

THESIS ABSTRACTS

FACULTY OF VETERINARY & ANIMAL SCIENCES



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FACULTY OF VETERINARY & ANIMAL SCIENCES



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Dr. A. Rajan, M. V. Sc., Ph. D.

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DEPARTMENT OF ANIMAL MANAGEMENT

1. The growth, carcass characteristics and economics of rearing of indigenous and exotic pigs

Code No. : VA-5A-1-2-2 (1)
Name of the Research Scholar : P. C. Saseendran
(M. V. Sc.)
Admission No. : 77-13-24
Name of the Major adviser : Dr. T. G. Rajagopalan
Year of starting the work : 1977
Year of completion of the work : 1979

Abstract

In order to have a comparative knowledge of growth rate, carcass quality and economics of rearing indigenous and exotic pigs under the same agroclimatic condition, this work was carried out.

Twelve indigenous and twelve exotic pigs of two month of age were equally divided into two groups and reared for a period of 156 days, on *ad libitum* food and water. At the end of the experiment half of the pigs from each group were randomly selected, slaughtered and the carcass characteristics were studied.

A significantly higher fortnightly gains was observed in exotic pigs than that of indigenous pigs (6.21 kg against 1.618 kg).

Food efficiency of indigenous pigs was inferior than that of exotic pigs (4.26 against 3.88). But food efficiency of indigenous female was equal to that of exotic female (3.83) and better than that of exotic male (3.92).

Dressing percentage of indigenous pigs and exotic pigs was not significantly different (75.34 against 72.17).

Back fat thickness observed was 1.53 cm and 2.03 cm in indigenous pigs and exotic pigs respectively.

Loin eye area of indigenous and exotic pigs was significantly different (8.0 cm² and 25.25 cm² respectively).

Percentages of shoulder, middle and ham against cold carcase weight were 27.78, 33.27 and 25.08 respectively for indigenous pigs. The corresponding figures for exotic pigs were 28.25, 34.42 and 31.37 percent respectively. The ham percentage was significantly lower ($P < 0.01$) in indigenous breed.

Total cost of production per kilogram live weight was estimated to be very high in indigenous pigs than that of exotic pigs (Rs. 10.52 against Rs. 7.707). But when the feed cost alone is taken, the cost of production of indigenous stock was not much different from that of exotic stock (Rs.5.75 Vs. Rs.5.24).

2 Bio-climatological studies on dry matter intake and water consumption of growing livestock

Code No. : VA-M-1-2-2 (1)
Name of the Research Scholar : V. L. Somanthan
(M.V.Sc.)
Admission No. : 77-13-23
Name of the Major Adviser : Dr. T. G. Rajagopalan
Year of starting the work : 1977
Year of completion of the : 1980
work

Abstract

The present work was undertaken to study the distribution of climate at Mannuthy and to study the effect of the prevailing ambient temperature and relative humidity on the performance of growing crossbred cattle.

The meteorological data over a period of five years (1974–1978) were analysed to study the climatic picture of this locality. The rectal temperature, respiration rate, dry matter intake, water consumption and growth rate of eleven male and five female calves were observed for a period of twelve months.

The climatic picture showed that there were two distinct seasons prevailing in this locality, namely, the dry and the rainy seasons. They were further sub divided into 'Warm and dry', 'Hot and dry', 'Cold and wet' and 'Warm and wet' seasons respectively.

The rectal temperature of the animals remained fairly constant throughout the year, inspite of wide variations in the ambient temperature, it showed negative correlation with ambient temperature (-0.357 in males and -0.207 in females) and positive correlation with relative humidity which was significant only in males (0.416).

The respiration rate varied from 30.973 per minute during July (lowest) to 49.230 per minute during April (highest). It showed positive correlation with ambient temperature (0.638 in males and 0.561 in females). Significant negative correlation between respiration rate and relative humidity was observed in males only (-0.253).

The percentage dry matter intake was found to have a strong negative correlation with ambient temperature [0.652 in males and -0.685 in females]. Whereas with the relative humidity, the correlation was positive and was significant only in males (0.514).

Highly significant positive correlation between ambient temperature and daily water consumption (0.763 in males and 0.741 in females) negative correlation between relative humidity and water consumption (0.725 in males and -0.503 in females) were obtained in this study.

There was negative correlation between ambient temperature and monthly weight gain and positive correlation between relative humidity and monthly weight gain, but was significant only in males. The negative correlation obtained in this case was attributed to the poor quality of the roughage during the summer months rather than the direct effect of ambient temperature

3. Effect of season on certain physiological norms of female buffaloes

Code No. : VA-M-1-2-2 (2)
Name of the Research Scholar : Francis Xavier
(M.V.Sc.)
Admission No. : 78-13-22
Name of the Major adviser : Dr. T. G. Rajagopalan
Year of starting the work : 1978
Year of completion of the work : 1981

Abstract

Investigations on the physiological norms like body temperature, respiration rate, heart rate, haemoglobin level, erythrocyte sedimentation rate and packed cell volume were made on eight buffalo heifers, of age group 16 to 20 months, maintained at the Livestock farm, Mannuthy; and compared to the physiological norms in eight castrated male buffaloes. The effect of bio-climatic factors like ambient temperature and relative humidity on the various physiological norms were also investigated.

The mean body temperature, in female buffaloes, was $38.22 \pm 0.08^{\circ}\text{C}$ and in males the same was $38.06 \pm 0.09^{\circ}\text{C}$. The mean respiration rate, in female buffaloes, was 16.79 ± 0.56 per minute and that in males was 15.59 ± 0.60 per minute. Female buffaloes had a mean heart rate of 53.50 ± 3.38 beats per minute and males had 51.77 ± 5.53 beats per minute.

The body temperature, respiration rate and heart rate of buffaloes showed highly significant positive correlation with the ambient temperature. But the relative humidity had non-significant effect on the above physiological norms. Highly significant diurnal variation and significant difference between sexes were noted in the body temperature of buffaloes. Similarly highly significant difference was observed between male and female buffaloes in the diurnal variation in respiration rate. There was no significant difference between the heart rate of male and female buffaloes though diurnal variation was discernible.

The mean haemoglobin levels in females and males were 12.12 ± 0.25 gm/100 ml blood and 11.54 ± 0.86 gm/100 ml blood, respectively. Highly significant difference between male and female buffaloes existed in the haemoglobin level. The mean erythrocyte sedimentation rates were 39.09 ± 0.73 mm per hour and 37.32 ± 1.65 mm per hour in females and males respectively. The mean packed cell volume was 39.13 ± 0.84 per cent in females and 36.13 ± 0.60 per cent in males. The haemoglobin level, erythrocyte sedimentation rate and packed cell volume did not show any relation with the climatic variables.

DEPARTMENT OF ANIMAL REPRODUCTION

4. Investigation on the pathological conditions in the genitalia of female goats

Code No. : VA-3-1-4-1 (1)
Name of the Research
Scholar (M. V. Sc) : K. Ramachandran
Admission No : 78-13-07
Name of the Major Adviser : Dr. C. P. Neelakanta Iyer.
Year of starting the work : 1978
Year of completion of the work : 1980

Abstract

The study was undertaken to assess the incidence and nature of pathological conditions affecting the genitalia of female goats. 950 genitalia were used for the study.

The following pathological conditions were observed.

Ovarian hypoplasia (0.316%); Cystic Ovarian degeneration (0.947%); Cystic corpus luteum (0.421%); Chronic oophoritis (0.211%), Multifollicular atresia (0.842%); Salpingitis (0.105%) Macerated foetus (1.684%), Endometritis (0.211%), Cystic glandular hyperplasia (0.105%) and cyst in the endometrium with sub-epithelial haemorrhage (0.105%).

The cervix, vagina and vulva did not reveal any pathological changes.

5. Studies on anoestrus in cross-bred cattle

Code No. : VA-6-1-3-12 (3)
Name of the Research
Scholar (M. V. Sc.) : G. P. Vijayakrishna Pillai
Admission No. : 78-13-06
Name of the Major Adviser : Dr. C. P. Neelakanta Iyer
Year of starting the work : 1978
Year of completion of the work : 1980

Abstract

The object of the study was to assess the incidence of anoestrus among cross bred cattle of Kerala and to find out the etiological factors so as to evolve suitable therapeutic measures for the same. 184 cross bred cows and 76 cross-bred heifers of the University Livestock Farm and 401 cross-bred cows and heifers in the field were utilized for the study.

Among the farm animals, 17.4 percent of cows and 22.4 percent heifers exhibited true anoestrus. Among the animals from the field 28.2 percent exhibited true anoestrus.

Wide Ca. P ratio (2.69 and 2.46) and subnormal copper level (88.32 g/dl and 91.07 g/dl) were detected in 46.6% of cows and 54.65% of heifers respectively in true anoestrus.

Fertivet (FVT 300) was capable of inducing ovulatory oestrus in 100% of cows and 80.47% of heifers in true anoestrus due to non-nutritional causes within a period of 5.73 and 5.43 days respectively. Conception rate in the treated group was 66.6% for cows and 42.11% for heifers.

Treatment with Fertimen (Mineral supplement) induced ovulatory oestrus in 91.67% of cows and 38.26% of heifers within a mean period of 38.8 and 27.77 days respectively.

6. Studies on uterine pathology in repeat breeding cattle

Code No. : VA-6-1-3-12 (2)
Name of the Research Scholar (MVSc) : K. N. Aravinda Ghosh
Admission No. : 77-13-10
Name of the Major Adviser : T. R. Bharathan Nambood-
iripad.
Year of starting the work : 1977
Year of completion of the work : 1979

Abstract

An investigation was undertaken to study the uterine pathology in repeat breeding cows employing uterine biopsy as a diagnostic technique. The studies were carried out in 26

repeat breeding cross-bred cows from the herd of University Livestock Farm, Mannuthy using a biopsy instrument which was a modification of one designed by Minocha *et al.* (1964). Four cows which settled at first insemination served as control animals for comparison. From all the animals biopsy was taken during the early part of heat and was inseminated 8 to 12 hours after biopsy followed by intrauterine antibiotic therapy after 12 to 24 hours. Seven out of 17 animals which failed to conceive even after biopsy and treatment were slaughtered and their genitalia were subjected to detailed studies.

Nine out of 26 repeat breeders and all the four control animals conceived at inseminations in the same heat of biopsy explaining the fact that biopsy operation did not affect the functional status of uterus. Pathological changes in the endometrium were observed in 14 out of 26 (53.35%) repeat breeding cows. Changes in the uterus observed in the biopsy were significant and consisted of infiltration of inflammatory cells, periglandular fibrosis, cystic dilatation of glands, glandular hypertrophy, stromal hyalinization and sclerosis. It was seen that endometritis constituted the most important lesion.

The experimental animals were classified into three groups based on histological findings; group I showing normal or nearly normal endometrium, group II with more extensive inflammatory changes and group III with severe inflammatory and fibrotic changes. Group I and II had a conception rate of 58.33 and 25 per cent respectively. In group III, none conceived. Results of insemination revealed that uterine lesions characterized by severe cellular infiltration and glandular changes effect the chances of conception adversely. The lesions in the slaughtered animals correlated with biopsy findings in general.

7. Studies on the preservation of buck semen

Code No. : VA-6-1-3-5 (1)
Name of the Research Scholar (M. V. Sc) : P. P. Balakrishnan
Admission No. : 77-13-07
Name of the Major adviser : Dr. C. P. Neelakanta Iyer
Year of starting the work : 1977
Year of completion of the work : 1979

Abstract

With the ultimate object of evolving a suitable extender for buck semen, 63 ejaculates from eight healthy cross-bred bucks (6 Saanen x Malabari and 2 Alpine x Malabari) selected at random from "All India Co-ordinated Research Project on Goats for Milk Production" Mannuthy, were used for the preservation studies. Six diluents viz. Tris, Skim milk citrate fructose glycine (SMCFG), Milk citrate fructose glycine (MCFG). Whole cowsmilk (CM) and Cornell University Extender (CUE) were stored at 5°C and at room temperature in coconut milk extender (CME). Buck semen could be stored up to 60 hours in Tris, SMCFG and MCFG with good motility at 5°C. In CME, semen could be stored only up to 34 hours in 1:200 dilution. Egg yolk containing diluents proved to be least suitable for preservation of buck semen at 5°C. The percentage of conception rate was 44.0, 52.0 and 53.3 with Tris, SMCFG and MCFC diluents respectively.

8. Studies on post-partem oestrus in cross-bred cows

Code No. : VA-6-1-3-12
Name of the Research Scholar (M. V. Sc.) : S. P. Suresan Nair
Admission No. : 77-13-09
Name of the Major Adviser : Dr. C. P. Neelakanta Iyer
Year of starting the work : 1977
Year of completion of the work : 1979

Abstract

The object of the study was to find out the various reproductive parameters that influence the onset of post-partum oestrus in cross-bred cows. With this object in view, a detailed investigation was undertaken in a herd of 115 cross-bred cows of Jersey x Sindhi and Jersey x Local breeds belonging to the University Livestock Farm, Kerala Agricultural University,

Mannuthy during the period from February, 1978 to March, 1979. After parturition, they were grouped into normal and abnormal calvers based on the normalcy of calving. All the cows were stall fed and were under identical conditions of feeding and management.

There were significant variations in the cessation of lochial discharge, regression of pregnancy corpus luteum, period of uterine and vulval involution, onset of first and second ovulations and the post-partum oestrus interval between normal and abnormal parturitions. Duration of lochial discharge, regression of pregnancy corpus luteum and onset of first ovulation were found to be significantly influenced by the season of calving. Parity of the cow was found to influence the period of lochia, involutions of uterus and also the post-partum oestrus interval. Milk yield of the cow significantly influenced regression of pregnancy corpus luteum and vulval involution. However, the breed of the cow and sex and weight of calf were not found to have any significant effect on the reproductive parameters studied. An incidence of 13.4 per cent of aberrations of oestrus was also observed.

DEPARTMENT OF ANIMAL BREEDING & GENETICS

9. Studies on certain genetic and nongenetic factors affecting birth weight and growth rate in Malabari and cross-bred goats

Code No.	: VA-3-1-4-4 (1)
Name of Research Scholar (M. V. Sc)	: Dr. K. C. Raghavan
Admission No.	: 77-13-22
Name of the Major Adviser	: Dr. B. R. Krishnan Nair
Year of starting the work	: 1978
Year of completion of the work	: 1980

Abstract

The data on 1227 kids belonging to Malabari (309) Saanen x Malabari (389) and Alpine x Malabari (529) genetic groups born and brought up at the All India Co-ordinated Research Project on Goats, Kerala Agricultural University, Mannuthy during the period from April 1974 to March 1979 were utilised to study the effects of various genetic and non-genetic factors on body weight at different ages.

Cross-bred goats, S x M and A x M, registered higher weights at birth: at one month, at four months and at one year than the local Malabari goats. Distinct sexual dimorphism in body weights at different ages could be observed in cross-bred goats. Litter size significantly affected birth weight and weight at one month. Season of birth had only non significant influence on weights at birth and that at one month, though the effect was significant at 4 months and one year. Even though the effect of gestation length undergone by kids was a significant source of variation for weights at birth alone in Saanen x Malabari and Alpine x Malabari kids, the same

had significant effect on body weights at birth and at one month in Malabari. Significant effects of dam's weight at kidding on weights at birth, one month and four months in Malabari, at birth and a one month in Alpine x Malabari and at birth alone in Saanen x Malabari could be observed. Sire effect was significant on body weights at one month, 4 months and one year in Malabari. at birth and one year in Alpine x Malabari and at one year alone in Saanen x Malabari. The growth rate was found to be the highest in A x M upto four months of age and afterwards upto one year S x M showed highest rate of gain. The effect of genetic group on growth rate was found to be significant during all the periods of growth.

The heritability estimate for weight at birth was near to zero. The h^2 estimates were seen getting higher as the age advanced. Genetic correlations between body weights at different ages were found to be fairly high. But the phenotypic correlations between weight at different ages were found to be highly variable. Twins were more than singles in all the genetic groups and the secondary sex ratio was found to be 50:50.

The results of the study indicated that crossbreeding of local goats with exotic breeds, Saanen and Alpine, is the desirable breeding plan to accomplish the improvement of body weight in goats, at different ages.

10. Studies on the peak yield and persistency of lactation in cross-bred dairy cows

Code No. ; VA-1-1-4-1 (1)
 Name of the Research Scholar
 (M. V. Sc.) : C. R. Girija
 Admission No. : 78-13-21
 Name of Major Advisor : Dr. B. R. Krishnan Nair
 Year of starting the work : 1978
 Year of completion of the
 work : 1980

Abstract

With the objective of studying the peak yield, persistency, their relation with other production traits and the shape of the lactation curves, the data on the production and reproduction records of 298 Jersey x Zebu and 69 Brown Swiss x Zebu cross-bred cows maintained at the Livestock farms of Kerala Agricultural University were utilised. Persistency was calculated as a ratio of the yield from the attainment of peak yield to the 305 days yield and the yield upto the peak yield.

The means of lactation yield upto 305 days were 1411.23 ± 32.38 kg and 1453.2 ± 77.89 kg respectively in Jersey and Brown Swiss crossbreds. The days to attain peak yield were 44.75 ± 1.23 days and 49.86 ± 3.06 days in Jersey and Brown Swiss cross-breds respectively. The respective means of peak yield in Jersey and Brown Swiss cross-breds were 7.91 ± 0.15 kg and 7.70 ± 0.31 kg. The persistency indices in Jersey x Zebu and Brown Swiss x Zebu cross-breds were 5.2 ± 0.30 and 4.18 ± 0.15 respectively. Season of calving, farm, year of calving and age at first calving had no significant effect on persistency index with the exception of farm effect in the case of Brown Swiss cross-breds.

There were highly significant positive correlation between peak yield and total lactation yield and 305 days yield. But the correlations between peak yield and lactation period was significant in Jersey cross-breds but not in Brown Swiss cross-breds. Correlations between persistency and lactation period, peak yield and 305 day's yield were highly significant in the case of Brown Swiss cross-breds but the same were non significant in Jersey cross-breds.

The lactation curves revealed that, following parturition the lactation yield sharply increased upto the 3rd week and then rose to a maximum by 7th week. The level was maintained upto 9th week and after which the production declined. The rates of decline were 1.9 per cent and 1.7 per cent respectively in Jersey x Zebu and Brown Swiss x Zebu cross-breds.

DEPARTMENT OF CLINICAL MEDICINE

11. Clinical investigations on the seasonally occurring respiratory disease in goats

Code No. : VA-7-1-5-5
Name of the Research Scholar
(M. V. Sc.) : C. R. Joseph
Admission No. : 77-13-18
Name of the Major Adviser : Dr. N. M. Aleyas
Year of starting the work : 1977
Year of completion of the
work : 1979

Abstract

Incidence of seasonally occurring respiratory disease problem in goats is on the increase in recent years. The present study was taken up to throw more light on it. A total of 65 clinical cases of respiratory disorders admitted to the University Veterinary Hospitals, Mannuthy and Trichur and Veterinary Dispensary, Ollur during the period November 1978 to February, 1979 were studied, keeping 10 apparently healthy goats of All India Co-ordinated Research Project on Goats for Milk Production as control. The investigation included collection of data on the incidence, clinical examination, culture and sensitivity tests of nasal swab, haematological examination and therapeutic trials with suitable chemotherapeutic agents in clinical cases.

The data collected from the records maintained in the Veterinary Hospitals, Mannuthy and Trichur showed a high incidence of this condition during the period November to February. The condition usually started as an upper respiratory affection. The important clinical signs noticed were anorexia, emaciation, easily induced frequent dry cough,

mucopurulent nasal discharge, high or normal temperature, increased pulse and respiratory rates, inspiratory dyspnoea, abnormal sounds on auscultation and fall in milk yield in lactating animals.

In vitro antibiotic sensitivity tests and efficacy of treatment in clinical cases showed that chloramphenicol is the drug of choice, followed by nitrofurantoin. If the disease can be treated sufficiently early with suitable chemotherapeutic agents nearly 100 per cent cure is possible. Bacterial isolates from apparently healthy animals were *Staphylococcus*, *Streptococcus*, *Corynebacterium*, *Pasteurella*, *Escherichia* and *Citrobacter* sp. while *Staphylococcus*, *Streptococcus*, *Corynebacterium*, *Pasteurella*, *Escherichia* and *Klebsiella* sp. were isolated from diseased animals.

Leukocytosis, neutrophilia, lymphopenia and normal count with a reduction in total erythrocyte count, haemoglobin and packed cell volume were observed in diseased animals. Anaemic changes were noticed even after getting clinical cure. Fall in total leukocyte count and neutrophil percentage towards normal and a slight increase in lymphocyte percentage was noticed on the date of discharge. Significant leukopenia was evident in chloramphenicol, nitrofurantoin, streptomycin, erythromycin and 'Proxymer' treated groups while in chlortetracycline and kanamycin groups no change was noticed. Significant neutropenia was noticed in chloramphenicol, chlortetracycline, nitrofurantoin, kanamycin and erythromycin groups where as the difference was not significant in streptomycin groups. Significant lymphocytosis was observed in all the groups treated except erythromycin group.

12. Incidence of leukaemia and leukaemoid reactions in cattle in Kerala

Code No. : VA-7-1-5-4

Name of the Research Scholar
(M. V. Sc.) : R. Vijayan

Admission No : 78-13-15

Name of the Major Adviser : Dr. M. Krishnan Nair
Year of starting the work : 1980
Year of completion of the work : 1980

Abstract

The present study was taken up to investigate the incidence of leukaemia and leukaemoid reactions in cattle in Kerala, utilising 550 animals from selected private and Government farms and Veterinary institutions of the State. For the haematological diagnosis Benedixen's key was followed. The haematological values of all the animals examined fell within the category of normal and it could be said that bovine leukaemia was not encountered in the bovine population screened in the present investigation. None of the samples showed any evidence of leukaemoid reaction. A few animals with enlarged lymphnodes showed lymphocyte per cent above 80, but their absolute lymphocyte values were within the normal range. The lymphocytes in the blood smears did not show any cytological abnormalities to indicate neoplastic property.

DEPARTMENT OF DAIRY SCIENCE

13. Evaluation of coffee husk for milk production in cows

Code No.	: VA-1-1-9-12
Name of the Research Scholar (M. V. Sc)	: P. I. Geevarghese
Admission No.	: 77-13-13
Name of Major Adviser	: M. Subrahmanyam
Year of starting the work	: 1978
Year of completion	: 1979

Abstract

An investigation was carried out to find out the feeding value of coffee husk for milk production in cows using nine Sindhi x Jersey cross-bred cows, divided into three groups of three animals each. The experiment was for a period of 90 days. Coffee husk was included in the concentrate mixture at 0, 10 and 20 percent levels. A switch-over design was used for the experiment.

Coffee husk fed at 10 and 20 percent levels in the concentrate ration did not significantly influence the body weight of animals. The total milk production of the animals getting coffee husk in the ration did not significantly differ from that of the animals on the control diet. The percentage of fat in milk, the total quantity of milk fat produced, the amount of four per cent fat-corrected milk, the percentage of total solids, the amount of total solids in milk, percentage of solids-not-fat, total quantity of solids-not-fat and the amount of solids-corrected milk remained the same for all the three groups of animals included for the study and no significant differences were noticed due to treatments.

The physiological status of the cows in all the groups was normal and satisfactory.

No significant difference due to treatments was noticed in some of the physical and chemical constants of butter fat.

The dairy merit (percentage) based on efficiency of feed conversion was less for animals getting ten percent coffee husk due to the reduced milk production and the greater feed consumption.

The total cost of feed for producing one kg milk was Rs. 1.42, 1.38 and 1.33 for animals getting 0, 10 and 20 percent coffee husk in the concentrate mixture respectively.

It was concluded that coffee husk upto 20 percent level can profitably be incorporated in the concentrate mixture of dairy cows.

14. Determination of solids content of milk by specific gravity Lactometer

Code No. : VA-1-1-6-10
Name of Research Scholar : Babu Mathew
(M. V. Sc.)
Admission No. : 78-13-24
Name of the Major Adviser : M. Subrahmanyam
Year of starting the work : 1980
Year of Completion of the work : 1980

Abstract

The methods of estimating total solids content of milk having a high fat percentage by Richmond's formula ($TS=0.25L + 1.2F + 0.14$) using Quevenne's specific gravity lactometer, modified Richmond's formula ($TS=0.25L + 1.2F + 0.50$) using Zeal specific gravity lactometer, ISI formula ($TS=0.25DH + 1.21F + 0.66$) using the density hydrometer, along with the percentage of fat estimated by Gerber method

were compared with the values obtained by gravimetric method using 307 samples of milk. In all the milk samples analysed the calculated values of total solids by the formula methods were both higher and lower than the gravimetric values.

Since the formula methods did not give a true estimate of the total solids in milk modifications to the existing formulae were required by applying a correction factor. It was observed that depending upon the percentage of fat in milk samples different correction factors were needed to be applied to the different formulae for getting the values close to the gravimetric method. Addition of a correction factor of 0.15 and 0.18 was necessary to the Richmond's formula for milk samples containing 5.1 to 6.0 and 6.1 to 7.0 per cent fat respectively. For the modified Richmond's formula addition of 0.57, 0.53, 0.66 and 6.1 to 7.0 per cent fat respectively. For the modified Richmond's formula addition of 0.57, 0.53, 0.66 and 0.75 was necessary for samples containing 3.0 to 4.0, 4.1 to 5.0 and 5.1 to 6.0 and 6.1 to 7.0 per cent fat. The addition of a correction factor of 0.16 to the ISI formula was essential for samples containing 4.1 to 5.0 milk fat to get the values in agreement with the gravimetric method. No correction factor was necessary if Ling formula used. The order of preference for using various formulae will be (1) Ling formula (2) ISI formula (3) Richmond's formula (4) modified Richmond's formula.

Ling formula can be used without any correction factor for determination of total solids content of milk for varying percentages of fat from 3.0 to 9.0.

DEPARTMENT OF EXTENSION

15. Comparative effectiveness of extension communication media used under the Dairy Development Programme and extent of adoption of improved Dairy Husbandry practices by members of milk Co-operatives in selected areas in Trichur Taluk

Code No. : VA-M-1-7-4 (1)
Name of the Research Scholar (M. V. Sc.) : M. R. Subhadra
Admission No. : 77-13-20
Name of the Major Adviser : Dr. G. R. Nair
Year of starting the work : 1978
Year of completion of the work : 1979

Abstract

The objectives of the study were to know the effectiveness of various extension communication media used in dairy development programmes for disseminating improved dairy husbandry practices, to measure the extent of adoption selected improved dairy husbandry practices and to understand the influence of personal and socio-economic characteristics of the adoption of improved dairy husbandry practices.

One hundred members of seven Milk Supply Cooperative Societies in Ollukkara Block area were selected for the study.

The findings showed that neighbourhood and Government agencies played dominant roles in diffusing the improved practices concerning dairy husbandry. Among the neighbourhood agencies, Milk Supply Cooperative Societies ranked first. Government agencies were found to be effective for influencing the respondents in adoption. Veterinary Surgeons were found to be a powerful medium within, the Government agencies. Thus Veterinary Surgeons and Milk Supply Cooperative Societies accounted very much to the knowledge

as well as the adoption of all the practices except for the practice "Clean milk production" which was influenced by mass media.

The adoption of practices in the aggregate were not influenced by the nine personal and socio-economic characteristics, viz., age, education, caste, income, land holding size, farming experience, herd size, social participation and contact with extension agencies. But for some individual practices there was slight significant difference between adopters and non adopters.

Age, herd size and education seem to have only a very negligible role in the adoption behaviour of dairy-men while contact with extension agencies appeared to have the largest influence on dairy husbandry practices. It was also observed that among the 10 practices, only one practice, viz., "Vaccination against contagious diseases" was not influenced by any one of the nine variables studied.

16. A study of selected environmental factors influencing extension personnel in communicating improved animal husbandry practices

Code No. : VA-M-1-7-1 (1)
Name of the Research
Scholar (M. V. Sc.) : P. J. Rajkamal
Admission No. : 77-13-21
Name of the Major Adviser : Dr. T. Prabhakaran
Year of starting the work : 1978
Year of completion of the work : 1979

Abstract

The objective of the study was to understand the working conditions of the personnel engaged in animal husbandry extension with regard to selected environmental factors and to explore the relationship, if any, existing between the perception of the selected environmental factors by the extension personnel and their self-assessment on their role in the "Change agent-Client system contact".

The study was conducted in Trichur taluk with all the 60 personnel engaged in animal husbandry extension work. These personnel comprised of Village Extension Officers, Livestock Assistants, Dairy Farm Instructors and Veterinary Surgeons.

Results revealed that for majority of the Village Extension Officers the 'Guidance and supervision', 'Service and supplies' and 'Job satisfactory' were only some-what satisfactory, and below, while for factors like people's participation Interpersonal relations and communication, the environment was some-what satisfactory and above. Livestock Assistants were in general not satisfied with 'Guidance and supervision, Services and supplies, Communication, and 'Job satisfaction, some-what satisfied with People's participation and satisfied with 'People's participation and satisfied with Interpersonal relations. Most of the Dairy Farm Instructors expressed the existence of some-what satisfactory' environment on factors like 'Guidance and supervision', Communication, and 'Job satisfactory with their 'Interpersonal relationship'. For majority of Veterinary Surgeons, all the six environmental factors appeared to be some-what satisfactory.

Livestock Assistants had an entirely different preception of the environmental factors leaning more towards total dissatisfaction when compared to other categories in the study.

There was almost unanimous agreement by all categories of personnel to the unsatisfactory nature of services and supplies prevailing in the diffusion of animal husbandry innovations and also in their 'Job satisfaction'.

It was found that in the self-assessment of the extension personnel's contacts with clients the environmental factors studied had least importance in the case of village Extension Officers and some importance in the case of Livestock Assistants and Veterinary Surgeons.

DEPARTMENT OF MICROBIOLOGY

17. Immunological survey on the incidence of infectious bronchitis (IB) and Infectious laryngotracheitis (ILT) in poultry in and around trichur

Name of Research Scholar (M.V.Sc) : M. C. George.
Name of the Major Advisor : Dr. K. T. Punnoose
Year of starting the work : 1977
Year of completion of the work : 1979

Abstract

Infectious bronchitis and infectious laryngotracheitis are the two viral diseases of poultry responsible for economic loss to the poultry by way of decreased feed efficiency and loss of weight gain. These diseases have been reported from the neighbouring states of Kerala. In the present study a serological survey was carried out to understand the prevalence of these two diseases in the poultry population in and around Trichur.

A total of 2,110 serum samples have been collected from the field, comprising of White Leghorn, Rhode island Red and Desi birds belonging to different age groups. Serum samples were collected from organised farms, from birds kept by farmers and from the birds slaughtered in different hotels at Trichur.

These serum samples were tested for infectious bronchitis and infectious laryngotracheitis, by employing agar gel precipitation test. The chorioallantoic membrane and allantoic fluid of infected embryos were used for the preparation of antigens for agar gel precipitation test. The potency of antigens was tested by conducting the agar gel precipitation test with corresponding hyper immune sera prepared in White Leghorn male chicks of six to eight weeks of age. A line of precipitation was obtained in both cases which was close and curved towards the antigen well,

because of the high concentration of antibody in the sera and due to the high molecular weight of the antigen. In the case of infectious bronchitis the line of precipitation was distinct where as in case of infectious laryngotracheitis it was diffuse.

The antigen, whose efficacy was tested using hyper immune sera was used to test samples of sera collected from the field. The samples were pooled to 211 groups and tested for the presence of infectious bronchitis and infectious laryngotracheitis precipitating antibodies separately by agar gel precipitation test. None of the samples gave precipitation line either to infectious bronchitis or to infectious laryngotracheitis. So it was assumed that both of these viral diseases are not prevalent in Trichur and its suburbs.

18. Comparison of serological tests for the detection of leptospira antibodies in immunised animals

Code No. : SA-7-1-8-1 (1)
Name of the Research Scholar (M.V.Sc.) : R. Ravikumaran Nair
Name of the Major adviser : Dr. P. K. Abdulla
Year of starting the work : 1978
Year of completion of the work : 1980

Abstract

Leptospirosis is a widespread disease of man and animals and is of considerable economic importance besides being a public health problem. The leptospira infection in man and animals may be confirmed either by isolation of the organisms or by detection of specific antibodies in the serum and tissues of infected animals. Isolation of leptospira is time consuming and beyond the scope of many diagnostic laboratories. In the present study the sensitivity of passive haemagglutination test was compared with the established microscopic agglutination test utilizing rabbit hyperimmune serum as the source of antibody.

Leptospira serotypes were grown in Korthof's medium enriched with 10% haemolysed rabbit serum. By 7-10 days satisfactory concentration of the organisms was obtained and was used for MA test. Passive haemagglutination test was carried out employing ethanol extracted antigen from concentrated leptospiral cultures. The PHA test was carried out after determining the optimum dilution of antigen required to sensitize sheep erythrocytes.

Hyperimmune sera to both serotypes were raised in rabbits by a series of intravenous inoculations. Serum samples or antibody titration was collected at weekly intervals from seven days following the first injection till the 49th day.

Serum collected periodically from immunized rabbits were preserved at 20°C at varying length of time upto three months. There was no deterioration in the stability or potency of ESS or sera on storage.

19. The bacterial species associated with gastroenteritis in goats

Code No. : VA-7-1-8-10
Name of the Research Scholar (MVS) : Sebastian Joseph
Admission No. : 77-13-11
Name of the major adviser : Dr. P. K. Abdulla
Year of starting the work : 1977
Year of completion of the work : 1979

Abstract

The information regarding the incidence, etiology and pathogenicity of enteric pathogens in goats is very meagre in our country. The present study was aimed at the isolation, identification and characterisation of Enterobacterial organisms from cases of enteritis in goats. The study also included, determination of sensitivity pattern of the isolates to various chemo-therapeutic agents.

A total of 190 specimens, which included rectal swabs (63), intestinal contents, portion of large and small intestines (92) and mesenteric lymph nodes (38) collected from live/dead animals were examined for enteric pathogens. From these specimens examined, 86 isolates of *Escherichia coli*

(45.26 per cent), 39 *Enterobacter cloacae* (20.53 per cent) and two salmonella (1.05 per cent) were obtained. Of all the *E. coli* isolates only one (EC/11) was found to be haemolytic.

In addition to the above specimens, eight samples of heart blood and 54 specimens of lung tissues collected from cases of gastroenteritis were also examined for the presence of bacterial organisms. Eleven isolates of *Streptococcus pyogenes* (From lung tissues only), 15 isolates of *Klebsiella Pneumoniae* (From lung tissues only), and one isolate of *Corynebacterium pyogenes* (from lung tissues only) were obtained.

The ability of haemolytic *E. coli* (EC/11) to produce necrotoxin on rabbit skin was tested and the lesions produced were of necrotic type. The strain was also found to be pathogenic to mice when tested.

One isolate of Salmonella (S/1) was also tested for its pathogenicity to mice, and found non-pathogenic.

Enterotoxin production in rabbit ileal loop was studied with haemolytic (EC/11) and non-haemolytic (EC/15) *E. coli*. The test materials included peptone water culture, soft agar culture fluid and acetone precipitated culture fluid. The results of the experiments have shown that, non-haemolytic *E. coli* produced dilatation reaction, while the haemolytic *E. coli* did not. The lesions noticed in the ideal segments of positive reaction were typical of enteritis.

Antibiotic sensitivity studies were conducted using 11 chemotherapeutic agents (Ampicillin, bacitracin, chloramphenicol, erythromycin, gentamicin, Kanamycin, nitrofurantoin, penicillin, streptomycin, sulfonamide and tetracycline) on *E. coli*, *salmonella* and *Enterobacter cloacae*. The result showed that 100 per cent isolates of *E. coli* were sensitive to gentamicin, 95.35 per cent to nitrofurantoin, 88.37 per cent to chloramphenicol, 60.47 per cent to Kanamycin, 43.70 per cent to streptomycin, 8.14 per cent to tetracycline and 2.33 per cent to erythromycin. All the 32 isolates of *Enterobacter cloacae* tested were sensitive to gentamicin and Kanamycin, whereas 30 (76.92 per cent) were sensitive to chloramphenicol and nitrofurantoin and 15 (38.46 per cent) to streptomycin. The drugs of choice for salmonella were found to be gentamicin, chloramphenicol, nitrofurantoin and streptomycin.

DEPARTMENT OF NUTRITION

20. Studies on the nutrient requirements of kids

Code No. : VA-3-1-9-3(1)
Name of the Research Scholar (MVSc) : A. D. Mercy
Name of the Major Adviser : Dr. E. Sivaraman
Year of starting the work : 1977
Year of completion of the work : 1979

Abstract

An investigation was carried out to find out the nutrient requirements for optimum growth in kids. Twenty four Alpine Malabari cross-bred kids of 3-4 months of age formed the experimental subjects for the study. The animals divided into three identical groups (groups I, II and III), were maintained on three different levels of nutrient intake for over a total period of 4½ months, the parameters recorded during the course of the study being average daily body weight gain, drymatter intake, feed conversion efficiency, digestibility coefficients of nutrients, nitrogen balance, mineral balance and haematological constituents.

The average daily gain and feed conversion efficiency recorded for animals in the three groups I, II and III were found to be 63.7 ± 5.3 , 64.4 ± 5.0 and 67.6 ± 2.0 g and 7.0 ± 0.7 , 7.5 ± 0.5 and 7.9 ± 0.3 respectively. The average drymatter consumption of animals were 3.1 ± 0.2 , 3.5 ± 0.3 and 3.6 ± 0.3 kg per 100 kg body weight respectively for the three groups I, II and III

The data collected for the haematological constituents were within the normal range for the species indicating that all the animals under the three dietary regimes were maintaining normal and sound nutritional status.

The requirements for protein and energy for unit gain in body weight were 0.86 ± 0.06 , 0.90 ± 0.06 and 0.89 ± 0.03 kg D. C. P and 4.84 ± 0.4 , 5.20 ± 0.30 and 5.31 ± 0.19 kg T. D. N for the animals in groups I, II and III respectively. The calcium requirements for kids for kg increase in body weight were 18.7 ± 4.4 , 15.5 ± 8.4 and 24.9 ± 2.8 g and those of phosphorus were 17.2 ± 1.1 , 13.0 ± 5.6 and 22.5 ± 2.5 g for the animals in the groups I, II and III respectively. The requirements of D. C. P, T. D. N, Calcium and Phosphorus obtained during the course of the experiment were considered optimum for normal growth in Alpine-Malabari cross-bred kids.

DEPARTMENT OF PARASITOLGY

21. Studies on the common ticks affecting livestock in Kerala

Name of the Research Scholar : K. Rajamohanam
Admission No. (Ph.D) : 74-23-02
Name of the Major Adviser : Dr. R. K. Sundaram
Year of starting the work : 1976
Year of completion of the work. : 1980

Abstract

An investigation was conducted for a period of 5 years from 1974 into the incidence of ticks in domestic animals in Kerala, the biology of the most common species, and their susceptibility to four commonly available organophosphorous compounds.

Nine different species of ticks belonging to 5 genera were collected from cattle, buffaloes, goats and dogs in different localities of the eleven districts of Kerala. The species of ticks identified were *Boophilus annulatus*, *Rhipicphalus sanguineus*, *R. haemaphysaloides*, *R. turanicus*, *Haemaphysalis bispinosa*, *H. turturis*, *H. spinigera*, *Hyalomma anatolicum* and *Amblyomma integrum*. The commonest among them was *Boophilus annulatus* which was found on cattle. The incidence of this tick was very high in the hilly areas and in the western ghat regions. The other common ticks found on cattle were *Rhipicephalus haemaphysaloides* and *Haemaphysalis bispinosa*. Tick infestation was found to be rare in buffaloes and goats and the common species found on them were *Haemaphysalis bispinosa* and *B. annulatus*. In dogs the common species recorded in the present study were of rare occurrence in the state. Variations in incidence was evidenced from the present study. The maximum incidence was found in the months of July, August, September, October and November.

The life-cycle of *B. annulatus* was completed experimentally in a period of 44 days. The maximum number of eggs produced by one tick was 1420 and minimum 680. The incubation period was dependent on the room temperature and variation in humidity had little influence. The larvae were found to prefer hairy areas of the body for attachment, and they did not attach at the hairless and exposed areas. The engorged females were found to drop off quickly when green grass was spread on the floor of the experimental animal's shed.

The life-cycle pattern could be summarised as :

Pre-oviposition	: 1 to 6 days
Oviposition	: 5 to 9 days
Incubation period	: 16 to 30 days
Larval fasting	: 2 to 5 days
Larval feeding	: 4 to 7 days
Larval moulting	: 8th to 12th day of infection
Nymphal feeding	: 3 to 6 days
Moulting of Nymph	: 15 to 19th day of infection
Adult feeding	: 5 to 10 days
Detachment of female	: From 20th day of infection onwards.

Four organophosphorous compounds *viz.* Malathion, Fenitrothion, Dichlorvos and Phosalone were tested for their action on ticks. The ovicidal and larvicidal actions and the lethal effects on nymphs and engorged females of *B. annulatus*, *R sanguinius* and *H. bispinosa* were studied in the laboratory. Cythion (Malathion 50%) 0.5 to 1% Sumithion (Fenitrothion 50%) 0.5 to 1%, Dichlorvos (Nuvan) 0.1 to 0.2%, and Zolone (Phosalone 35%) 0.2 to 0.3% were found effective at different degrees. The efficacy was directly proportional to the concentration of compound and the duration of treatment. Phosalone showed maximum efficacy followed by Dichlorvos.

In field trials, all the four compounds gave satisfactory results, but phosalone showed maximum efficacy and least toxicity to animals. Nuvan was also effective but was the

most toxic among the four compounds. Thus the acaricide of choice for routine use in Kerala was determined to be Phosalone (35%) at a concentration of 0.3% to be used as a spray or wash.

22. Studies on certain Gastro-Intestinal nematodes with special reference to those found in goats.

Name of the Research Scholar : V. Sathianesan
(Ph.D)

Admission No. : 74-23-01

Name of the Major Adviser : Dr. R. Kalyana Sundaram

Year of starting the work : 1974

Year of completion of the work : 1980

Abstract

Life history of *Trichuris globulosa* was elucidated for the first time using kids as experimental animals. Both free living and parasitic stages were described in detail. The prepatent period of the worm was determined to be 85-89 days. Haematology and histopathology of trichuriasis in kids experimentally infected with *T. globulosa* have also been studied for the first time and heavy infection with the worm was found to cause anaemia and pathological changes in caecum of the host.

Prepatent period of *Strongyloides papillosus* was worked out in kids for the first time and it has been determined to be 6-7 days.

Neoscaris vitulorum of calves was found to be not transferable to goats either transplacentally or orally. Infection of calves with this worm was established to be not post-natal. This worm did not attain sexual maturity in guinea pigs.

Oesophagostomum columbianum of goats was not transferable to calves. Prepatent period of the worm in kids was determined to be 40 days under local conditions.

Against monospecific infection with *Trichuris globulosa* in experimentally infected kids the efficacies of Oxibendazole, Thiophanate, Albendazole & Parabendazole at the recommended doses of 10 mg, 50 mg, 10 mg & 30 mg per kg body wt, respectively were found to be very poor. At double the recommended dose their efficacies were found to increase to 100%.

89%, 96% and 100% respectively, Oxibendazole and Albendazole @ 10mg and 10mg/kg. body wt respectively were found to be 100% effective against *Haemonchus contortus*, *Trichostrongylus colubriformis*, *Bunostomum trigonocephalum*, *Oesophagostomum columbianum*, *O. asperum* and *Strongylodies papillosus*. Thiophanate at the recommended dose (50 mg/kg body wt) was also 100% effective against all the nematodes mentioned above except *Haemonchus contortus* against which it was only 97% effective. Parbendazole at the recommended dose of 30 mg/kg body wt was 100% effective against all the nematodes referred to above with the exception of *Bunostomum trigonocephalum* against which only 86.6% efficacy was noticed,

Against immature nematodes in the G 1 tract Oxibendazole and Albendazole were 100% effective where as the efficacy of Parbendazole and Thiophanate was only 85 & 74% respectively

In *in-vitro* studies the anthelmintic efficacy of Oxibendazole against *Haemonchus contortus* was found to be superior to that of the other anthelmintics.

In ovicidal property also, Oxibendazole was better than all the others, since it was ovicidal in 6 hrs. after administration whereas Albendazole, Thiophanate and Parbendazole were ovicidal in 8 h 9 h and 11 h respectively.

Albendazole was found to be superior to all the other 3 anthelmintics in their influence on the body wt. gain of treated animals closely followed by Oxibendazole.

Treatment trials with Oxibendazole, Albendazole and Thiophanate against G. 1 nematodes of goats have not been attempted earlier.

23. Pathogenicity of *Acuaria hamulosa* to Chicken

Code No : VA-7-1-10-9 (1)
Name of the Research Scholar (M.V.Sc.) : Y. Ganeswara Rao
Admission No. : 78-1 -02
Name of the Major Adviser : Dr. R. K. Sundaram
Year of starting the work : 1979
Year of completion of the work : 1981

Abstract

Controlled experiments were conducted with commonly occurring spirurid worm of chicken, *Acuaria hamulosa* in two breeds of chicken, namely the White Leghorn (an egg strain) and the White Plymouth Rock (a broiler strain).

The haematological studies revealed an initial leucocytosis from 14th day to 30th day, followed by heterophilia from 43rd day to 70th day post infection, and a mild eosinophilia throughout the experimental period. The infected White Plymouth Rock birds lost considerable body weight in White Leghorn layers, there was great delay in sexual maturity and poor feed efficiency as indicated by reduced egg production. The percentage of establishment in the experiment was found to be not correlated to the infective dose. The pathological changes in the affected gizzards indicated an acute inflammation during the invasive phase of juveniles, followed by a chronic reaction, which by 60th day post infection was well established indicating the development of a host-parasite balance, towards the later stages of infection.

24. Studies on the incidence and pathogenicity and control of gastro-intestinal nematodes in cross-bred calves in Kerala with special reference to strongyloidosis

Code No. : VA-7-1-10-12 (1)
Name of the Research Scholar
(M. V. Sc) : Dr. G. Sukumara Pillai
Admission No. : 78-13-01
Name of the Major Adviser : Dr. K. Chandrasekharan
Year of starting the work : 1978
Year of completion of the
work : 1980

Abstract

The non-descript and cross-bred calves of Kerala were found to be infected with eight species of gastro-intestinal nematodes viz., *Strongyloides papillosus*, *Neoascaris vitulorum*, *Cooperia* sp; *Haemonchus contortus*, *Bunostomum*

plebotmum, *Oesophagostomum radiatum*, *Trichostrongylus colubriformis* and *Trichuris globulosa*. Incidence of nematodes was more in cross-bred calves (64.8%) as compared to non-descript (51.52%). Catarrhal enteritis and frequent diarrhoea were observed in cross-bred calves infected with *Strongyloides papillosus*. Thiophanate at 100 mg/kg body wt, Mebendazole at 15 mg/kg, Levamisole at 15 mg/kg, Thiabendazole at 100 mg/kg, Tetramisole hydrochloride at 20 mg/kg, Morantel tartrate at 15 mg/kg and Parabendazole at 45 mg/kg body weight were found to be 100% effective against natural infection of *Strongyloides papillosus*. Fenbendazole at 5 mg/kg body weight as a single dose had 83 to 100% efficacy against *Strongyloides papillosus*, 78 to 100% against Ascariasis, 85 to 100% against Strongylosis and 50 to 100% against *Trichuris* of calves.

DEPARTMENT OF PATHOLOGY

25. Post-natal mortality of kids—a patho-anatomical investigation

Code No. : VA-7-1-11-16 (1)
Name of the Research Scholar
(M. V. Sc.) : C. B. Manomohan
Admission No. : 77-13-05
Name of the Major Adviser : Dr. M. Krishnan Nair
Year of starting the work : 1978
Year of completion of the
work : 1980

Abstract

A study was conducted to evaluate the patho-anatomical features of the important diseases causing mortality in kids. A total of 105 kids below six months were studied.

Mortality was found to be highest in kids of the 0-3 month age group.

Gastro-enteritis was found to be the most important cause of post-natal mortality in kids as this was the cause of death in 77 kids (73.3%).

Gastritis was mainly manifested as a catarrhal type. Abomasal erosions, gastric ulcers and patchy necrotic abomasitis were also encountered in some cases. Enteric lesions were seen in 72 cases of which 46 animals did not show any lesions in stomach. This included six cases of coccidiosis and one case of taeniasis. Enteritis was mainly manifested as catarrhal enteritis with infiltration of lymphocytes. Haemorrhagic enteritis and necrotic enteritis were seen in few cases. The mesenteric lymph nodes from some of these animals showed depletion of lymphocytes.

Escherichia coli and *Enterobacter aerogenes* could be isolated from intestinal contents. The probable role of these organisms in the pathogenesis of the lesions has been discussed.

Six kids had lesions of coccidial enteritis produced by *Eimeria arloingi* and *Eimeria intricata*.

One animal died due to taeniasis caused by *Moniezia* sp.

Pneumonia caused mortality in 13 kids (17.1%). Twelve animals out of them belonged to 0-3 month age group. Lesions were mainly in the apical, cardiac and intermediate lobes. Basically the reaction was of suppurative type. Bronchitis, peribronchitis and necrosis were seen in some cases. Two cases showed interstitial fibrosis and one case showed infiltration of macrophages and giant cells.

Streptococcus pneumoniae and *Klebsiella pneumoniae* were isolated from pneumonic lungs. Virulent *Klebsiella pneumoniae* failed to produce pneumonia in kids when inoculated experimentally. The probability of kids possessing immunity against this organisms and of multiple etiological factors have been discussed.

In four cases toxic hepatitis was seen. The possible role of aflatoxin in the production of hepatitis has been discussed.

In three animals renal cortical hypoplasia was noticed.

26. Enzymology of tumours arising from the Ethmoid region in cattle

Code No	: VA-7-1-11-2 (2)
Name of the Research Scholar (M.V.Sc.)	: H. K. Dhawe
Admission No.	: 78-13-05
Name of the Major Adviser	: Dr. M. Krishnan Nair
Year of starting the work	: 1978
Year of completion of the work	: 1980

Abstract

A series of 36 clinical cases of tumours arising from the ethmoid region in cattle were studied with regard to the serum activity of alkaline phosphatase (ALP), acid phosphatase (AcP), glutamic oxalacetic-transaminase (GOT), glutamic pyruvic oxalacetic-transaminase (GOT) glutamic pyruvic-transaminase (GPT) and lactate dehydrogenase (LDH). The above mentioned enzymes were also evaluated in ten apparently healthy cattle.

Statistically no significant difference was found between the tumour bearing animals and controls regarding the activity of the above mentioned enzymes. However, when the animals were clinically staged, it was found that serum LDH activity was increased from stage II A onwards, reaching maximum activity in stage II B. with a fall in activity in stage III A. But the value for animals in Stage III A was not less than that found in stage II A.

The serum LDH activity was found increased in those tumour bearing animals with increased tumor mass, especially in those found in clinical stage II B and III A, where the tumour mass extended beyond half the nasal passage.

The tumours were categorised on histological examination as adenocarcinoma, squamous cell carcinoma and undifferentiated carcinoma.

Serum enzyme estimation was not found to be of clinical value in the early diagnosis of tumours arising from the ethmoid region in cattle. But detectable increase in serum LDH activity observed in advanced cases could be correlated to the tumour load and perforative bone lesions.

27. Pathobiology of the neoplasm involving the paranasal sinuses in bovines

Code No. : VA-7-1-11-2 (3)
Name of the Research Scholar : T. Sreekumaran
(Ph. D.)
Admission No. : 77-23-02
Name of the Major Adviser : Dr. A. Rajan
Year of starting the work : 1977
Year of completion of the work : 1980

Abstract

An investigation was carried out on the pathobiology of the tumour involving the paranasal sinuses in bovines. The study was spread over a period of two years from 1977 to 1979. The incidence, symptomatology and clinico-pathological features were studied and the immune status of the tumor bearing animals was assessed and immunotherapy was attempted.

The tumour bearing animals obtained from different parts of the Kerala State were brought to the Department of Pathology for detailed investigation. Clinical symptoms were

delineated and haemogram was chartered. The plasma protein and serum calcium and phosphorus levels were estimated. Serum protein was fractionated. *In vivo* tests were carried out employing purified tumour antigen as specific and BCG and tuberculin as non-specific antigens to assess the immunological status and to evaluate the immunocompetence of tumour bearing animals. Employing the LMI test and lymphoproliferative response of lymphocytes to PHA as indexes the cell mediated immune response was assessed. The immunological response of the regional lymph node was studied by the intranodal administration of BCG as the test antigen. Active specific immunotherapy was carried out employing irradiated tumour cells and Freund's complete adjuvant. Non-specific immunotherapy was attempted by intralesional administration of BCG at different dose levels. The animals were subjected to detailed autopsy after death/sacrifice. Gross lesions were recorded and histopathological examination of tissues was carried out employing special stains wherever necessary. Cellular reaction in the regional lymph node draining the head was studied to evaluate immunological response of these nodes to tumour associated antigens.

The tumour of the paranasal sinuses occurred in an endemic form as revealed by 139 cases that were recorded during the two year period from 1977 to 1979. The condition was recorded in all the districts of the state. The highest incidence was found in the age group of 7-10 years. No sex specificity was observed. All breeds of animals were found affected. However, the incidence was more among cross-bred cattle. The incidence of the tumour was recorded throughout the year.

The earliest clinical symptom was intermittent nasal discharge. Exophthalmos, epistaxis, respiratory difficulty and bulging of the forehead were later clinical manifestations. Pregnancy was found to exacerbate the clinical symptoms in cows.

The haemogram was characterised by anaemia and moderate to severe lymphocytosis. A reduction in plasma protein level was observed in the advanced stage of the

tumour growth. There was an imbalance of serum calcium and phosphorus levels particularly in animals with perforation of frontal bone. An increase in the levels of gammaglobulin and alpha-1 globulin was a consistent feature. Hypoalbuminaemia and a decrease in albumin globulin ratio were also recorded.

The *in vitro* and *in vivo* tests employing purified tumour antigen revealed that tumour bearing animals were immunologically competent. The monitoring of the immune system by different intradermal skin sensitisation tests with BCG and tuberculin indicated that there was no immunosuppression in tumour bearing animals in early stages of tumour growth. A significant reduction in the blastogenic response of peripheral blood lymphocytes was observed on treatment with PHA-M. Intranodal administration of BCG revealed that there was an enhancement of general CMI response in tumour bearing animals.

Non-specific immunotherapy with BCG was found to be of value in reducing the rate of growth of the tumour and enhancing the survival period of animals. Specific immunotherapy with tumour cell vaccine was found to be effective in early stages of tumour growth.

The malignant tumour was established to arise from the mucosa of the ethmoid and it was found to be an infiltrating invasive tumour. Metastasis to regional lymph nodes was observed in 40% of cases and most of the foci were seen in the retropharyngeal lymph nodes. Pulmonary metastases were recorded in five instances. The histological pattern of reaction observed in the regional lymph nodes was classified as 1. lymphocyte predominant 2. germinal centre predominant 3. unstimulated 4. lymphocyte depleted and 5. sinus histiocytic. The histiocytic response in the regional lymph node was considered as an index of CMI response to tumour associated antigens.

All the 74 tumours studied histologically were carcinomas and they were classified as Adenocarcinoma (30), Squamous cell carcinoma (35) and undifferentiated carcinoma (9). By gross, histological and histochemical studies it was clarified that the tumour is a primary growth arising specifically from the mucosa of the ethmoid region.

DEPARTMENT OF PHARMACOLOGY

28. An assessment of the antifertility property of *Ocimum sanctum*

Code No. : VA-7-1-12-1 (1)
Name of the Research scholar (M.V.Sc.) : K. Girisan
Admission No. : 77-13-06
Name of the Major Adviser : Dr. Jacob V. Cheeran
Year of starting the work : 1978
Year of Completion of the work : 1979

Abstract

A study was carried out in rats, to assess the antifertility property of the benzene fraction of the leaves of the plant *Ocimum sanctum*. Premating treatment was done in female animals at dose levels of 200 and 400 mg per kg body weight for a duration of eight days. Male animals were subjected to the treatment at a dose level of 200 mg per kilogram body weight for 20 days. The experimental animals were allowed to mate with untreated animals of the opposite sex. Histopathological examination of the organs pituitary, ovary, testis, liver and kidney was carried out.

Results of the study suggested considerable reduction of fertility in both the sexes. This was attributed to the impaired release of gonadotrophic hormones and the resulting improper functioning of the gonads. Administration of the extract showed no toxic effects in the treated rats as well as in their offspring.

DEPARTMENT OF PHYSIOLOGY

29. Studies on the metabolic activity of the re-productive system of chicken

Name of the Research Scholar : M. G. Ramakrishna
Ph. D. Pillai
Admission No. : 73-23-02
Name of the Major Adviser : Dr. G. Nirmalan
Year of starting the work : 1973
Year of completion of the work : 1979

Abstract

Information on the specific role of enzymes in controlling the various biochemical events leading to formation of an egg in the avian oviduct is scanty. Hence, it was considered worthwhile to investigate the enzyme pattern in the plasma and in the reproductive organs in White Leghorn and White Plymouth Rock breeds of fowls, and to study the tissue localization of acid and alkaline phosphatases by histochemical techniques. The influence of various exogenous sex hormones on the development and enzyme pattern of the female reproductive organs was also studied.

The blood plasma and tissue homogenates of the reproductive organs were assayed for alkaline phosphatase, glutamate oxaloacetate transaminase, glutamate pyruvate transaminase and glucose-6-phosphatase.

Many of the enzymes studied were present in the plasma and tissue homogenates without any significant breed difference. Acid phosphatase activity could not be detected in the blood plasma of one-to-two-months-old White Leghorn and White Plymouth Rock birds. In the White Plymouth Rock chicks, plasma glutamate pyruvate transaminase activity also could not be detected. Alkaline phosphatase activity was higher in the ovary of White Leghorns.

In the two-to three-months-old pullets, White Plymouth Rock birds showed higher concentration of glucose-6-phosphatase in their oviducts.

Five to six-months-old fowls of both the breeds did not show any plasma acid phosphatase activity. But in the infundibulum, activities of both the transaminases were higher in the White Leghorn fowls. Glutamate pyruvate transaminase activity in White Plymouth Rock oviduct was confined to the magnum and isthmus.

While there was no significant difference in the morphological development of the oviduct in immature chicks under the influence of different combinations of stilbestrol dipropionate and testosterone propionate or stilbestrol dipropionate and progesterone compared to chicks on stilbestrol dipropionate alone, the White Leghorn chicks receiving stilbestrol dipropionate and testosterone propionate showed higher ovarian levels of acid phosphatase and glutamate pyruvate transaminase. Oviducal contents of acid phosphatase, glutamate oxaloacetate and glutamate pyruvate transaminases were also high. In the White Plymouth Rock chicks, on the other hand, lower concentration of plasma glutamate pyruvate transaminase and lower levels of oviducal alkaline phosphatase, acid phosphatase and glutamate oxaloacetate transaminase were evident. In between the two experimental groups, the White Plymouth Rock chicks had higher content of acid phosphatase in the isthmus and glucose-6-phosphatase in the vagina. But, among the control groups higher contents of plasma glutamate pyruvate transaminase and oviducal alkaline phosphatase were seen in the White Plymouth Rock chicks.

Stilbestrol dipropionate and progesterone administration resulted in higher oviducal concentration of glutamate oxaloacetate transaminase in White Plymouth Rock chicks. Glutamate pyruvate transaminase activity could not be detected in either of the two breeds in any of the tissues studied. In White Leghorn experimental chicks the ovarian acid phosphatase content was less than their corresponding control chicks.

Histochemical localisation of alkaline phosphatase was seen in all the regions of the female reproductive organs in both the breeds. Ovarian localization of the enzyme was in the follicular epithelium and stroma with strong reaction for the enzyme in many of the blood vessels. The reaction was of stronger intensity in magnum and vagina compared to other regions of the oviduct. Localization of acid phosphatase was similar to that of alkaline phosphatase.

The histochemical localizations of acid and alkaline phosphatases in the various regions of the female reproductive organs developed under the influence of different sex hormones were similar to those seen in adult fowls. However, the intensity of the staining reaction for the enzyme in the reproductive organs of chicks developed under the influence of stilbestrol dipropionate was more compared to that of the other two experimental groups.

DEPARTMENT OF POULTRY SCIENCE

30. Economics of raising white leghorn male chicks for meat

Code No. : VA-4-1-14-27
Name of the Research scholar : Maria Liza Mathew
(M. V. Sc)
Admission No : 77-13-15
Name of the Major Adviser : Dr. C. K. Venugopalan
Year of starting the work : 1978
Year of completion of the work : 1978

Abstracts

With a view to determine the economics of raising White Leghorn male chicks for meat, a study was conducted with 200, one-day old White Leghorn male chicks divided randomly into four groups of fifty chicks each to form two treatments with replicates. One treatment group was fed regular farm starter and grower rations while the other group received broiler type starter and finisher diets.

Weekly body weights, feed consumption and feed efficiency were recorded. Economics of marketing Leghorn males was evaluated. The results of the study indicated that marketing Leghorn males at 12 weeks is more beneficial when fed with broiler diets while with regular starter and grower diets they could be marketed at 14 weeks economically.

31. Performance of certain pure bred and cross bred for broiler traits.

Code No: : VA-4-1-14-26
Name of the Research Scholar (M. V. Sc) : Leo Joseph
Admission. No. : 77-13-14
Name of the Major Adviser : Dr. A. Ramakrishnan
Year of starting the work : 1978
Year of completion of the work : 1979

Abstract

An experiment was conducted to compare Australorp (ALP), Rhode Island Red (RIR) and White Plymouth Rock (WPR) breeds of chicken and their crosses for broiler production. There were twenty chicks per each group and a total of 180 chicks. They were raised upto twelve weeks of age on deep litter under identical conditions of management. Body weight was recorded at ten and twelve weeks of age. Feed efficiency and genetic effects, general combining ability, specific combining ability and reciprocal effects on body weight were also calculated at ten weeks of age. Slaughter studies were conducted at ten and twelve weeks of age.

The results of the study tend to suggest that among the three breeds studied, **WPR** was the best for broiler production. The other two breeds, **ALP** and **RIR** are not beneficial for broiler production since the performance of those with **WPR** were not satisfactory for the traits studied.

The statistically significant **GCA** effects for tenth week body weight observed in **WPR** indicated that purebred selection schemes could be used for further refinement in body weight in **WPR**. The significant **SCA** effect observed for tenth week body weight in **ALP** and **RIR** suggest the use of crossbred selection schemes for improving body weights in these two breeds.

DEPARTMENT OF PREVENTIVE MEDICINE

32. Study on the incidence of brucellosis in buffaloes in Trichur

Name of the Research Scholar
(M. V. Sc) : K. Baby.
Admission No. : 76-13-01
Name of the Major Adviser : Dr. E. P. Paily.
Year of starting the work : 1976
Year of completion of the work : 1978

Abstract

An investigation to study the incidence of Brucellosis in buffaloes in and around Trichur was carried out. The 1026 serum samples subjected to study, by the Standard Tube Agglutination Test were collected from in and around Trichur (590), three organised farms of the State (146) and slaughter house, Kuriachira (290). Milk ring test was conducted on 115 individual samples of milk. The overall incidence of Brucellosis in the buffalo population tested was 2.24 per cent. All animals in organised farms were negative to Brucellosis. The possible methods of control and eradication of Brucellosis in Kerala state were discussed.

33. Studies on mastitis in goats

Name of the Research Scholar
(M.V.Sc.) : K. Venugopal
Admission No. : 76-13-09
Name of the Major Adviser : Dr. E. P. Paily
Year of starting the work : 1976
Year of completion of the work : 1978

Abstract

In a study on mastitis in goats, 56 milk samples from clinical and 379 from apparently normal goats were examined. *Staphylococcus aureus* was isolated from 52 per cent of clinical cases, other organisms being *staph. epidermidis*, *Str. agalactiae*, *C. pyogenes*, *K. pneumoniae*, *Esch. coli*, *Ent. aerogenes* and *P. aeruginosa*. Forty seven per cent sub-clinical mastitis was observed in healthy goats. California Mastitis Test using Mastaid reagent was 96.5 per cent efficient in detecting sub-clinical mastitis. Somatic cell counts performed on milk samples showed that normal milk with CMT score Zero had counts 0.9 lakhs per ml. The cell counts of 5-10 lakhs per ml. (CMT Score +) represented sub-clinical mastitis. Among the Mastaid Test, Whiteside's test and Teepol Mastitis test, Mastaid test had maximum reliability. On the basis of sensitivity testing, Chloramphenicol was found to be the drug of choice in goat mastitis followed by Erythromycin. Ampicillin Terramycin & Pencillin.

DEPARTMENT OF SURGERY

34. Experimental studies on rumeno-rectal fistula in calves

Code No. : VA-7-1-16-1 (1)
Name of the Research Scholar (M.V.Sc.) : M. Sumangala
Admission No. : 78-13-12
Name of the Major Adviser : Dr. K. N. M. Nayar
Year of starting the work : 1978
Year of completion of the work : 1980

Abstract

Experimental studies on rumeno-rectal fistula were conducted in 12 bull calves in two groups of six calves each. In the animals of Group I, through a right flank laparotomy, the posterior part of the right dorsal sac of the rumen was anastomosed to the anterior part of the rectum. In the animals of Group II, laparotomy was performed on the left flank and the left dorsal sac of the rumen was anastomosed to the anterior part of the rectum. The animals were kept under observation for a period upto 100 days.

The pH of the rectal contents was reduced after the fistulation and rumen protozoa were present in the rectal contents. A gradual fall in the erythrocyte count, packed cell volume and haemoglobin content was observed in four animals in each group. The variations in the total and differential leucocyte counts were within the normal limits. A gradual loss of body weight was noticed in all the animals in Group I, where as an increase in body weight was noticed in four animals of group II. The animals were normal in their feeding habits, but the dung was loose and became more fluid soon after drinking water.

At autopsy, adhesion at the site of anastomosis was observed in three animals of each group. Rumen contents were present in the rectum and the fistula was patent in all animals.

In two animals from each group, surgical closure of the fistula was performed. It was concluded that functional rumeno-rectal fistula could be established experimentally in calves and that these fistulae permitted escape of rumen contents into the rectum. The fistula could be closed surgically later.

DEPARTMENT OF VETERINARY PUBLIC HEALTH

35. Differentiation of beef from chevon by serological methods

Coe No : VA-M-1-17-1 (2)
Name of the Research Scholar (M.V.Sc) : N. Mohandas
Admission No : 78-13-16
Name of the Major adviser : Dr. P. Prabhakaran
Year of starting the work : 1979
Year of completion of the work : 1980

Abstract

Identification of meat of different species by physical examination alone is difficult. Serological tests are advocated as one of the reliable methods. In order to differentiate beef from chevon, tube precipitation and gel-diffusion tests were concurrently done. Antisera raised in rabbits against beef and chevon, and saline extracts of meat samples collected from known sources as antigen, were used for the tests. In order to remove cross-reacting antibodies, the sera were absorbed with freeze dried antigen against which cross-reacting antibodies were present.

The tube precipitation and gel-diffusion tests were adopted for identifying the meat samples. The tests conducted on eighty samples of meat gave 95 percent accuracy in identifying the meat.

Buffalo meat and mutton used in the test as antigen reacted in the same manner as that by beef and chevon respectively. It was also possible to detect the presence of adulterant in a mixed sample of beef and chevon when the proportion or level of adulterant was up to 20 percent.

The antisera could be preserved for more than six months at 5°C and 20°C without loss of efficacy inspite of occasional electricity failure. It is concluded that tube precipitation and gel-diffusion tests were reliable methods for differentiation of beef and chevon.

36. Studies on certain post-slaughter physico-chemical changes in beef

Code No. : VA-1-1-17-1(1)
 Name of the Research Scholar (M.V.Sc.) : M. T. Jose
 Admission No. : 77-13-19
 Name of the Major Adviser : Dr. R. Padmanabha Iyer
 Year of starting the work : 1978
 Year of completion of the work : 1980

Abstract

The keeping quality of beef under conditions prevalent in Kerala was assessed by determining the different physico-chemical changes in meat. The influence of various treatments (Sodium chloride, 2 per cent and glucose 5 per cent by weight under ambient temperature (23.4 to 33.3°C) and refrigerated temperature (5°C) were investigated. The initial glycogen level at one hour post-mortem was found to vary in beef obtained from different sources (Field and farm origin, 0.751 per cent and 1.002 per cent respectively). The ultimate pH obtained also varied with the source (Field sample - 5.85 and farm sample - 5.53). Mincing of beef did not affect the ultimate pH attained. The beef of field origin spoiled early, but its shelf life, under ambient temperature, can be prolonged by addition of two percent salt (w/w). At room temperature addition of glucose (5 per cent) was found to reduce the keeping quality of meat. Significant positive correlation was noticed between initial glycogen content and time taken for spoilage. A significant negative correlation was observed between initial glycogen level and ultimate pH attained.