Amma, T.S. (Kerala Agricultural University, Thrissure (India) Department of Veterinary Surgery and Radiology) Postoperative behavior as indicators of pain in dogs after elective ovariohysterectomy. Indian Journal of Veterinary Surgery (Jun 2008) v.29(1). Keywords: Dogs; Surgical operations
The study was conducted in 12 clinically healthy nondescript bitches to investigate the postoperative behavior for assessing postoperative pain in dogs after elective ovariohysterectomy. The dogs recovering from ovariohysterectomy were approached to record postoperative behavior. Sedation score and pain score were measured using postoperative behaviors. Surgery resulted in an increase in pain score, sedation score and time spent sleeping. During interactions, greeting behavior and overall activity were decreased after surgery. The purpose of this study was to establish a behavior based scale for evaluation of postoperative pain in dogs recovering from elective surgery.

074 Malik, V.; Singh, B. (UP. Pt. Deen Dayal Upadhyay Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go Anusandhan Sansthan, Mathura (India)). Effects of midazolam supplementation on ketamine anaesthesia in butorphanol – xylazine premedicated horses. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 486 –488 Key words: Anaesthesia; Horses; Xylazine
Clinically healthy horses (6) were utilized to evaluate the effect of midazolam supplementation on ketamine anaesthesia in horses premedicated with butorphanol and xylazine. Midazolam supplementation resulted in to slight increase in duration of anaesthesia and a significant improvement in the quality of analgesia, muscular relaxation and depth of anaesthesia with out producing any adverse effect on cardiorespiratory system.

075 Awandkar, S.P.; Majee, S.B.; Sherikar, A.A.; Ghanbahadur, V.S. (Maharashtra Animal and Fishery Sciences University, Nagpur (India)). Characterization of structural proteins of velogenic field isolate (Bom-1) and vaccine strains (R2B and LaSota) of Newcastle disease virus by SDS-Page. Indian Journal of Animal Sciences (India). (Mar 2006) v. 76(3) p. 188-190 KEYWORDS: POULTRY; NEWCASTLE DISEASE VIRUS; PATHOTYPES; ELECTROPHORESIS; STRUCTURAL PROTEINS.

Newcastle disease virus(NDV) strains including a velogenic field isolate from Konkan region (BOM-1) and 2 established vaccine strains (R2B and LaSota) were characterized on the basis of electrophoretic mobility of their structural proteins using SDS-PAGE. On virus fragmentation, 3 major protein patterns revealed similarities among all 3 strains of NDV. These proteins were haemagglutinin-neuraminidase (HN-75,000 D), fusion protein (F-66,000 D) and nucleoprotein (NP-56,000 D). The BOM-1 demonstrated 5(205,000 D; 79,000 D; 50,000 D; 44,000 D and 28,000 D) minor viral proteins (VP) while R2B had 8(224,000D; 205,000 D; 98,000D;79,000 D. 50,000 D, 44,000 D, 38,000 D and 28,000 D) and VP79(79,000 D) were common in all 3 strains. The protein profile of BOM-1 revealed differences in the minor proteins whereas structural proteins appeared to be similar to the vaccine strains. The differences in the minor proteins between virulent and vaccine strains reflect the epidemiological significance of the test in molecular characterization of NDV.

076 Sharma, S.K.; Misra, S.S.; Adarsh Kumar; Varshney, A.C.; Amit Kumar (Chaudhary Sarvan Kumar, Himachal Pradesh Agricultural University, Palampur (India)). Chloral-mag-thiopental anaesthesia in neonate calves: Sedative, haemato-biochemical and electrocardiography studies. Indian Journal of Animal Sciences (India). (Mar 2006) v. 76(3) p. 196-198 KEYWORDS: CALVES; NEWBORN ANIMALS; ANAESTHESIA; ANAESTHETICS; BLOOD COMPOSITION; ELECTROCARDIOGRAPHY.

Chloral-mag(6 percent 10 mg/kg i/v) followed 10 min later by thiopental sodium (5 percent 15mg/kg to effect, i/v) was evaluated in 6 clinically healthy, 10-15 days old and weighing 16-24 kg neonate male calves. General anaesthesia was induced in 60 sec with peak effect remaining for 60-90 min and sedation remaining for more than 4 h. Breach holding was of common feature in all the animals. There was excellent muscular relaxation and analgesia throughout the study. A significant hypothermia and nonsignificant tachycardia was recorded. Elevation of ST segment was a constant feature. There was evidence of hyperglycaemia with a nonsignificant increase in AST and ALT values.

077 Fani, F.A. (Maharashtra Animal and Fishery Science University, Nagpur (India). Post Graduate Institute of Veterinary and Animal Science, Akola Department of Veterinary Surgery and Radiology);Mehesare, S.P. (Maharashtra Animal and Fishery Science University, Nagpur (India). Post Graduate Institute of Veterinary and Animal Science, Akola Department of

Veterinary Surgery and Radiology);Pawshe, D.B. (Maharashtra Animal and Fishery Science University, Nagpur (India). Post Graduate Institute of Veterinary and Animal Science, Akola Department of Veterinary Surgery and Radiology);Khan, K.M. (Maharashtra Animal and Fishery Science University, Nagpur (India). Post Graduate Institute of Veterinary and Animal Science, Akola Department of Veterinary Surgery and Radiology);Jadhav, N.D. (Maharashtra Animal and Fishery Science University, Nagpur (India). Post Graduate Institute of Veterinary and Animal Science, Akola Department of Veterinary Surgery and Radiology);. Haematological and biochemical changes during epidural xylazine hydrochloride anaesthesia in dogs. Veterinary World (India). (June 2008) v.1(6) p. 175-177 KEYWORDS: DOGS; ANAESTHESIA; XYLAZINE; ANALGESICS; BLOOD; BIOCHEMISTRY.

Atropine sulphate was given 0.04 mg/kg body weight 1/M 15 minutes prior to the xylazine HCL anaesthesia 0.75 mg/kg b.wt at the lumbosacral epidural space and haematological and biochemical parameters were evaluated. A significant decrease in haematological parameters viz. TEC, PCV, Hb and non-significant decrease in TLC and platelet count whereas significant increase in ESR was observed. A significant increase in serum glucose value was recorded while the other biochemical parameters like SGOT, SGPT, and BUN significantly altered whereas no change in serum creatinine value was also recorded. 0225. Manjulkar, G.P. (Pet Clinic and Care Centre, Akola (India).);Zade, P.R. (Pet Clinic and Care Centre, Akola (India).);Pathak, V.P. (Pet Clinic and Care Centre, Akola (India).);. Use of PVC sheet for repair of fracture in eagle. Veterinary World (India). (Apr 2008) v. 1(4) p. 119 KEYWORDS: EAGLES; FRACTURES; FRACTURE FIXATION; POLYVINYL CHLORIDE.

L72 Pests of Animals

078 Gadre, A.S. (Nagpur Veterinary College, MAFSU, Nagpur (India). Department of Parasitology);Maske, D.K. (Nagpur Veterinary College, MAFSU, Nagpur (India). Department of Parasitology);Panchbhai, C.G. (Nagpur Veterinary College, MAFSU, Nagpur (India). Department of Parasitology);Gawande, T.R. (Nagpur Veterinary College, MAFSU, Nagpur (India). Department of Parasitology);Kolte, S.W. (Nagpur Veterinary College, MAFSU, Nagpur (India). Department of Parasitology);Sirothia, A.R. (Nagpur Veterinary College, MAFSU, Nagpur (India). Department of Parasitology);. Efficacy of Doramectin and Fendendazole against naturally infected dairy animals with parasites at central zone of vidarbha region of Maharashtra state. Veterinary World (India). (Apr 2008) v.1(4) p.101-102 KEYWORDS: DAIRY CATTLE; HELMINTHOSES; INFECTION; ANTHELMINTICS; MAHARASHTRA.

Comparative efficacy of doramectin and fenbendazole was studied against naturally infected dairy animals with helminth parasites showing clinical symptoms such as rough body coat, emaciation, diarrhoea and weakness etc. Based on the number of days taken for clinico-parasitological cure and the mean reduction EPg, doramectin was found to be superior to fenbendazole.

079 Mritunjay Kumar (Ranchi Veterinary College, Kanke (India). Department of Veterinary Medicine); Pallav Shekhar (Ranchi Veterinary College, Kanke (India). Department of Veterinary Medicine); Haque, S. (Ranchi Veterinary College, Kanke (India). Department of Veterinary Medicine); Mahto, D. (Ranchi Veterinary College, Kanke (India). Department of Veterinary Medicine);. Feline babesiosis. *Veterinary World (India)*. (Apr 2008) v. 1(4) p. 120-121
KEYWORDS: BABESIOSIS; AETIOLOGY; EPIDEMIOLOGY; CHEMOPROPHYLAXIS.

L73 Animal Diseases

080 Yadav, A.; Gupta, S.K. (CCS Haryana Agricultural University, Hisar (India) Department of Veterinary Parasitology) Effect of ionophores on immunity to *Eimeria tenella* field isolates. *Indian Journal of Animal Research*, (Mar 2007) v. 41 (1) Keywords: **Ionophores; Eimeria tenella; Immunity**

Three *Eimeria tenella* field isolates from Gurgaon district of Haryana (North India) were studied in a battery test for evaluating the effect of currently used ionophores, maduramicin (5 ppm) and salinomycin (60 ppm) on development of immunity. Broiler birds (Ross Strain) were infected with 10^5 sporulated oocysts each at the age of 2 weeks (day 0) and prophylactic medication commenced 2 days prior to infection. The birds were challenged with 2×10^5 sporulated oocysts each at the age of 4 weeks i.e. after a withdrawal period of 7 days. The effect of medication on development of immunity was assessed by calculating the per cent interference in the development of immunity for individual ionophore compound based on weight gain, lesion score and mortality (per cent survival). Present study revealed negligible immunity interference with Gurgaon isolate-I and III by both the ionophores whereas, slight interference in immunity development was observed with isolate-II.

081 Kusumakar, A. L.; Savita; Malik, Y. P. S. (Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (India)). Minakshi; Prasad, G. (CCS Haryana Agricultural University, Hisar (India)) Occurrence of mammalian group A rotavirus in swine population of central India. *Indian Journal of Animal Sciences* (May 2008) v. 78 (5) p. 475–477. Keywords: Swine; Porcine rotavirus, Morbidity, RNA

This study reports distribution of porcine rotavirus and existence of genomic diversity among isolates of porcine rotavirus in central region of India. RNA electrophoresis (RNA-PAGE) results revealed presence of porcine rotavirus with a typical migration pattern of 4: 2: 3: 2, indicative of group A rotavirus. All the porcine rotavirus isolates obtained during the study from different areas showed the same type of long electrophoretic migration pattern based on the relative migration of 10th and 11th genome segments. Incidence of PRV in swine population was 25.71% (9/35). The results of age-wise incidence showed that piglets were more commonly infected during early period of life with the highest incidence between 4 and 8 weeks of age (50%), whereas it reduced with age, as piglets above 3 months of age showed incidence of only 7.69%. The results of present study clearly indicate circulation of single strain of porcine rotavirus in this region of the country which can be targeted to make a suitable vaccine.

However more data with detailed studies are required on this infection in pigs from central India as well as other parts of the country.

082 Savita; Kusumakar, A L; Malik, Y P S (Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (India)). Minakshi; Prasad, G (CCS Haryana Agricultural University, Hisar (India)) Co-occurrence of avian rotavirus and bacterial pathogens in diarrheic poultry. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 478–479. Keywords: Diarrhea, *E. coli*, Poultry, Prevalence, *Salmonella*, Serotyping Association of avian rotavirus, *E. coli* and *Salmonella* were studied in the present study. Results indicated that 11.68% samples obtained from 7 different farms had mixed etiology for diarrhea, which included 5.19% (4 samples) of both *E. coli* and *Salmonella* and 6.49% (5 samples) of *E. coli* and avian rotavirus infections. Therefore, proper investigation should be made to know the causative agent of disease and only then treatment would be effective. Study emphasized the implementation of hygienic conditions on poultry farms as antimicrobial agents are not effective in the prevention of viral diseases.

083 Senthilkumar, T.M.A.; Subathra, M.; Ramadass, P.(Madras Veterinary College, Chennai(India)) Serodiagnosis of leptospiral infections using recombinant LipL32 antigen bound carboxyl-modified latex beads. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 480–482 Keywords: Latex agglutination test, Leptospirosis, Recombinant LipL32 The recombinant outer membrane protein antigen based LAT was evaluated with suspected cattle and dog sera. The rLipL32 was specific for pathogenic serovars of *Leptospira*. Relative sensitivity and specificity of LAT was 94.84% and 96.55% for dog sera and 93.68% and 98.3% for bovine sera, respectively. The test was simple, rapid and cost effective for large scale screening of bovine and dog sera against leptospiral antibodies.

084 Sahni, Y P; Gautam, V.; Shukla, D. (Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (India)) Evaluation of herbal extracts for antibacterial activity against *Staphylococcus aureus* and *Klebsiella pneumoniae* micro-organisms. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 483–485 Keywords: Drug plants; Antimicrobial properties; *Withania somnifera*; *Klebsiella pneumoniae*; *Staphylococcus aureus* The MIC of aqueous extract of *Boerhaavia diffusa*, *Eclipta alba* and *Withania somnifera* was recorded as 100, 62.5 and 50 mg, respectively, against *Staphylococcus aureus* bacteria. The alcoholic extracts of *Boerhaavia diffusa*, *Eclipta alba* and *Withania somnifera* were more effective against *S. aureus* with MIC of 50, 12.5, 21.87 mg, respectively. However, aqueous and alcoholic extracts of *Boerhaavia diffusa*, *Eclipta alba* and *Withania somnifera* were resistant against *Klebsiella pneumoniae*.

085 Chakrabarti, A.; Baksi, S. (Faculty of Veterinary and Animal Sciences, West Bengal University of Animal and Fishery Sciences Kolkata (India), Dept. of Veterinary Medicine, Ethics and

Jurisprudence.); Mukherjee, A. (Acharya J.B. Roy Aurvedic College Kolkata, West Bengal, (India)» Canine pyoderma and its clinical management by green antibiotic an alternative approach. Journal of Interacademia. (July, 2004). p. 433-435 KEYWORDS :ANTIBIOTIC; STAPHYLOCOCCUS AUREUS; MORINGA OLEIFERA; BACTERIA

Out of 36 dogs suffering from superficial pyoderma as treated with Moringa oleifera 31 (86.11) dogs showed either clearing of lesions or marked improvement. Staphylococcus aureus was the predominant bacteria. The recovered dogs

086 Zunita, Z. (Universiti Putra Malaysia, Serdang, Selangor (Malaysia). Faculty of Veterinary Medicine); Bashir, A. (Universiti Putra Malaysia, Serdang, Selangor (Malaysia). Faculty of Veterinary Medicine); Hafizal, A. (Universiti Putra Malaysia, Serdang, Selangor (Malaysia). Faculty of Veterinary Medicine); Occurrence of multidrug resistant staphylococcus aureus in horses in Malaysia. Veterinary World (India). (June 2008) v.1(6). p. 165-167 KEYWORDS: HORSES; STAPHYLOCOCCUS AUREUS; DRUG RESISTANCE; ANTIBIOTICS.

A total of 22 staphylococcus aureus were isolated from 50 samples from 8 stable horses. They are positive in the catalase and coagulase tests. Upon testing the cultures with SLIDEX test kit all formed agglutination within a few seconds, confirming they are of S.aureus. When cultured onto MSA all isolates formed yellow colonies. However, none of the isolates produced blue colonies on ORSAB indicating that there were no MRSA among the S.aureus. There were 13 isolates which were multiresistant. Eleven are resistant to eight out of ten antibiotics tested. All these isolates were found to originate from stable. G. One isolate is resistant to 5 antibiotics while another one isolate is resistant to 3 antibiotics. The rest of the isolates are not multiresistant to the antibiotics tested.

087 Mohan, M. (Veterinary Dispensary, Puducherry (India).); Fernandez, T.F. (Veterinary Dispensary, Puducherry (India).); A case report of pigeon pox-histopathologic diagnosis. Veterinary World (India). (Apr 2008) v. 1(4) p. 117-118 KEYWORDS: PIGEONS; DIAGNOSIS; AVIPOXVIRUS.

088 Keraki, K. (Central Veterinary Laboratory, Tripureswor, Kathmandu (Nepal). Parasitology Unit); A laboratory epidemiological outbreak investigation of Kumri (cerebrospinal nematodiasis) and use of diethylcarbamazine in treatment of goat in Banke district of mid-western region of Nepal. Veterinary World (India). (Jun 2008) v. 1(6) p. 168-170 KEYWORDS: GOATS; LESIONS; MORBIDITY; EPIDEMIOLOGY; PARALYSIS; NERVOUS SYSTEM DISEASES; SETARIA (HELMINTH).

Seasonal occurrence (mainly in October-November) of a disease syndrome locally called Kumri meaning weak back was observed in goats in Banke and other districts of western Terai in the last few years. Traumatic injury to the lumbar region, nutritional deficiencies and parasitism in the spinal cord were the likely causes considered. Based on the epidemiological pattern viz; seasonal occurrence, clinical symptoms, afebrile condition and local nature of infection, and non response to supplementation of vitamins and minerals, the disease was provisionally

diagnosed as cerebrospinal nematodiasis. This has been further substantiated through laboratory of Seteria spp in cattle in this region, detection of microfilaria in affected goat and treatment response of affected goats with diethylcarbazine. As adult seteria spp in cattle, Buffalo and microfilaria from blood smears of affected goat confirmed the cerebrospinal nematodisease in goat in Nepal.

089 Mahajan, S. (College of Veterinary Sciences and Animal Husbandry, Mhow (India). Department of Veterinary Microbiology);Chhabra, Daljeet (College of Veterinary Sciences and Animal Husbandry, Mhow (India). Department of Veterinary Microbiology);. Leptospirosis: a re-emerging disease. *Veterinary World (India)*. (Jun 2008) v. 1(6) p. 182-185 KEYWORDS: LIVESTOCK; CATTLE; DOGS; HORSES; SWINE; SHEEP; GOATS; DIAGNOSIS; LEPTOSPIROSIS.

090 Mohan, M. (Acharya N.G. Ranga Agricultural University, Hyderabad (india). College of Veterinary Science);Fernandez, Trevor Francis (Acharya N.G. Ranga Agricultural University, Hyderabad (india). College of Veterinary Science);Feroz Mohammed, M.S. (Acharya N.G. Ranga Agricultural University, Hyderabad (india). College of Veterinary Science);. Avian influenza infection in human. *Veterinary World (India)*. (Apr 2008) v. 1(4) p. 122-125 KEYWORDS: AVIAN INFLUENZAVIRUS; MANKIND; PATHOGENICITY.

L74 Miscellaneous Animal Disorders

091 Gupta, V.K.; Sharma, S.D.; Vihan V.S.; Ashok Kumar (Central Institute for Research on Goats, Makhdoom (India)). Prevalence and changes in haemogram in sub-clinical ketosis in sheep reared under organized farming system. *Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 453–456* Keywords: Ketosis; Metabolic disorders; Sheep; Disease surveillance
Sheep (74) of Muzzafarnagri breed were screened in advance stage of pregnancy and early stage of lactation for prevalence of ketosis. The prevalence rate in relation to type of birth, kid's birth weight, dam's weight, age and breed, lactation number, feeding status, environmental stress, transportation and managemental variations was studied in organized farming system. The prevalence rate of sub-clinical ketosis was 14.86% in pregnancy, and 13.51% in lactation stage. The prevalence rate of sub-clinical ketosis was 13.89% in sheep giving birth to single lamb and it increased with increasing lamb's birth weight. The prevalence rate was positively correlated with dam's weight in both pregnancy and lactation. Similarly, age-wise distribution of data revealed that 3–4 years age group was the most susceptible for sub-clinical ketosis in pregnancy as well as during lactation periods. The prevalence rate in pregnant ewes was 50.00% and it increased with the increase in parity numbers in sheep. No clinical case was found in either goats or sheep based on overt signs of ketosis, but sub-clinical ketotic cases were identified on the basis of hypoglycemia (<30 mg%) and ketonemia. In normal physiological

states (dry, pregnancy and lactation), erythrocytic indices (TEC, Hb and PCV) showed a declining trend on the values of these parameters during pregnancy and lactation states, which showed the state of anemia particularly in the last month of pregnancy. TLC levels increased in both pregnancy and lactation as compared to dry period. TEC, Hb, PCV and MCV did not show any significant changes in sub-clinical ketotic cases in either species of animals under study compared to healthy group animals. The value of TEC, Hb and PCV were 8.26 ± 0.61 and $6.81 \pm 0.34 \times 10^6/\mu\text{l}$, 6.70 ± 0.20 and 6.28 ± 0.33 g% and 25.20 ± 0.70 and $25.38 \pm 0.38\%$ in pregnancy and lactation in ketotic sheep respectively

092 Vohra, J. Singh, S.V. Singh, A.V. Singh, P.K ; Sohal, J.S. (Central Institute for Research on Goats, Makhdoom (India)) Detection and characterization of *Mycobacterium avium* subspecies *paratuberculosis* from vaginal secretions of post-parturient farm goats, using culture, IS 900 and ELISA kit. Indian Journal of Animal Sciences (May 2008) v. 78 (5) p. 441–445 .Keywords: Goat; Johne's disease; Mycobacterium avium ; paratuberculosis; PCR; ELISA; Vaginal secretions
Vaginal secretions and sera from 29 post-parturient farm goats were screened by culture, IS900 PCR and indigenous ELISA kit to know the presence of MAP in reproductive tract after parturition. Decontaminated pellets from vaginal secretions and MAP cultures were processed for DNA isolation and screened by IS900 PCR. Positive DNA samples on amplification yielded specific 229 bp band from pellets of vaginal secretions. Of 10 DNAs obtained from 29 pellets, 4 were amplified. Soluble protoplasmic (PPA) antigen from MAP 'Bison type' strain cultured from terminal case of JD in goat was used in ELISA kit. Vaginal secretions (VS) 37.9% each were positive in culture and ELISA from 29 goats of farm herds. Of the 3 tests, culture was the most sensitive. There was poor correlation (37.5%) between culture of VS and strong positives in ELISA kit. However, correlation was good between positives, low positives and suspected goats in S/P ratio with culture of VS. This study was maiden attempt and reports high presence and recovery of MAP in vaginal secretions of post parturient farm goats in India by culture and ELISA kit. Positive IS900 PCR in DNA pellets confirmed presence of MAP. Vaginal secretion was potential source of contamination to new born kids and animals handlers and was a good clinical material to screen post parturient female goats. It also indicated potential contamination of fetus during pregnancy in JD infected goats.

093 Chakraborty, N.M.; Das, N.K.; Chakraborti, P.P.; Mondal, S.C. (Regional Research centre Central Institute of fresh water aquaculture kalyani (India)» On mass demonstration of integrated fish cum pig farming in meghalaya. Journal of interacademia.Oan., 2005) .p. 1100116 KEYWORDS :SWINE; PIGGERIES; CARP; FEEDS; LIVESTOCK; GROWTH; MEGHALAYA

094 Gangwar, P. (College of Veterinary and Animal Sciences, Pantnagar (India). Department of Epidemiology and Preventive Veterinary Medicine.); Upadhyay, A.K. (College of Veterinary and Animal Sciences, Pantnagar (India). Department of Epidemiology and Preventive Veterinary Medicine.); Gangwar, N.K. (College of Veterinary and Animal Sciences, Pantnagar (India).

Department of Epidemiology and Preventive Veterinary Medicine.);Rajput, M.K.S. (College of Veterinary and Animal Sciences, Pantnagar (India). Department of Epidemiology and Preventive Veterinary Medicine.); Relationship of mineral and vitamin supplementation with mastitis. Veterinary World (India). (Apr 2008) v.1(4) p.103-104 KEYWORDS: WATER BUFFALOES; MASTITIS; SUPPLEMENTS; MINERAL NUTRIENTS; IMMUNITY; VITAMIN E.

Fifty lactating buffaloes were divided into five groups viz., four treated and one control group. The treated groups received Ashwagandha, Vitamin E, Selenium, Copper and Zinc in different combinations. Animals of group IV (provided with 50 gm of Ashwagandha and 500 IU Vitamin E, 800 mg zinc methionine, 250 mg copper sulphate and 5 mg of selenium) showed highest recovery (80.00) with an average post treatment CMT score point 1.53 ± 0.75 , as compared to rest of the treated groups. Supplementation of trace minerals is only required at low levels to improve immune functions such as decreasing the incidence of mastitis.

095 Bodkhe, A.M. (Maharashtra Animal and Fishery Sciences, University, Nagpur (India). Nagpur Veterinary College. Department of Veterinary Clinical Medicine);Khan, L.A. (Maharashtra Animal and Fishery Sciences, University, Nagpur (India). Nagpur Veterinary College. Department of Veterinary Clinical Medicine);Raut, P.A. (Maharashtra Animal and Fishery Sciences, University, Nagpur (India). Nagpur Veterinary College. Department of Veterinary Clinical Medicine);Chavhan, P.B. (Maharashtra Animal and Fishery Sciences, University, Nagpur (India). Nagpur Veterinary College. Department of Veterinary Clinical Medicine);Nakade, M.K. (Maharashtra Animal and Fishery Sciences, University, Nagpur (India). Nagpur Veterinary College. Department of Veterinary Clinical Medicine);Pawshe, M.D. (Maharashtra Animal and Fishery Sciences, University, Nagpur (India). Nagpur Veterinary College. Department of Veterinary Clinical Medicine);Vyavanare, S.S. (Maharashtra Animal and Fishery Sciences, University, Nagpur (India). Nagpur Veterinary College. Department of Veterinary Clinical Medicine); Parient Paresis in crossbred cow. Veterinary World (India). (Jun 2008) v. 1(6) p. 181 KEYWORDS: COWS; CROSSBREDS; DRUG THERAPY; PARTURIENT PARESIS.

096 Dhonde, S.N. (Maharashtra Animal and Fishery Science University, parbhani (India). College of Veterinary and Animal Sciences. Teaching Veterinary Clinical Service Complex);Rasal, T.D. (Maharashtra Animal and Fishery Science University, parbhani (India). College of Veterinary and Animal Scien);Chavan, V.V. (Maharashtra Animal and Fishery Science University, parbhani (India). College of Veterinary and Animal Scien);Digaskar, S.U. (Maharashtra Animal and Fishery Science University, parbhani (India). College of Veterinary and Animal Scien);Londhe, S.V. (Maharashtra Animal and Fishery Science University, parbhani (India). College of Veterinary and Animal Sciences). Clinico-therapeutic management of dimethoate-30 (Rogor) poisoning in a non-descript bullock. Veterinary World (India). (Jun 2008) v. 1(6) p. 178-179 KEYWORDS: BULLOCKS; POISONING; DRUG THERAPY; DEXAMETHASONE; DIMETHOATE. A non-descript bullock suffering from dimethoate-30(Rotor) poisoning was treated using Inj. Dexamethasone, Inj-2PAM, Inj. B-complex and Sodium Bicarbonate alongwith fluid therapy, the bullock responded well to the therapy and survived.

097 Pradhan, M.S. (Maharashtra Animal and fishery Science University, nagpur (India). Nagpur Veterinary College. Department of Veterinary Medicine);Waghaye, U.G. (Maharashtra Animal and fishery Science University, nagpur (India). Nagpur Veterinary College. Department of Veterinary Medicine);Jadhve, S.C. (Maharashtra Animal and fishery Science University, nagpur (India). Nagpur Veterinary College. Department of Veterinary Medicine);. Paralytic ileus in a cattle. Veterinary World (Jun 2008) v. 1(6) p. 180 KEYWORDS: CATTLE; INTESTINES; DRUG THERAPY; DIGESTIVE DISORDERS.

098 Kumar Puneet; Prasad, Y.; Ranjan, R.; Swarup D.; Pattanaik, A.K.; Patra, R.C. (MJP Rohilkhand University, Bareilly (India) Department of Animal Science) Accumulation patterns of cadmium in tissues of Indian Catfish *Clarias batrachus*. Animal Nutrition and Feed Technology (Jan 2008) v.8(1) Keywords: *Clarias batrachus* , Heavy metals, Toxicity. Cadmium

A study was conducted to determine the accumulation pattern of cadmium in selected tissues of *Clarias batrachus*. Sixty *Clarias batrachus* were first acclimatized for 15 days in plastic pools filled with non-chlorinated water and subsequently divided equally into four groups and subjected to different concentrations (0, 14, 28 and 56 mg/L) of cadmium for a period of 96 hours. Physio-chemical attributes viz. pH, temperature, dissolved oxygen, hardness and chloride content of aquaria water were monitored. Following 96h of exposure, all the fishes were sacrificed and cadmium content of various organs were assessed. The result revealed that the highest level of cadmium was accumulated in kidney 17.276 ± 0.975 ppm, followed by liver 4.018 ± 0.508 , gill 2.881 ± 0.138 and intestine 2.493 ± 0.285 . Skin and muscles accumulated the lowest level (0.135 ± 0.010 to 0.982 ± 0.027) of cadmium. The kidney and liver seems to be the target organ for cadmium accumulation with respect to exposure level in *Clarias batrachus* and may have public health significance for human consumer.

M11 Fisheries Production

099 Chakraborty, N.M.; Das, N.K.; Chakraborti, P.P.; Mondal, S.C. (Regional Research centre Central Institute of fresh water aquaculture kalyani (India)). On mass demonstration of integrated fish cum pig farming in Meghalaya. Journal of interacademia. (Jan. 2005) .p. 110-116 KEYWORDS : SWINE; PIGGERIES; CARP; FEEDS; LIVESTOCK; GROWTH; MEGHALAYA

A series of scientific demonstration on integration of fish culture with piggery are being made in 16 beneficiaries' pond having a water area of 2.13 ha with individual pond area 0.10 - 0.20 ha located at 7 different districts of the state of Meghalaya. Indigenous but up graded piglets of 3 months old suitable for rearing were installed in October-November, 2003 in pigsties (10x8x5 ft) with an average weight range of 7.0 - 10.0 kg comprising 2 females and 1 male . Pigs are being fed on pig mash 0.8 Kg/pig/day in addition to grass and other fodder. Three different types of culture practices viz. 3 species, 4 species, and 6 species of carps (Indian major carps and exotic carps) have adopted. The initial combined stocking size of carp fingerlings varied

from 8.0-15.0 cm/ 10.0-20.0 g and stocking density of 12000 no/ha have been maintained uniformly in all ponds. No supplementary feed was applied as fish feed directly on pig excreta containing 70% of digestible food for fish. Growth observed in March 2004 revealed that the range of weight attained by piglets are 10.0 - 17.5 kg and carp fingerlings from 10.0 - 31.2 cm/ 11.0 - 325 g in different ponds. The input costs and estimated return from the system have been worked out.

100 Sharma, A. (Nagaland University SASRD, (India), Dept. of Agril, Economics) Constraints of fish production - a case study in rainfed areas of Uttar Pradesh. Journal of Interacademia (Oct. 2004).p. 639-643 KEYWORDS :FISHERY PRODUCTION; RAIN; PRODUCTION; COSTS

Though in present scenario of green revolution, country has reached the level of self-sufficiency in food grain production, the rainfed areas, where natural hazards have put these areas in situation of production uncertainties, fish farming is own economic significance. Therefore, in the rainfed area the chance of shifting towards the other farming activities like-fisheries, piggery, poultry etc., have much scope. For better utilization of un-culturable wasteland, a fishery is the best option with the farmers. Government also provides necessary infrastructure, technical backup, encourage co-operatives for developing better system for aqua production. In this context Uttar Pradesh has great potential for the development of fisheries, which can help to improve the socio-economic situation of the farmers.

101 Sharma, A. (School of Agricultural Sciences and rural Development, Nagaland University campus (India), Dept. of Agril. Economics); Nizamuddin (School of Agricultural Sciences and Rural Development, Nagaland University Campus (India), Dept. of APM.) Fish production in rainfed area of uttar pradesh a regression approach. Journal of interacademia.(July, 2004).p. 441-446 KEYWORDS :FISHERY PRODUCTION; RAIN; GRAIN; UTTAR PRADESH; FARM INPUTS; STATISTICAL METHODS

The results are an urgent need to bring more attention towards the XI (cost of feed, manure, fertilizer and lime) factor to the non-beneficiaries farm to gain more grass in compare to the non-beneficiaries. The cost of input and cost of fish seed both were highly correlated with gross return on beneficiaries' farm, which provides an range of 1.04 to 6.34 per cent against the investment of one per cent as input, except on medium farm, cost of fish seed had negative significant contribution on the production level.

M12 Aquaculture Production and Management

102 Dave, M.; Krishnappa, N.S.R. (Ecology lab., Department of Botany, Faculty of Science, M.S. University Vadodara (India)) Habitat alteration and floristic changes in and around harni pond baroda, india. Tropical ecology.(2004).p. 293-301 KEYWORDS :BOTANICAL COMPOSITION;GENE

BANKS; PONDS; ANGIOSPERMS; BIODIVERSITY; ECOSYSTEMS; BOTANICAL COMPOSITION; HABITATS; INDIA

Fragmentation of habitat is one of the major reasons for altering the vegetal cover across different scales. The present study aims to focus on the changes occurred in the overall vegetal cover and floristic composition in and around Harni pond at Baroda due to the impact of anthropogenic pressure over the past 45 years. It documents the existing vegetal cover and compares the shifts in the density and diversity of plant species documented earlier. Vegetal cover in and around the pond was monitored for a period of 2 years (2000-2002). The plants documented were compared with that of a previous study carried out in 1957. The earlier study documented a total of 158 angiosperms of 48 families. In the present study, out of these 158 initially documented species, a total of 113 species belonging to 46 families were relocated and a new documentation of 28 angiosperms belonging to 15 families was made from the study area. A good number of plants with lesser density have undergone local extinction and the population of commonly occurring plants has shown a reduction. Notable reason behind the diversity decline is the high reduction in seed bank of pond area. Few species with larger densities disappeared. The disappearance was more in species with low density. Some species maintained similar numbers irrespective of habitat variation. Results are discussed in the light of habitat alteration and vegetal cover variation.

M40 Aquatic ecology

103 Bahuguna, B.K. (H.N.B. Garhwal University, Srinagar (India), Dept. of zoology); Nautiyal, R. (Government Degree College Talwari Tharali Chamoli (India), Dept. of zoology); Nautiyal, P; Singh, H.R. (Allahabad University Allahabad (India), Dept. of zoology.) Stream regulation; variations in the density, composition and diversity of benthic macroinvertebrates occurring in the up and downstream sections of the impounded zone of the river Ganga in the foothills. Tropical ecology, (2004). p. 251-26] KEYWORDS : RIVERS; HIGHLANDS; BENTHIC ENVIRONMENT; INVERTEBRATES; HIMALAYAN REGION; DENSITY Variations in the density, composition and diversity of the benthic macroinvertebrates were studied in the up and downstream sections of the impounded zones (Veerbhadra and Bhimgoda barrage) of the river Ganga in the foothills. In these sections differences in the benthic density were found to be insignificant ($P < 0.05$). The sections differed in terms of composition and relative abundance of different taxa. The regulated stretch was found to harbour only Ephemeroptera, Diptera, Trichoptera and Mollusca. Plecoptera were absent while Coleoptera were very rare in the regulated stretch as compared with the upstream pristine stretch studied earlier. The predominance of Heptageniidae and fragmented occurrence exhibited by other taxa are attributed to fluctuations in the flow regimes and loss of substrate diversity. The diversity of benthic community was lower in upstream sections being least in UVB (0.1348-1.1319). However, the

differences were not significant. Similarity index indicated lack of similarity in the community at impounded locations.

Q02 Food Processing and Preservation

104 Khanna, N.; Panda, P.C. (CCS Haryana Agricultural University, Hisar (India) Department of Livestock Products Technology) Effect of papain on tenderization and functional properties of spent hen meat cuts. Indian Journal of Animal Research, (Mar 2007) v. 41 (1) Keywords; Chicken meat; Processing; Papain

Spent hen leg cuts were treated with different concentrations of papain (0, 0.025, 0.05, 0.075 and 0.1%) at 3 and 5% levels (w/w) to improve the tenderness of meat. Papain with 0.025% concentration and at 3% level produced significantly ($P < 0.05$) more tender meat than control (0%) group. The above selected concentration and level were tried using both the multiple injection and the infusion plus forking technique in breast cuts. It was observed that papain at the above said concentration and level using infusion plus forking technique could significantly ($P \leq 0.05$) increase the pH, salt soluble protein, water holding capacity (WHC), emulsifying capacity and emulsion stability irrespective of cuts with lower values in leg as compared to breast cuts except the pH which was higher in leg cuts.

Q53 Feed contamination and toxicology

105 Sharma, A.; Panwar, S; Singh, A.K.; . (National Dairy Research Institute, Karnal (India)); Jakhar, K.K (CCS HAU, Hisar (India) Veterinary Diagnostic Lab) Studies on the genotoxic effects of sucralose in laboratory mice, Indian Journal of Animal Research, (Mar 2007) v. 41 (1) Keywords; Carcinogens; Toxicity; Mice; Laboratory animals

Forty female (Swiss albino) mice were divided into 4 groups of ten animals each. Mice of groups I, II and III were fed sucralose 500, 1000 and 1500 ppm, respectively in feed. Group IV was fed sucralose free diet. Five animals were sacrificed from each group on 30th and 60th day of study and metaphase spreads prepared for evaluation of mitotic index and chromosomal aberrations. Liver and kidney samples of mice were also collected on 30th and 60th day of experiment for histopathological study. Among the chromosomal aberrations observed, polyploidy and monosomy were most common. The differences in mitotic indices and chromosomal aberrations between the 4 groups at different intervals were found to be statistically non-significant. Histopathological changes were observed in the liver and kidney of all treated groups. It is concluded from the present study that sucralose consumption up to 1500 ppm for two months did not produce any genotoxicity but it is hepatotoxic and nephrotoxic. However, its effect at higher doses and longer duration needs to be studied.

106 Karki, Kedar (Central Veterinary Laboratory, Tripureswor, Kathmandu (Nepal).); Manandhar, Poornima (Central Veterinary Laboratory, Tripureswor, Kathmandu (Nepal).); Clinical-Epidemiological Investigation of Moldy corn poisoning due to *Penicillium* spp in mules at Udayapur district, Nepal. *Veterinary World (India)*. (Apr 2008) v.1(4) p.107-109
KEYWORDS: MULES; ANIMAL FEEDING; MAIZE; BIOLOGICAL CONTAMINATION; MOULDS; PENICILLIUM; NEPAL.

A clinical epidemiological investigation of Acute sudden death syndrome due to which 31 mules from a herd of 900 died within the period of 12.07.2006 to 21.10.2006 in Udayapur District Nepal. These animals were being used for good transportaion work in hilly region of Nepal. On rout these animals were being fed only whole maize and gram. Normally healthy looking animals started dying suddenly. Initially suspected for acute bacterial disease and treated with broad-spectrum antibiotics and vaccinated with bacterial vaccine. On close observation of herd their feed stuff revealed grains fed to these animal during rainy season was found 20 moldy in appearance. On Postmortem examination acute severe congestion and hemorrhages in liver, lung, spleen heart, intestinal mucosa were found. Histopathological examination of tissue from these organs revealed infiltration of mononuclear cell in tissue indicative of chronic nature of condition. Continous use of apparently 15-20 moldy grain (maize, gram) was used as feed. On laboratory analysis of sample of same grain was found to be containing 6-10-110-10 CFU/gm of *Penicillium* spp of fungus. When remaining herd still using same feed treated with toxin binder (toxicurb, varishta), liver tonic like biolive, digevet, mineral mixture promin and immunocare controlled the mortality may be indicative of the disease syndrome being caused by moldy corn poisoning similar to condition Equine Encephalomalacia. Laboratory findings and response of treatment indicates that during rainy season and immediately after rainy season feeding of stored grains are going to be detrimental to equine species. During this period care should be taken to feeding grains to this animal if treated with any toxin binder as well as herbal immunomodulater is going to reduce the chances of occurring this syndrome.

107 Gowda, N.K.S.; Ledoux, D.R. (University of Missouri, Columbia (USA) Division of Animal Sciences, Mycotoxin Research Laboratory) Use of antioxidants in amelioration of mycotoxin toxicity: A review. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords Mycotoxins; Aflatoxins; Ochratoxins; Antioxidants; toxicity

Mycotoxins are toxic metabolites of different species of fungi naturally occurring in various feed stuff. Two mycotoxins of major significance to livestock production are aflatoxin B1 (AFB1) and ochratoxin A (OTA). They cause pathological lesions in liver and kidney through cell damage, release of free radicals, and lipid peroxidation. Several synthetic and natural antioxidants have been used to ameliorate the toxic effects of these mycotoxins. Vitamins (A, E, C) and provitamins (â - carotene, carotenoids), phenolic compounds, curcuminoids, and sulfur containing compounds (glutathione, methionine) are known to exhibit antioxidant action against AFB1 and OTA. Some of these compounds are also effective in preventing carcinogenesis during mycotoxicosis. There is a need to evaluate the antioxidant potential of these compounds with emphasis on their stability, effective level of inclusion and effect on other biochemical or tissue functions. Ascertaining and confirming the antioxidant properties of

cultivable medicinal/aromatic plants would add value to these products and contribute to their commercial viability.

108 Garg, M.R.; Bhanderi, B.M.; Kumar, S.; Sathish; Sherasia, P.L. (National Dairy Development Board, Anand (India) Animal Nutrition & Feed Technology Laboratory) Macro and Micro mineral status of dairy animals in Hilly Zone of Kerala. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: Calcium, Phosphorus, Copper, Zinc, Selenium, Feeds, Feed intake, Mountain soils

A study was conducted in the hilly zone of Kerala, to assess the status of certain macro and microminerals in dairy animals, by analyzing feed and fodder samples. Paddy straw was major dry roughage available for feeding dairy animals and found to be low in Ca (0.11%), P (0.09%), S (0.11%), Cu (1.79 ppm) and Zn (11.69 ppm). Amongst green fodders, mainly local grasses and hybrid napier were available and found to be good sources of Ca (0.43%), Mg (0.34%), Cu (13.83 ppm), Mn (74.52 ppm) and Fe (1379 ppm). Azolla was subsidiary green fodder grown in stagnant water by the farmers and found to be a good source of various minerals. The feeds and fodder were found to be rich in K content (1.83%) and Fe (192–3600 ppm). Groundnut cake and copra extraction were major concentrate supplements in the surveyed area. Groundnut cake, copra extraction, rice bran and wheat bran were good sources of P (0.57–1.13%), Mg (0.25–0.45%), S (0.24–0.33%), Cu (17.82–41.22 ppm), Zn (38.40–84.12 ppm) and Mn (44.51–174.5 ppm). The Na content was lower in concentrate ingredients (0.014%) and roughages (0.06%). Se content in feeds and fodder was adequate (0.18–0.83 ppm), however, Co was found to be marginally deficient in feedstuffs (0.10–1.19 ppm). From the present study, it was apparent that in view of the feeding practices followed in the survey area, levels of certain minerals such as Ca, P, S, Zn, Cu and Co were inadequate and much below the requirement of animals yielding 8–11 kg milk (4% fat) per day. Supplementation of area specific mineral mixture with highly bio-available mineral salts could be a cost effective method to improve productive life and productivity of animals in the zone.

Q54 Feed composition

109 Shinde, A.K.; Sankhyan, S.K. (Central Sheep and Wool Research Institute, Avikanagar (India). Division of Animal Nutrition). Mineral contents of locally available feeds and fodders in flood prone Eastern plains of Rajasthan and dietary status in ruminants. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: Feeds, Forage, Mineral nutrients, Ruminants, Mineral content

Mineral contents of common feeds and fodders and dietary mineral composition of cattle, buffaloes, sheep and goats under existing feeding practices in flood prone eastern plains of Rajasthan have been evaluated to identify the deficiency and development of supplementation strategies. Wheat, barley and sorghum cereal grains contained Ca 0.03–0.50%, P 0.34–0.39%, Mg 0.13–0.27%, Zn 28–36 ppm, Cu 7–8 ppm, Mn 27–50 ppm and Fe 319–365 ppm. Mustard, cotton seed cake, cluster bean grain and gram churi contained Ca 0.49–0.81%, P 0.34–0.60%, Mg 0.46–0.68%, Zn 35–51 ppm, Cu 4–10 ppm, Mn 1367 ppm and Fe 131–635 ppm. Green

fodder contained Ca 0.42–1.00%, P 0.09%, Mg 0.64–0.83%, Zn 23–51 ppm, Cu 3–19 ppm, Mn 86–106 ppm and Fe 925–1536 ppm. Cereal straws and Stover contained Ca 0.47–1.14%, P 0.09–0.18%, Mg 0.18–0.83%, Zn 13–29 ppm, Cu 3–11 ppm, Mn 23–63 ppm and Fe 434–1431 ppm. Tree leaves contained Ca 0.79–1.61%, P 0.09–0.10%, Mg 0.46–0.86%, Zn 24–34 ppm, Cu 9–31 ppm, Mn 34–68 ppm and Fe 555–801 ppm. Cattle and buffaloes in pregnancy and lactation stages were found short of Ca (7–10%) and P (50–56%) requirement. Magnesium content of diet of cattle and buffaloes was adequate and excesses the requirement in all the stages. Zn content during pregnancy and lactation stages in the diet were deficient (14–16%), Cu and Mn contents of diet were adequate and Fe content of diet was considerably higher (1074–1201 ppm) than requirement in the diet. Sheep and goats under existing feeding practices were found short of Ca in their diet. Phosphorus content of diet of sheep and goats in all the stage were below than the requirement owing to grazing resource and tree leaves in the region were primarily poor in P content. Mg, Zn, Cu, Mn and Fe intakes of sheep and goats were found to be adequate under the prevailing feeding practices. It was concluded from the study that diet of pregnant and lactating cattle and buffaloes were deficient in Ca, P and Zn and sheep and goats diets were deficient only in Ca and P. Mineral mixtures or concentrate need to be supplemented, to overcome the deficiency and production and health losses.

Q54 Feed composition, L02

110 Garg, M.R.; Bhanderi, B.M.; Sherasia, P.L. (National Dairy Development Board, Anand (India) Animal Nutrition & Feed Technology Laboratory). Assessment of macro and micro minerals status of milch animals for developing area specific mineral mixture for Bharatpur District of Rajasthan. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: Feeds, Forage, Calcium, Phosphorus, Copper, Zinc, Selenium, water Buffaloes, Tropical zone, Rajasthan A study was conducted in Bharatpur district (tropical zone) of Rajasthan, to assess the prevalence of macro and micro-minerals deficiency in animals, by analyzing feed and fodder samples (n=240) at random from various locations. The calcium content (0.14%) was low in concentrate ingredients, except mustard cake (0.74%). Phosphorus content (0.45%) in concentrates was higher in comparison to roughages. The average calcium content in straws (0.34%) was higher in comparison to phosphorus (0.10%). The calcium and phosphorus content in green berseem were 1.33 and 0.31 per cent, respectively. The magnesium content in feedstuffs was adequate (0.38%) to meet the requirement of large ruminants (0.20%). The feed ingredients of the surveyed area were rich in potassium content (1.55%), whereas, sodium content was consistently low in dry roughages (0.14%) and concentrate ingredients (0.064%). The sulphur content was low in crop residues (0.13%), whereas, concentrate feed ingredients (0.18%) were better source of sulphur. Cobalt was occasionally deficient in the diet of animals. However, iron and manganese contents were adequate in the diet of animals, with traditional feeding system. The average copper content was low in straws (5.40 ppm), moderate in green fodders (9.68 ppm) and concentrate ingredients (9.87 ppm). Molybdenum content in feeds was within safe limit (average level<1.25 ppm). Selenium content in most of the feeds and fodder samples was adequate (0.61 ppm) and its supplementation in the diet was not necessary. Zinc was acutely deficient in most of the feedstuffs (average level<26.30 ppm) and needed to be

supplemented in the ration of animals for proper productive and reproductive functions. It was apparent from the present study that the feeds and fodders available in tropical zone of Rajasthan may not meet the requirements for calcium, phosphorus, sodium, sulphur, zinc, copper and cobalt in order to sustain a milk production of 28 kg/day. Hence, it is necessary to supplement these minerals in the ration by formulating area specific mineral mixture

111 Shelly Madhu; Saijpaal, S.; Naik, P.K. (Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (India) Department of Animal Nutrition Prediction of grain content of compounded feeds. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: Maize, rice, Wheat, Compound feeds, Coarse grains

Ten sets of compounded feeds (T1–T10) having 2 to 20% grain of maize (MC), rice kani (RC) or wheat (WC) and six more sets of compounded feeds containing 25 to 50 per cent maize (T11–T16) were analyzed to develop equations for predicting the grain level. At the same level of grain, the NDF value differed ($P < 0.05$) for MC, RC and WC but the starch content remained similar. Every 2% increase in grain level increased ($P < 0.05$) the starch content of the compounded feeds but the change in trend of NDF values was less consistent. For predicting the grain content, 14 simple linear regression equations based upon the starch and NDF values of the compounded feeds were developed and the predictability of grain content had more than 85 per cent coefficient of correlation (r^2). To test the accuracy of the derived prediction equations, several compounded feeds with known grain levels of 10 – 48% were formulated. The starch and NDF values were fitted in the derived equations and the r^2 values were determined. The equation $Y = -14.31 + 1.323 X$; where, Y = the grain content and X = the starch content of the compounded feed, had high accuracy of prediction with grain content up to 30 per cent. From the above study, it may be concluded that the prediction equations based on the starch content are most reliable for predicting the grain content of the compounded feeds containing maize, rice kani or wheat up to 30 per cent level.

112 Nehra, R.; Purohit, G.R.; Sharma, T.; Dhuria, R.K.; Legha, R.A. (Rajasthan Agricultural University, Bikaner (India) College of Veterinary & Animal Science, Department of Animal Nutrition). Nutritional evaluation of sewan (*Lasiurus sindicus*) grass hay in Marwari horses of arid region. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: horses *Lasiurus*, Feed grasses, hay, Digestibility, Arid zones

Marwari stallions (5–6 year age and 345 kg BW) were fed on a sole diet of sewan grass (*Lasiurus sindicus*) hay in order to define its nutritive value for horses. The grass contained 2.45% DCP, 57.47% TDN, 1:22.46 nutritive ratio and 52.31% starch equivalent. The daily dry matter intake was recorded to be 2.77 kg/100 kg BW equivalent to 119.80 g/kg W0.75 indicative of its high palatability in horses. The average digestibility coefficients were found to be 52.39, 55.75, 45.46, 47.04, 67.35, 39.70, 30.66, 49.48 and 47.91 for DM, CP, CF, EE, NFE, NDF, ADF, hemicellulose and cellulose, respectively. The intake of digestible nutrients i.e. DCP (236 g/d) and DE (24.43 Mcal/d) revealed that a sole feeding of the hay is adequate to meet the

maintenance requirements of mature horses at rest. It was observed from the study that horses can efficiently utilize sewan grass hay and it can serve as basal roughage source for horses in arid regions of country.

113 Das, P.P.; Roy, B.; Sardar Parimal (West Bengal University of Animal and Fishery Sciences, Kolkata (India). Department of Animal Nutrition) Evaluation of paddy straw based complete feeds through In vitro dry matter digestibility. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords:

A study was undertaken to evaluate three potential complete feeds made from locally available feed ingredients through in vitro dry matter digestibility (IVDMD). Three fistulated steers used as donors of rumen inoculums were fed the same three complete feeds (CRI, CRII and CRIII) after proper adaptation. The roughage: concentrate ratio in CRI, CRII and CRIII was maintained at 60: 40 but the cost/kg diet were Rs. 3.33, 3.70 and 3.91/kg diet, respectively. The CP, EE and TA of the three complete feeds ranged between 11.45–11.50, 3.07–3.32 and 12.61–13.21 per cent, respectively, indicating little variations. However, variation was apparent in the fibre fractions of the three feeds attributable to varying contents of the fibrous feed ingredients. Overall IVDMD (%) was significantly ($P < 0.05$) higher in CRI (50.67 ± 0.82) followed by CRIII (47.00 ± 0.89) and in CRII (43.33 ± 0.67). Overall TVFA (meq/100ml) production was significantly ($P < 0.05$) higher in CRI (12.76 ± 0.30) than CRII (11.01 ± 0.63) and CRIII (11.05 ± 0.43) but values between CRII and CRIII did not differ significantly. It may be concluded that CR1 is superior to CRII and CRIII in terms of IVDMD, in vitro TVFA production and cost of formulation.

Q55 Feed additives

114 Shivakumar, M.C.; Umakantha, B.; Hosamani, S.V. (University of Agricultural Sciences, Dharwad (India) Animal Science Division). Influence of virginiamycin on performance of broilers fed two levels of energy. *Animal Nutrition and Feed Technology* (Jan 2008) v.8(1) Keywords: Broiler chickens; Additives, Virginiamycin, Animal Performance

Biological trial of 42 days duration was conducted on broiler chicks to evaluate the effect of virginiamycin supplementation with two levels of energy 2900 and 2800 ME kcal/kg during starter and 2950 and 2850 ME kcal/Kg during finisher using 352, day-old chicks. Virginiamycin at the rate of 20 ppm during starter and 10 ppm during finisher was added to each test diet. Supplementation of low energy diets with virginiamycin significantly ($P < 0.05$) improved the body weight over its corresponding unsupplemented group. Feed consumption remained unaffected. Feed efficiency was better in all the virginiamycin supplemented groups. Mortality rate of 1.25 and 5.00 percent was recorded in unsupplemented groups of normal energy and low energy groups respectively but no mortality was recorded in supplemented groups. Litter moisture did not differ significantly ($P < 0.05$) among the groups. Litter score was significantly lower in normal energy with virginiamycin group compared to its unsupplemented control.

Total bacterial and cocci counts differed significantly ($P < 0.05$) between supplemented and control groups from second and fourth week onwards. Net economic returns per bird over feed cost was better in all the supplemented groups.