VOL. 3 No. 1 : FEBRUARY 1983

The Indian Journal of Animal Reproduction

SOUVENIR ISSUE :

JOURNAL OF THE
INDIAN SOCIETY FOR THE
STUDY OF
ANIMAL REPRODUCTION

(Regd. No. Bom. 253/78)

THE INDIAN JOURNAL OF ANIMAL REPRODUCTION (SOUVENIR ISSUE)

Official Organ of the Indian Society for the Study of Animal Reproduction

Vol. 3 No. 1 FEBRUARY 1983

For Particulars Contact

Editor, The Indian Journal of Animal Reproduction

C/o, Department of Gynaecology and Obstetrics,
Gujarat Veterinary College, Anand-388 001.

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CONTENTS

Editorial

BOVINE MALE COMPONENT

The clinician has a unique opportunity to study the patterns of bovine male component in normal and abnormal reproductive behaviour, function and to correlate these patterns with clinical expression of the normal or altered state of breeding health. The method of approach to this sexual problem briefly consists of analysing in a systematic manner the information supplied by the owner, a detailed anamnesis of the case, summary of the mating performances and then comparing the information with the norms.

Structure, function and integration are vital and these communicate the possible mechanisms involved in the order or disorder. For investigations gross observations, detailed andrological investigation, collecting semen, examination of fresh and stained smears, series of seminal evaluations including, libido, mating capacity, willing to serve in artificial vagina, performing sire health tests, histomorphological studies, microscopic analysis, seminal microflora cultural tests, biochemical assays, ultrastructural studies etc., provide the basis. The definitions of the necessity to look forward to explain the altered disease pattern and to quote the words of Edward. A. Smuckler (1976) "Rather than backward at a museum of familiar diagnostic artifacts".

The best opportunity for development and application of new criteria according to Foote (1969) occur in Artificial Breeding. Bull studs are the best places, to make accurate and extensive measurement. Economically, the farmers can-not allow their breeding programmes to fall behind schedule. There is a great need for more information on the causes of lowered fertility in bulls. The expanded use of artificial insemination has immensely emphasised the same.

Actually, the bulls used in artificial insemination are kept longer and in groups and allowed to live longer than those used in villages or by average dairy farms. It would be very important to go thoroughly into a clear concept of all the basic reasons for elimination of bulls from services. Fortunately, it is possible to collect information on history, health, management, feeding practices and available fertility rates at the semen banks or bull stations. This will aid diagnosis, prevention and treatment. Unfortunately, many of the treatments for infertility in the bulls are of little value.

Considering the time, energy and expenses involved in obtaining a bull's reproductive assessment, it is apparent that only the highly fertile bulls that maintain their high level of fertility for many years are economical for usage in artificial insemination services.

As regards infective factors, it is necessary to make Sire Health Tests more rigid for bulls in artificial insemination. Strict hygienic precautions while collecting semen, evaluation, dilution, processing, transport and usage need be scrupulously observed. Breeding hygiene should be improved by reducing the preputial contamination of microflora and periodical seminal and preputial microflora cultural examinations for evaluation. Other wise frozen semen will preserve and provide for spread of infective factors.

By means of maintaining all the relevant records of the bulls since birth to their disposal and judiciously using the records we may be able to cull the bulls in time and to contribute to improvement of cattle breeding programmes so that a higher overall Animal Production may result.

Editorial Board

I.J.A.R. 3 : 1 : 1—4

Serum Alkaline Phosphatase and Lactic Dehydrogenase Activity in Buffaloes With Retained Fetal Membranes

J. C. Dutta and Y. G. Dugwekar,

Department of Obstetrics & Gynaecology,
Punjab Agricultural University, Ludhiana-141 004 : India.

Retention of fetal membranes (RFM) is a common postpartum complication in bovines. It is responsible for great economic losses to dairy farmers unless treated promptly. The etiology and pathogenesis of RFM is incompletely understood. The present study was conducted to evaluate the biochemical response of RFM in terms of alkaline phosphatase (AKP) and lactic dehydrogenase (LDH) in buffaloes before and after parturition and its possible usefulness in the prediction of RFM and the evaluation of its response to treatment.

Material and Methods

Thirty three buffaloes belonging to Murrah or Nili Ravi breed, maintained at the Punjab Agricultural University Dairy Farm, Ludhiana, India constituted the subjects for the present study. The buffaloes were maintained under good managerial conditions. The animals were in their first to sixth lactation. Twenty five of these buffaloes expelled their fetal membranes normally (WRFM) and eight had retained fetal membranes (RFM). Fifteen ml. blood was collected from each animal on 295th day of gestation, and 12th hour, 1st, 2nd, and 5th day postpartum. The blood was allowed to clot and serum was separated by centrifugation. The serum samples were stored at — 20°C until used for the enzyme determinations. The serum AKP an LDH were determined by the method of Wootton (1964).

Results

The mean levels of AKP on 295th day of gestation, and 12th hour, 1st, 2nd, and 5th days postpartum in 8 RFM and 25 WRFM buffaloes are shown in table 1 and Fig 1. The AKP values ranged beween 15.28 ± 2.43 and 18.05 ± 2.17 and between 9.67 ± 0.96 and 10.73 ± 1.02 K.A. units/100 ml. in RFM and WRFM buffaloes, respectively. The differences in the AKP values on 12th hour, 1st, 2nd, and 5th day postpartum between RFM and WRFM buffaloes were statistically significant ($P<0.01$). However, the differences in AKP levels between the two groups of buffaloes on 295th day of gestation were not statistically significant.

The mean serum LDH levels on 295th day of gestation, and 12th hour, 1st, 2nd, and 5th days postpartum in 8 RFM and 25 WRFM buffaloes are presented in table 1 and Fig. 2. The mean serum LDH values ranged between 413.29 ± 19.39 and 499.10 ± 8.01 I.U./litre and between 394.06 ± 6.70 and 401.34 ± 7.48 I.U./litre in RFM and WRFM buffaloes respectively. The LDH values were higher in RFM buffaloes than in WRFM buffaloes on all the days of observation and the differences were statistically significant ($P<0.01$) on 12th hour, 1st, 2nd, and 5th day postpartum.

TABLE 1. MEAN SERUM ALKALINE PHOSPHATASE AND LACTIC DEHYDROGENASE IN BUFFALOES RETAINING AND NOT RETAINING FETAL MEMBRANES.

Constituents	Group	Gestation days 295th	12th hour postpartum	Days postpartum 1	2	5
Serum alkaline phosphatase (K.A.Units/100 ml)	RFM	15.28±2.43 (6)	18.05±2.17 (8)	17.25±2.37 (8)	17.56±2.02 (8)	16.68±1.98 (8)
	WRFM	9.67±0.96 (25)	9.71±0.89 (25)	9.94±0.83 (25)	10.51±0.86 (25)	10.73±1.02 (25)
	"t" values	1.2083	4.2989**	3.7106**	3.7302**	2.8066**
Serum lactic dehydrogenase (I.U./L.)	RFM	413.29±19.39 (6)	430.78±8.13 (8)	499.10±8.01 (8)	447.95±3.17 (8)	432.29±11.76 (8)
	WRFM	394.06±6.70 (25)	398.54±5.18 (25)	401.34±7.48 (25)	399.10±8.03 (25)	385.67±7.35 (25)
	"t" values	1.2034	3.1331**	3.3969**	3.3829**	3.1909**

Figures in parenthesis indicate the number of observations.
** $P < 0.01$

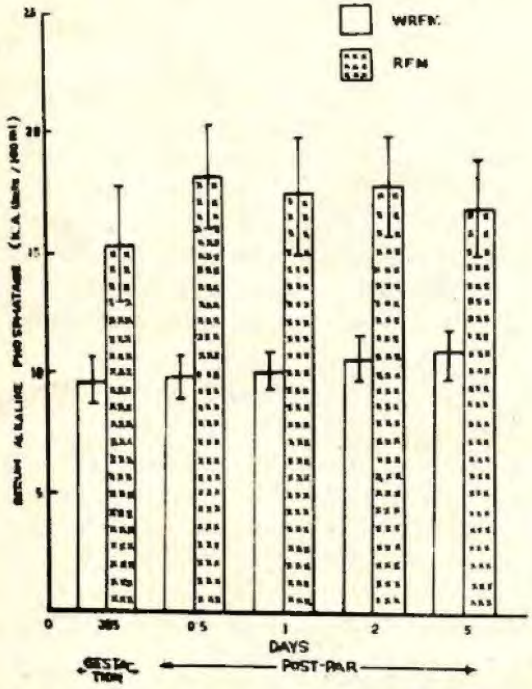

FIG.1 SERUM ALKALINE PHOSPHATASE LEVELS BEFORE AND AFTER CALVING IN BUFFALOES RETAINING (RFM) AND NOT RETAINING (WRFM) FETAL MEMBRANES (MEAN±SE).

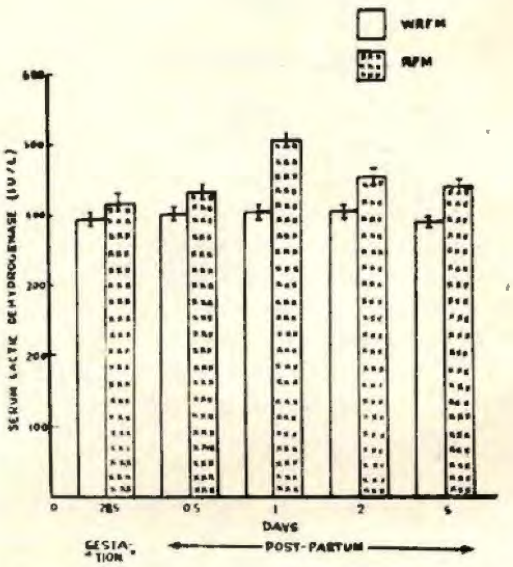

FIG.2 SERUM LACTIC DEHYDROGENASE LEVELS BEFORE AND AFTER CALVING IN BUFFALOES RETAINING (RFM) AND NOT RETAINING (WRFM) FETAL MEMBRANES (MEAN±SE).

Discussion

In the present study the mean AKP levels on 295th day of gestation was found to be 9.67±0.96 K.A. units/100 ml. in buffaloes of WRFM group. These levels continued to increase till 5th day postpartum. The mean value of AKP in buffaloes with RFM was 15.28±2.43 K.A. units/100 ml. on 295th day of gestation and there was further elevation of AKP levels during the postpartum period. The differences between the two groups of buffaloes were statistically significant ($P<0.01$). Boitor *et al.* (1972) reported similar findings in cows.

The AKP levels are known to increase under several pathological conditions including those of liver, bones, placenta and intestine (Rodwell, 1971). The increased levels of enzyme in the serum may result from leakage out of necrotic or damaged cells (Wootton, 1964). Retention of fetal membranes is commonly associated with small portion of necrotic epithelium between the chorionic villi and the cryptal walls. The degree of placentitis that may develop as a complication secondary to retained fetal membranes could vary from a mild peripheral type of necrosis involving only the villi to a severe necrosis involving the entire cotyledons and a part or all of the caruncles (Roberts, 1971). This might explain the obtained elevated levels of AKP in buffaloes with RFM.

It has been suggested that the estimation of isozymes of AKP which are tissue specific may improve the diagnostic value of the test (Rodwell, 1971). Although it was not possible in the present study to estimate the isozymes of AKP of placental origin, the animals with RFM were otherwise clinically normal and hence the significant differences in the serum AKP levels between the two groups of buffaloes could presumably be attributed to the AKP isozymes originating from the placenta. The observed striking differences in the serum AKP levels on 295th day of gestation between the two groups of buffaloes would probably be of clinical significance in indicating postpartum complications like RFM. It would be tempting to infer that the pathological changes leading to RFM might occur much before parturition. However, further studies would be necessary to draw a conclusion.

The mean serum LDH levels from 295th day of gestation to 5th day postpartum in buffaloes of both, WRFM and RFM groups ranged between 385.67± 7.35 and 401.34±7.48 I.U./litre and between 413.29±19.39 and 499.10±8.01 I.U./litre, respectively. These values are comparable with those of normal cycling and anestrus buffaloes (Sikka, 1977). The average serum LDH levels were significantly higher ($P<0.01$) in RFM buffaloes than those in WRFM group. This might be due to the presence of endometritis in buffaloes with RFM. The elevated levels of serum LDH in cows having clinical endometritis has been reported earlier (Sommer and Marx, 1969). It is interesting to note from the present study that even on the day of calving when the clinical features of endometritis were not exhibited, the serum LDH levels were increased significantly. These results might suggest that the biochemical changes leading to elevated levels of serum LDH could be detected much earlier before the clinical manifestations of the inflammatory changes were perceptible in the affected tissues. The indication of endometritis

based on the elevated serum LDH levels before the development of clinical symptoms could be of great value in the prediction of complications like RFM.

Summary

Serum alkaline phosphatase (AKP) and lactic dehydrogenase (LDH) activities were determined in 8 buffaloes with retained fetal membranes (RFM) and 25 buffaloes without retention of fetal membranes (WRFM). The results revealed that the levels of both, AKP and LDH were higher in buffaloes with RFM during late gestation and continued to be higher till 5th day postpartum. The clinical application of these findings is discussed.

Acknowledgement

The authors are thankful to the Council of Scientific and Industrial Research, New Delhi, and the Punjab Agricultural University, Ludhiana for the grant of Junior Research Fellowship to the first author.

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I.J.A.R. 3 : 1: 5—8

Comparative Studies on semen ejaculates (Static and Motile) in Surti Buffalo bulls*

S. P. Nema, S. B. Kodagali, K. Janakiraman and G. A. Prabhu

Gujarat College of Veterinary Science and
Animal Husbandry, Anand - 388 001

ABSTRACT

A study was undertaken on serving ability, semen quality and certain biochemical estimates in static and motile semen ejaculates. It was found that the reaction time taken was higher in motile ejaculates. The colour and consistency score, per cent progressively motile sperm, live sperm percentage were significantly higher in motile ejaculates than in the static semen samples. The initial fructose, total protein and total solids levels were significantly higher in motile ejaculates. Inorganic phosphorus levels did differ significantly amongst static and motile ejaculates. The static semen ejaculates proved to be of low quality eventhough they regain motility on dilution.

*

Initially nonmotile (static) ejaculates which gain motility on dilution have been reported (Joshi *et al.*, 1967; Abhi *et al.*, 1968; Tomar *et al.*, 1966, 1970; Tomar and Misra, 1971 and Sengupta *et al.*, 1977). An effort was made to study sexual behaviour, semen characteristics and certain biochemical estimates in the initially motile and nonmotile semen/ seminal plasma of Surti buffalo bulls. The results of the investigation have been reported here.

Materials and Methods

A total of 100 ejaculates from 30 Surti buffalo bulls were studied for sexual behaviour, serving ability (reaction time) and semen quality.

Ejaculates were immediately examined for initial motility at 37°C on a warm stage. Samples with 'O' initial motility were grouped as static and with 1-5 score of motility were grouped as initially motile samples.

Seminal characters viz: volume/ml, colour and consistency score (0-5 point scale), per cent progressively motile sperm, sperm concentration per ml, (haemocytometer technique), per cent total sperm abnormalities and per cent live sperm were studied by following standard procedures.

Biochemical estimates viz: initial fructose (Mann, 1948 a & b), inorganic phosphorus (Fiske and Subbarow, 1925), total protein (Lowry *et al.*, 1951), total and free cholesterol (Schoenheimer and Sperry, 1934) and total solids (Blom, 1969), in semen/seminal plasma, were assessed.

Results and Discussion

Out of total 100 ejaculates studied, 38 were static samples (38%). The mean reaction time in bulls donating static samples was 109.61 ± 12.80 seconds, whereas in bulls with initially motile

* Part of M.V.Sc. thesis submitted by Senior Author to Gujarat Agricultural University, Anand.

samples the reaction time was 118.79± 6.28 seconds. Although, statistically there was no significant difference in the reaction time, it was higher in motile semen samples. This observation agrees with Tomar and Misra (1971),, Semen characteristics in static and motile semen samples are presented in Table 1.

TABLE 1. SEMEN CHARACTERISTICS IN STATIC AND MOTILE EJACULATES

Semen character	Semen samples	
	Static Mean±S.E.	Motile Mean±S.E.
Volume/ml	3.60±0.17 (38)	3.68±0.16 (62)
Colour & consistency (score)	3.29±0.17 (38)	3.79±0.13* (62)
Per cent progressively motile sperm	60.79±1.34 (38)	68.87±0.91* (62)
Sperm concentration/ml × 10^6	898.97±46.72 (29)	929.12±28.78 (49)
Per cent live spermatozoa	81.16±1.38 (38)	84.77±0.95* (62)
Per cent total abnormalities	10.03±0.69 (38)	9.65±0.73 (62)

* Significant $P < 0.05$

(Figures in parenthesis indicate number of observations).

On comparing seminal characters in static and motile semen samples it was observed that colour and consistency score, per cent progressively motile sperm and per cent live spermatozoa varied significantly. These characteristics were on a higher level in initially motile semen samples. Abhi *et al.*, 1968 and Tomar *et al.*, 1970 also reported higher percentage of live spermatozoa in initially motile samples.

The values for sperm concentration and volume/ml, were higher in motile samples, though did not differ significantly. The percentage of total abnormalities was more in static semen samples. These findings are in agreement with Tomar and Misra (1971).

The results of biochemical profile in static and motile semen samples have been presented in Table 2.

TABLE 2. BIOCHEMICAL ESTIMATES IN SEMEN/SEMINAL PLASMA

Biochemical estimates		Semen Samples		
		Static	Motile	
		Mean±S.E.	Mean±S.E.	
Initial fructose	mg%	647.43±28.214 (36)	797.14±32.254* (61)	(Semen)
Total protein	mg%	6.26±0.376 (37)	7.37±0.331* (61)	(Seminal plasma)
Inorganic phosphorus	mg%	19.58±0.940 (37)	15.52±0.640* (61)	,,
Total cholesterol	mg%	64.11±6.879 (36)	62.20±4.040 (59)	,,
Free cholesterol	mg%	30.61±3.858 (36)	28.85±2.626 (59)	,,
Total solids	%	3.43±0.183 (36)	3.87±0.223* (61)	,,

* Significanct P / 0.05
(Figures in parenthesis indicate number of observations).

The initial fructose, total protein and total solids levels were significantly higher in motile semen samples. Inorganic phosphorus levels were significantly lower in motile semen samples. Practically, there was no difference in the total and free cholesterol levels between static and motile sample group. The finding pertaining to initial fructose pattern is in close agreement with Tomar and Misra (1971). As regards inorganic phosphorus the results are contrary for the levels. The reason may be inorganic phosphorus levels are negatively correlated with conception rate (Chaudhary and Gangwar, 1977); and fertility levels are positively correlated to initial motility (Kodagali, and Bhavsar, 1972).

The higher levels of protein in motile group of seminal plasma is justifiable because these levels are also lower in infertile bulls, (C.I.S. report, 1976). Total solids levels are reported to be higher in excellent & optimal ejaculates (Blom, 1969).

In view of the present study under report it can be inferred that immotile ejaculates are of low quality even though they regain motility after dilution. Hereditary causes for this problem cannot be ruled out though these have not been explored.

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I.J.A.R. 3 : 1 : 9—11

Efficacy of Garlic (Allium Sativum) Treatment Against Non-Specific Uterine Infections in Repeat Breeding Cows

G. M. Garg, S. V. Vadnere and V. D. Sharma*

Department of Gynaecology & Obstetrics, College of Veterinary Sciences,
G.B. Pant University of Agriculture & Technology, Pantnagar, Distt. Nainital, U.P. 263 145

ABSTRACT

Twelve repeat breeding cows, having no apparent abnormalities of the genital tract but harbouring microbes in their reproductive tracts, were treated with garlic extract. Following 2 to 3 intrauterine infusions with 20 ml of 1:5 garlic extract, cervical mucus samples from all the animals were found to be microbiologically negative and seven (58.33%) of them became pregnant.

*

Repeat breeding has been recognised as a major infertility problem affecting both small and large milch herds. Of the numerous factors enumerated towards the etiology of repeat breeding, infection of the genital tract is considered as an important one (Hatch *et al.*, 1949; Ford, 1956; Farrelly and Mullaney, 1964; Elliot *et al.*, 1968; Namboothiripad and Raja, 1976). Although antibiotics have proved quite helpful in combating infections, there are certain limitations with their use, viz., drug resistance in pathogens, toxicity and allergy to antibiotics and their high cost etc. Further, there is a dearth of antibiotics effective against fungal pathogens.

Garlic (Allium sativum) has been found to possess marked antibacterial (Schang, 1931; Filtova, 1943; Cavallito and Bailey, 1944; Wang and Hsuesh, 1959; Sharma *et al.*, 1977; Mantis *et al.*, 1979 and Arunachalam, 1980) as well as antifungal (Szymona, 1952; Kabelic and Hejtmaukovauhrova, 1968; Fliermans, 1973; Tansey and Appleton, 1975; Barone and Tansey, 1977; Fromtling and Bulmer, 1978; Prasad, 1979 and Sandhu *et al.*, 1980) properties *in vitro*.

In the present investigation attempts were made to study the microflora in the genital tract of repeat breeders and to determine the therapeutic efficacy of garlic against the non-specific infections.

Materials and Methods

Twelve repeat breeding cows of 3 to 5 years of age which had repeated 3-8 times and having no apparent abnormalities in their genital tracts on clinico-gynaecological examination were taken as experimental animals. Cervical mucus samples were aseptically collected from these animals by using sterilized cotton swabs (Hatch *et al.*, 1949). To isolate bacteria, blood and brain heart infusion agar plates were inoculated and incubated at 37°C for 24-48 hours. The bacterial isolates were identified according to Buchanan and Gibbons (1974). Sabouraud's dextrose agar plates were inoculated with the samples to isolate fungi. The

* Department of Microbiology and Public Health

plates were incubated at 27°C for one week. The fungal isolates were identified as per procedure of Moore and Jaciew (1979). The bacterial and fungal isolates were tested for their sensitivity to garlic extract *in vitro* according to Sharma *et al.* (1977) and Prasad (1979), respectively.

The Garlic extract was prepared as per procedure described by Sharma *et al.* (1977) by grinding hulled cloves in sterile pestle and mortar with sterile distilled water at 1:1 (W/V) ratio. After grinding to a complete mash, it was filtered through sterile double layered muslin cloth and then filtered through Whatman filter paper No. 41. This extract was further diluted to 1:5 with sterile distilled water and was then used for the therapy. To each animal, 20 ml of diluted garlic extract was administered as an intra-uterine infusion at an interval of 24 hours. The therapy was continued till the cervical mucus samples from the animals under treatment became microbiologically negative.

All the animals, found to be microbiologically negative after treatment, were inseminated with liquid or frozen semen in mid-estrous, 8-12 hours after the onset of oestrus by recto-vaginal technique. The pregnancy diagnosis was done by rectal palpation 45 days after the last insemination.

Results and Discussion

Cervical mucus samples from all the experimental animals were found to be microbiologically positive, yielding staphylococci, streptococci, *Proteus morganii*, *Pseudomonas* sp. *Bacillus* sp., *Escherichia coli*, *Candida albicans*, *C. tropicalis*, *C. guilliermondii* and *Cladosporium* species either alone or in combination.

All the isolates were found to be sensitive to garlic extract (1:5) *in vitro* showing zones of inhibition ranging from 23 mm to 40 mm. The garlic extract was used in 1:5 concentration because it was found to be lethal to all the isolates *in vitro* and did not cause any inflammatory reactions when instilled in the rabbit eyes for 3 consecutive days. Out of the 12 experimental animals, 4 became microbiologically negative after two intra-uterine infusions of garlic extract, while the remaining 8 animals required 3 infusions for becoming microbiologically negative. Three infusions of garlic extract were found to be significantly effective, than two infusions as the C.R. with 3 infusions was higher (75%) than that with 2 infusions (25%).

Of the 12 treated animals, 6 (50%) conceived on first A.I. while one (8.33%) conceived after 2 inseminations. The conception rate did not differ significantly than that recorded for repeat breeders treated with Mastalone-U or strepto-penicillin, concurrently (Garg, 1981). Kodagali *et al.*, 1977 reported conception rate of 53.33% in repeat breeders treated with Mastalone-U, which is a drug of choice for the treatment of repeat breeders with infections of the genital tract. The conception rate was significantly higher in repeat breeders treated with garlic extract than those treated with acriflavine (Garg, 1981). It is worthwhile to mention here that the other agents were used only in cases where the isolates were found to be sensitive to the respective drugs *in vitro*. Otherwise it is obvious that some of the animals would not have responded to treatment as *in vitro* studies revealed that isolates from these animals were not sensitive to other drugs used, viz., Mastalone-U, strepto-penicillin and acriflavine (Garg, 1981). Further, the use of other

drugs in cases having fungal infections would not have been effective.

It is noteworthy that out of the 5 animals which did not conceive, despite being microbiologically negative following garlic therapy, one had persistant corpus luteum in the right ovary and four had significantly low level of protein bound plasma iodine as compared to the pregnant ones (Garg, 1981). This suggests that in addition to infections, these 5 animals had other factors for being repeat breeders and eventually failed to conceive.

The intra-uterine infusion with garlic extract in 1:5 concentration had no deletarious effect on the genital tract, since no apparent abnormality of the genital tract was observed in the treated animals. Further, conception in repeat breeders treated with garlic extract, suggested that the therapy did not cause any toxic effect on the genital tract. Tynecka and Skwarek (1974) found that garlic was injurious to microbial cells but not to mammalian cells in tissue culture which supports the present findings.

Therefore, garlic extract could be considered as an effective and safe therapy for the treatment of non-specific infections of the genital tract. Needless to mention that the use of garlic would be much cheaper than antibiotics and other drugs. In addition there are no reports on the development of resistance in sensitive organisms against garlic extract.

There seems to be no earlier report on the use of garlic extract in the genital tract infections.

It is suggested that for better results in the field, garlic extract infusions may be carried out three times.

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Studies On Antepartum Prolapse Of Vagina In Buffaloes : Vaginal Microflora

S. K. Verma, M. P. Kapoor, R. C. Gupta, S. K. Khar and A. K. Sharma

Department of Gynaecology & Obstetrics, College of Veterinary Sciences
Haryana Agril. University, Hissar.

ABSTRACT

Of the 30 clinical cases of antepartum prolapse of vagina in buffaloes examined, 27 yielded different organisms in the following order: *Escherichia coli* (9), Haemolytic streptococci (5), *Klebsiella* Spp. (5), *Proteus* Spp. (4), *Staphylococcus* Spp. (4), unidentified Gram negative coccobacilli (2), diptheroid bacill, (2) and *Pseudomonas Aeruginosa* (1). The possible role of these organisms in the causation of antepartum prolapse of vagina in buffaloes is discussed.

*

Antepartum vaginal prolapse constitutes one of the most serious economic hazards to the buffaloe dairy industry. The exact etiology of the condition still remains obscure. Nevertheless, various etiological and predisposing factors suspected include, an imbalance of the steriod hormones and deficiency of minerals, particularly calcium, phosphorous and magnesium. However, the role of vaginal bacterial flora in cases of vaginal prolapse has received little attention in the past. Pandit (1978) investigated the vaginal microflora of buffaloes with antepartum prolapse of the vagina. The organisms isolated were—*Escherichira coli*, *Proteus* Spp., *Klebsiella* Spp., *Bacillus* Spp., *Pseudomonas* Spp. *Streptococcus* Spp. and *Staphylococcus* Spp. The present study was undertaken to assess the relationship, if any, between the bacterial flora of the vagina and the antepartum prolapse of the vagina in buffaloes.

Material and Methods

The present study was carried out on thirty clinical cases of antepartum prolapse of the vagina at the Veterinary Clinics, HAU, Hissar. Vaginal swabs were taken from the affected animals before any treatment was adopted. The swabbing equipment consisted of a 16" long thick walled glass speculum, a 18" long hollow aluminium guard tube and a bamboo stick 1-2" longer than the guard tube at one end of which a small piece of gauze was wrapped and secured with thread. The entire set was wrapped with paper and sterilized before use.

Before swabbing the perineal portion of the affected animals was thoroughly scrubbed and washed with soap and water. A sterile and well lubricated glass speculum was introduced into the vagina. This was followed by the introduction of

the sterilized aluminium guard tube consisting of the bamboo stick with a sterile gauze at one end of it. The anterior portion of the vagina was swabbed and thereafter withdrawn. The gauze was cut off and dropped into a tube containing nutrient broth. The cultures from each sample were attempted on 10% bovine blood agar and MacConkey's agar plates. The identification of the organisms isolated was done using standard bacteriological techniques. *E. coli* isolates were sent for serotyping to the Director, National Salmonella and Escherichia Centre, Kasauli (U.P.)

Results

Details of various microorganisms isolated from clinical cases of vaginal prolapse are presented in table I and II. It was observed that of the 30 samples examined, in three no pathogens were isolated The organisms encountered in order of their frequency were *E. coli* (9), Haemolytic streptococci (5), *Klebsiella* Spp. (5), *Proteus* Spp. (4), *Staphylococcus* Spp. (4), unidentified gram negative coccobacilli (4), diptheroid bacilli (2) and *Pseudomonas aeruginosa* (1). Four samples revealed mixed infection.

TABLE I. VAGINAL MICROFLORA IN ANTEPARTUM PROLAPSE OF VAGINA IN BUFFALOES.

Organisms	*Number of isolates*
E. coli	9
Haemolytic streptococci	5
Klebsiella Spp.	5
Proteus Spp.	4
Gram-negative coccobacilli	4
Staphylococcus Spp.	4
Diptheroid bacilli	2
P. aeruginosa	1

TABLE II. RESULTS OF SEROTYPING OF *E. COLI* ENCOUNTERED IN THE VAGINA OF CLINICAL CASES OF ANTEPARTUM PROLAPSE OF VAGINA IN BUFFALOES.

N. of Animals	*O-serotype*
3	05
1	029
1	017
1	Rough Strain
3	Untypable

Resulta of serotyping of *E. coli* revealed type 05 to be most predominent

Discussion

In the present investigation only 10% of the animals investigated failed to reveal the presence of any pathogen. *E. coli* was the most frequently encountered organism and further O. serotyping revealed *E. coli* type 05 to be predominent. This observation is in agreement with that of Pandit (1978). The other

micro-organisms isolated in the present study included, *Streptococcus* Spp., *Staphylococcus* Spp. *Klebaiella* Spp. *Proteus* Spp. *Pseudomonas aerugionasa*, diptheroid bacilli and unidentified gram negative cocobacilli. These organisms have also been isolated from normal vagina of the cows (Laing, 1955 and Mitchell, 1965). Whenever there is heavy bacterial load of these organism in the vagina, they can cause the obstetrical problems in animals (Pathak and Kohli 1982). It is also common practice among the livestock owners that the prolapsed vaginal mass is retained with "Jooti". In such cases the microorganisms may gain entrance into the vagina from outside.

A common line of treatment of vaginal prolapse in the field is to clean the vaginal prolapsed mass with an anteiseptic solution followed by replacement and application of an antibiotic cream. Such antibiotic application in the vagina might be helpful in suppressing the growth of the organism in the vagina.

The isolation of the common pathogens from most of the vaginal samples of antepartum prolapse in buffaloes suggest that these microorgamisms may have some role to play in the initiation of the vaginal prolapse at least in some of the animals. The practice of hygienic sanitary conditions while housing dairy cattle may therefore considerably reduce the incidence of antepartum prolapse of the vagina in buffaloes.

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I.J.A.R. 3 : 1 : 15—17

Clinical Studies on Cystic Ovarian Degeneration In Rathi Cows

N. S. Bugalia and I. S. Kohli

Department of Obstetrics & Gynaecology
College of Veterinary Sciences, Bikaner - 334 001 Rajasthan

ABSTRACT

Thirty nymphomaniac Rathi cows having follicular cysts were clinically examined. 15 (50.0%), 10 (33.3%) and 5 (16.7%) cows exhibited constant, frequent and irregular estrus, respectively. Relaxation of sacrosciatic ligament was noticed in all cows. 28 (93.3%) and 14 (46.7%) cows showed enlargement of uterus and cervix, respectively. 26 (86.7%) cows had congestion of vulvo-vaginal mucus membrane and edema of vulva. Clitoris was hypertrophied in 20 (66.7%) cows. Relaxation of sacrosciatic ligament and changes in genital organs were prominent in constant and frequent estrus nymphomaniac cows.

*

Cystic ovarian degeneration or nymphomania is a common cause of infertility and sterility in dairy cows. Empirical use of hormones in veterinary practice has increased the incidence of the disease (Roberts, 1971). Garm (1949) observed bellowing and progressive unthriftyness in nymphomaniac cows. Relaxat.on of sacrosciatic ligament was a prominent sign of the disease in constant and frequent estrus cows (Garm, 1949; Roberts, 1955). Garm (1949) found enlargement and glandular hyperplasia of uterus in nymphomaniac cows. Garm (1949) and Vanderplassche (1951) described enlargement of cervix and estrual mucus discharge in nymphomania.

The present study was undertaken due to paucity of literature on cystic ovarian degeneration in Indian cattle and to add in existing knowledge of the disease.

Materials and Methods

Sexual behaviour and clinico-pathological changes in genital organs were studied in thirty nymphomaniac Rathi cows having follicular cysts. These nymphomaniac cows were reported in outdoor obstetrics and gynaecology clinics and in infertility camps organised by Rajasthan Dairy Development Corporation, Bikaner in collaboration to Department in rural areas of Bikaner district.

A. *Sexual behaviour*

The nymphomaniac symptoms were observed by psychic changes in behaviour and duration of estrus. These cows, on the basis of duration of exhibited estrus, were grouped in three categories (constant, frequent and irregular estrus group).

B. *Examination of external genital organs and sacrosciatic ligament:*

Sterilized speculum, lubricated with liquid paraffin was used for examination of vulva, clitoris and vulvo-vaginal mucus membrane. The average length of clitoris in normal healthy Rathi cow was found to be 3 mm. The clitoris length between 3 to 4 mm and 4 to 6 mm was grouped into moderate and high degree of hyper-

trophy. Relaxation of sacrosciatic ligament was categorised into high, moderate and slight degree depending upon sinking of croup muscles and elevation of tail head.

C. *Examination of internal genital organs*

Nymphomaniac cows were examined per rectum for enlargement of uterus and cervix with conisderation of age and parity. The normal size of uterus and cervix in normal healthy Rathi cow was approximately 20 cm and 6 cm, respectively. The size of uterus approximately between 20-25 cm; 25-30 cm and 30-35 cm was categorised into slight, moderate and high degree of enlargement, respectively. Similarly, size of cervix approximately between 6-8 cm, 8-10 cm and 10-12 cm was categorised into slight, moderate and high degree of enlargement, respectively.

Results and Discussion

Bellowing "bull like" and progressive unthriftyness was common in nymphomaniac cows. These nymphomaniac cows attempted to ride on other cows and seldom accepted the riding of another cow. Garm (1949) also recorded bellowing with alteration in pitch of voice (bull like) and progressive unthriftyness in nymphomaniac cows. 15 (50.0%) cows exhibited constant estrus, 10 (33.3%) cows showed frequent estrus and 5 (16.7%) exhibited irregular estrus. Similar pattern of estrus symptoms was observed by Garm (1949).

Clinical findings of thirty nymphomaniac Rathi cows exhibited constant, frequent and irregular estrus. The sacrosciatic ligament was highly relaxed in 19 (63.3%), moderately relaxed in 7 (23.3%) and slightly relaxed in 4 (13.3%) nymphomaniac Rathi cows. The ligament was highly relaxed in 12 (80.0%), 5 (50.0%) and 2 (40.0%), moderately relaxed in 2 (13.3%), 4 (40.0%) and 1 (20.0%) and slightly relaxed in 1 (6.7%), 1 (10.0%) and 2 (40.0%) nymphomaniac cows exhibiting constant, frequent and irregular estrus, respectively. Similarly, Garm (1949) observed highly relaxed sacrosciatic ligament in 78 per cent and 50 per cent, moderately relaxed in 10 per cent and 42 per cent and slightly relaxed in 6 per cent and 5 per cent nymphomaniac cows exhibiting constant and frequent estrus, respectively.

The uterus was highly enlarged in 18 (60.0%), moderately enlarged in 6 (20.0%), slightly enlarged in 4 (13.3%) and normal in 2 (6.7%) nymphomaniac cows. The uterus was highly enlarged in 11 (73.3%), 5 (50.0%), and 2 (40.0%), moderately enlarged in 2 (13.3%), 3 (30.0%) and 1 (20.0%) and slightly enlarged in 2 (13.3%), 2 (20.0%) and nil in nymphomaniac Rathi cows exhibiting constant, frequent and irregular estrus, respectively. However, Garm (1949) observed 49 per cent overall and 57 per cent enlargement in constant estrus cows in 62 clinical cases of cystic ovarian degeneration. 2 (6.7%) nymphomaniac cows had mucometra with highly enlarged uterus in constant estrus group.

Variation in the size of cervix was noticed in nymphomaniac cows. The cervix was highly enlarged in 2 (6.7%), moderately enlarged in 5 (16.7%), slightly enlarged in 7 (23.3%) and normal in 16 (53.3%) nymphomaniac cows. The cervix was highly enlarged in 2 (13.3%), nil and nil, moderately enlarged in 1 (6.7%), 4 (40.0%) and nil, slightly enlarged in 4 (26.7%), 1 (10.0%) and 2 (40.0%) and normal in 8 (53.3%), 5 (50.0%) and 3 (60.0%) in constant, frequent and irregular estrus showing

nymphomaniac cows, respectively. Garm (1949) and Vanderplassche (1951) also observed enlargement of cervix and estrual mucus discharge in nymphomaniac cows.

The vaginal mucus membrane was highly congested in 15 (50.0%), moderately congested in 6 (20.0%) and slightly congested in 5 (16.7%) and normal in 4 (13.3%) nymphomaniac cows. The vaginal mucus membrane was highly congested in 10 (66.7%), 3 (30.0%) and 2 (40.0%), moderately congested in 2 (13.3%), 3 (30.0%) and 1 (20.0%), slightly congested in 2 (13.3%), 3 (30.0%) and nil and normal in 1 (6.7%), 1 (10.0%) and 2 (40.0%) in nymphomaniac cows exhibiting constant, frequent and irregular estrus, respectively.

The vulvar mucus membrane was highly congested in 12 (40.0%), moderately congested in 8 (26.7%), slightly in 6 (20.0%) and normal in 4 (13.3%) nymphomaniac cows. The vulvar mucus membrane was highly congested in 7 (46.7%), 3 (30.0%) and 2 (40.0%), moderately congested in 5 (33.3%), 2 (20.0%) and 1 (20.0%), slightly congested in nil, 5 (50.0%) and 1 (20.0%) and normal in 3 (20.0%), nil and 1 (20.0%) nymphomaniac cows showing constant frequent and irregular estrus, respectively.

The vulva was highly edematus in 15 (50.0%), moderately edematus in 5 (16.7%) and slightly edematus in 6 (20.0%) and normal in 4 (13.3%) nymphomaniac cows. The vulva was highly edematus in 9 (60.0%), 4 (40.0%) and 2 (40.0%), moderately edematus in 3 (20.0%), 1 (10.0%) and 1 (20.0%), slightly edematus in nil, 5 (50.0%) and 1 (20.0%) and normal in 3 (20.0%), nil and 1 (20.0%) in constant, frequent and irregular estrus exhibiting nymphomaniac cows, respectively.

The clitoris was highly hypertrophied in 13 (43.3%) moderately hypertrophied in 7 (23.3%) and normal in 10 (33.3%) nymphomaniac cows. The clitoris was highly hypertrophied in 9 (60.0%), 2 (20.0%) and 2 (40.0%), moderately hypertrophed in 4 (26.6%), 3 (30.0%) and nil and normal in 2 (13.3%), 5 (50.0%) and 3 (60.0%) nymphomaniac cows showing constant, frequent and irregular estrus, respectively.

The present study indicated that relaxation of sacrosciatic ligament, enlargement of uterus and cervix, congestion of vulvo-vaginal mucus membrane, edema of vulva and hypertrophy of clitoris were prominent in constant and frequent estrus nymphomaniac cows.

Acknowledgements

The authors with to acknowledge the assistance of Dr. S. K. Kakkar, General Manager, Rajasthan Dairy Development Corporation, Bikaner for organising infertility camps in rural areas of Bikaner district. Our grateful thanks are due to Dr. Mohan Singh, Dean, College of Veterinary Science, Bikaner for providing necessary facilities.

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I.J.A.R. 3 : 1 : 18—22

Haematological and Trace Mineral Constituents of Marwari Sheep in Different Phases of Reproduction

P. C. Shukla, M. C. Desai, H. B. Desai and L. P. Purohit

Animal Nutrition Department, Gujarat Agricultural University
Anand Campus, Anand - 388 110

ABSTRACT

The study was carried out to know the haematological and trace mineral constituents of Marwari sheep in different phases of reproduction. The overall average values in dry, pregnant and lactating ewes were 6.4±0.17,6.2±0.39 and 5.6±0.36 haemoglobin (g/100 ml), 5.84±0.36, 4.86±0.74 and 6.22±0.92 total erythrocyte count (millions/cmm), 8.80±0.58, 9.04±1.37 and 10.32±1.69 total leucocyte count (thousand/cmm), 37.8±2.0, 31.1±1.99 and 39.4±4.73 neutrophils, 3.7±0.56, 5.3±1.39 and 3.4±0.61 eosinophils, 56.2±2.23, 60.5 ±2.24 and 53.9±4.45 lymphocyte, 32.± 0.26, 3.1±0.95 and 3.3±0.67%monocyte respectively. Zinc (ppm), copper (ppm) and iron (mg/100 ml) were 5.31±0.92, 1.13±0.08 and 22.66±3.45 in dry ewes, 3.25±0.82, 1.20±0.26 and 25.68±5.68 in pregnant ewes, 4.82±1.26, 1.0±0.13 and 13.92±0.87 in lactating ewes, respectively. No statistical significant differences were found in different constituents between different categories.

The average values of haemoglobin (g/100 ml), total erythrocyte count (millions/cmm), total leucocyte count (thousands/cmm), neutrophils (%), eosinophils (%), lymphocytes (L), monocytes (M), zinc (ppm), copper (ppm) and iron (mg/100 ml) were 6.6±0.52, 5.58±0.72, 6.89±0.88, 30.7±3.84, 1.5±0.54, 66.5 ±3.27, 1.3±0.34, 4.40±2.43, 0.87±0.27 and 17.40±5.02 for adult male sheep, 6.0, 8.02, 8.93, 33.8±8.30, 1.5±0.76, 62.67±7.62, 2.0±1.0, 1.87±0.22, 1.53 ±0.18 and 18.85±5.80 for male lambs and 7.30±0.33, 9.13, 6.52±1.22, 30.5± 4.31, 2.3±0.17, 66.0±4.27, 1.2±0.17, 2.64, 1.30 and 50.02 for female lambs, respectively. Haemoglobin, total minerals viz., zinc, copper and iron, were within the normal range in different categories of sheep.

*

Blood studies of sheep under field condition is essential to know the normal ranges of different blood constituents and to find out deficiency if any as sheep are mainly raised on grazing in waste lands or other areas. Further the norms of this breed for different blood constituents are not available under field conditions. Therefore, it was decided to study the blood constituents of Marwari sheep.

Materials and Methods

Jugular blood samples were collected from different categories of Marwari sheep of randomly selected different villages belonging to various talukas of Banaskantha district. Haemoglobin (Hellige method) and other haematological constituents were determined as per the methods given by Napier and Das Gupta (1954). The trace minerals *viz*.., serum zinc, copper and iron were determined by wet digestion method using atomic absorp-

tion spectrophotometer. The statistical analysis of the data was carried out by analysis of variance method as per Snedecor and Cochran (1968).

Results and Discussion

The taluka wise results for haematological constituents for different physiological groups of adult ewes are given in Table 1 and for adult rams and ewe and ram lambs are given in Table 2.

The values given in Table 1 reveal that haemoglobin content (g/100 ml) ranged from 5.4±0.47 to 6.93±0.30 in dry ewes, 5.3 to 7.3 in pregnant ewes and 5.2 to 6.8 in lactating ewes respectively. The haemoglobin value was slightly lower in all the categories of ewes of Tharad taluka than in ewes of other talukas. Further, there was no significant difference in haemoglobin content of different categories of ewes. The present values for haemoglobin in Marwari sheep are lower than the ranges reported for Marwari, Sonadi and Malpura sheep (Ghosh and Purohit, 1964), Egyptian sheep (Soliman and Amrousi, 1965), Patanwadi sheep (Bhagoji, 1978 and Pandya, 1978) and Russian Merino ewes (Shukla *et al.*, 1980). However, haemoglobin values under present study are quite comparable with the values reported for Chokla and Magra breed of sheep by Ghosh and Purohit (1964).

Total erythrocyte count (millions/cmm) ranged from 5.18±0.19 to 6.88±0.75 in dry ewes, 2.70 to 6.19 in pregnant ewes and 5.72 to 6.39 in lactating ewes respectively. The total erythrocyte count was slightly lower in dry ewes of Tharad taluka and in pregnant ewes of Wav taluka than in ewes of other talukas. In lactating ewes it was lower in sheep of Shihori taluka than in sheep, of other talukas. There was no significant difference in total erythrocyte count between different categories. The present values of erythrocyte count was slightly lower than the values reported for high and low potassium Marwari sheep (Taneja *et al.*, 1971), Awassi sheep (Bhattacharya and Uwayjan, 1975) and Patanwadi sheep (Pandya, 1978). However, Shukla *et al.* (1980) reported lower values for Russian Merino ewes compared to present values.

The total leucocyte count (thousands/cmm) ranged from 8.25±2.31 to 10.30 ±1.52 in dry ewes, 6.88 to 12.35 in pregnant ewes and ranged from 7.49 to 15.30 in lactating ewes. There were no significant differences in total leucocyte count and differential leucocyte between different categories. Total leucocyte count values obtained for Marwari sheep are comparable to the values reported by Bhattacharya and Uwayjan (1975) for Awassi sheep and are slightly higher than those reported for Patanwadi sheep (Pandya, 1978) and Russian Merino ewes (Shukla *et al.*, 1980).

From the results given in Table 2, it can be seen that the haemoglobin (g/100 ml), TEC (million/cmm), TLC (thousand/cmm and differential count N, E, L and M were 6.6±0.52, 5.58± 0.72, 6.89±0.89, 30.7±3.84, 1.5±0.54 66.5±3.27 and 1.3±0.34 respectively, in adult male sheep. The corresponding values in ram lambs were 6.0,±8.02, 8.93, 33.8±8.30, 1.5±0.76, 62.67±7.62 and 2.0±1.0 respectively. In ewe lambs the corresponding values were 7.30± 0.33, 9.13, 6.52±1.22, 30.5±4.31, 2.30 ±0.17, 66.0±4.27 and 1.2±0.17 respectively.

Trace Mineral Constituents

Results of trace mineral contents (zinc,

TABLE 1. HAEMATOLOGICAL CONSTITUENTS OF MARWARI SHEEP.

Taluka	Hb g/100 ml	Total Erythrocyte count millions/cmm	Total Leucocyte count thousand/cmm	Differential Leucocyte count %			
				N	E	L	M
Pregnant Ewes							
Dhanera (3)	6.00 ±0.29	6.19 ±0.74	9.98 ±0.41	34.7 ±3.61	3.80 ±1.64	60.2 ±2.74	1.30 ±0.60
Deesa (2)	6.50	—	6.88	28.5	2.50	66.0	3.00
Tharad (2)	5.30	3.95	9.98	31.0	10.7	52.3	6.00
Wav	7.3	2.70	12.35	28.2	5.0	63.8	3.00
Gen. Av. Pregnant ewes (9)	6.2 ±0.39	4.86 ±0.74	9.04 ±1.37	31.1 ±1.99	5.3 ±1.39	60.5 ±2.24	3.10 ±0.95
Lactating ewes							
Sihori (2)	6.80	5.72	15.30	45.0	4.70	46.3	4.00
Tharad (6)	5.20 ±0.33	5.39 ±2.14	7.49 ±1.75	37.6 ±5.69	3.00 ±0.71	56.4 ±5.22	3.00 ±0.61
Gen. Av. Lactating ewes (8)	5.60 ±0.36	6.22 ±0.92	10.32 ±1.69	39.4 ±4.73	3.40 ±0.61	53.9 ±4.45	3.30 ±0.67
Dry ewes							
Dhanera (7)*	6.93 ±0.30	6.88 ±0.75	8.44 ±0.44	36.0 ±5.14	4.50 ±0.82	57.6 ±5.50	1.90 ±0.57
Deesa (4)	6.60 ±0.24	—	6.19 ±0.46	42.1 ±7.03	3.10 ±0.59	53.3 ±7.14	1.50 ±0.46
Sihori (5)	6.70 ±0.25	6.48 ±0.99	8.25 ±2.31	40.7 ±7.01	4.10 ±1.14	52.0 ±7.28	3.20 ±0.60
Tharad (8)	5.40 ±0.47	5.18 ±0.19	9.24 ±1.01	36.2 ±3.71	4.60 ±1.89	57.7 ±4.88	2.50 ±0·48
Wav (8)	6.60 ±0.23	5.58 ±0.82	10.30 ±1.52	36.8 ±2·44	1.90 ±0.34	58.9 ±2.79	2.40 ±0.15
Gen. Av. Dry ewes (32)	6.40 ±0.17	5.84 0.36	8.80 ±0.58	37.8 2.0	3.70 ±0.56	56.2 ±2.23	2.30 ±0.26

* Figure in parenthesis indicate number of sampels analysed.

TABLE 2. HAEMATOLOGICAL CONSTITUENTS OF ADULT MALE SHEEP, RAM LAMBS AND EWE LAMBS

	Adult male (5)*	Ram lambs (3)	Ewe lambs (3)
Hb (g/100 ml)	6.6±0.52	6.0	7.30±0.33
Total erythrocyte count (million/cmm)	5.58±0.72	8.02	9.13
Total leucocyte count (thousand/cmm)	6.89±0.89	8.93	6.52±1.22
Differential (Leucocyte count %):			
Neutrophils	30.70±3.84	33.8±8.30	30.5±4.31
Eosinophils	1.50±0.54	1.5±0.76	2.3±0.17
Lymphocytes	66.50±3.27	62.67 , 7.62	66.0±4.27
Monocytes	1.30±0.34	2.00±1.00	1.2±0.17

* Figure in parenthesis indicate number of samples analysed.

copper and iron) in different categories of Marwari sheep are given in Table 3.

The results given in Table 3 reveal that average zinc (ppm), copper (ppm) and iron (mg/100 ml) were 5.31±0.92, 1.13±0.08 and 22.66±3.45 for dry ewes, 3.25±0.82, 1.20±0.26 and 25.62±5.68 for pregnant ewes, 4.82±1.26, 1.00±0.13, 13.92±0.87 for lactating ewes, 4.40±2.43, 0.87±0.27 and 17.40±5.02 for adult male sheep, 1.87±0.22, 1.53±0.18 and 18.85±5.80 for ram lambs and 2.64, 1.30 and 50.02 for ewe lambs, respectively. Statistical analysis of data for adult ewes showed no differences in trace mineral contents in different categories of ewes. The results are not suggestive of any trace mineral deficiency except in sheep of one or two villages as per Underwood (1971). The results of iron content in pregnant ewes are quite comparable with those reported by Soliman and Amrousi (1965) for Egyptian sheep. However, they reported higher values of iron content in dry ewes and in male sheep.

Thus, it appears that wide ranges observed in haematological constituents and trace minerals in sheep give them ability to survive and thrive well in arid and semi arid conditons.

Acknowledgement

The help given by Research Scientist (Micronutrient), A.I.C.R.P. on Micronutrients in soils and plants, G.A.U., Anand is gratefully acknowledged.

TABLE 3. SERUM TRACE MINERAL CONTENT IN MARWARI SHEEP.

Taluka		Zinc (ppm)	Copper (ppm)	Iron mg/100 ml
			Pregnant ewes	
Dhanera	(3)	1.85±0.23	0.87±0.07	39.15 ± 5.02
Deesa	(2)	2.97	1.20	13.05
Tharad	(2)	6.93	2.10	30.45
Wav	(2)	1.82	0.80	13.05
Gen. Av. (Pregnant ewes)	(9)	3.25±0.82	1.20±0.26	25.62±5.68
			Lactating ewes	
Sihori	(1)	6.60	0.60	—
Tharad	(5)	4.37±1.52	1·04±0.12	13.92±0.87
Gen. Av. (Lactating ewes)	(6)	4.82±1.26	1.00±0.13	13.92±0.87
			Dry ewes	
Dhanera	(5)	2.23±0.16	0.84±0.07	17.40±2.75
Deesa	(3)	6.44	1.13±0.13	10.15±1.45
Shihori	(3)	7.92±3.14	0.75±0.10	17.40
Tharad	(7)	8.86±2.11	1.11±0.14	31.69±9.99
Wav	(8)	2.48±0.22	1.52±0.16	23.38±4.17
Gen. Av. (Dry ewes)	(26)	5.31±0.92	1.13±0.08	22.66±3.45
			Rams	
Av. (Rams)	(6)	4.40±2.43	0.87±0.27	17.40±5.02
			Ram lambs	
Av. (Ram lambs)	(3)	1.87±0.22	1.53±0.18	18.85±5.80
			Ewe lambs	
Av. (Ewe lambs)	(2)	2.64	1.30	50.02

Figure in parenthesis indicate number of samples analysed

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I.J.A.R. 3 : 1 : 23—24

Studies on Initiation of Ovarian Activity Following Summer Season in Village Buffaloes

GURDIAL SINGH, G. B. SINGH and R. D. SHARMA

Department of Obstetrics & Gynaecology, College of Veterinary Science
Punjab Agricultural University, Ludhiana.

ABSTRACT

In the present investigation ovarian activity in 112 randomly selected rural buffaloes of graded Murrah breed recorded at 7-10 days interval from April to November, 1981. The study revealed that only 10 (8.96%) buffaloes were polyoestrous throughout the summer. Ovarian activity was initiated only in few animals from mid of July to mid of August but thereafter the number of animals exhibiting ovarian activity increased with the result that 25.00, 75.00, 92.86 and 97.32 per cent of the 112 experimental animals were found cycling at the end of August, September, October and November, respectively. However, maximum ovarian activity (20/28= 71.44%) was elicited in the month of October. At the end of November only three buffaloes remained anoestrous with smooth, inactive ovaries and were declared as "true anoestrous".

*

Various studies have highlighted seasonal trends in the reproductive behaviour of buffaloes which greatly affect the production and reproduction of this species (Whyte and Mathur, 1966; Narasimha Rao and Sambasiva Rao, 1970; Roy *et al.*, 1972; and Luktuke *et al.*, 1973). However, information regarding cyclic activity based upon regular gynaecological examinations in buffaloes in rural conditions during summer and subsequent breeding season are very scanty. The present investigation was taken up to study the ovarian activity in rural buffaloes during summer and also the pattern of initiation of cyclic activity in summer-anoestrous buffaloes at the commencement of the breeding season.

Materials and Methods

The data for the study were obtained during 8 months period (April to November, 1981) from 112 randomly selected healthy nongravid (14 primiparous and 98 pluriparous) graded Murrah buffaloes at village Ghuman Khurd in District Gurdaspur (Punjab). The buffaloes varied between 5 and 13.5 years of age (average 8.58 ± 1.98 years), while their post-calving intervals till the commencement of this study varied between 4 and 36 months (9.45 ± 5.54 months). Their daily milk yield varied from 0 to 8 kg (average 4.38 ± 1.98 kg). They were let loose in the pastures for 4 to 7 hours daily and had access to the slow running water for drinking and wallowing. In addition they were fed green hay and chaffed fodder in the evening. All the buffaloes were rectally palpated at 10 days intervals till the month of July and thereafter, at weekly intervals till the end of the study and ovarian changes were recorded separately for individual animal.

Results and Discussion

The results of cyclic activity in buffaloes

TABLE 1. OVARIAN ACTIVITY OF BUFFALOES DURING SUMMER AND PEAK BREEDING SEASON

Period of study	No. of buffaloes initiating ovarian activity (%)	Total no. of cycling buffaloes (%)
April, 1 to July, 15	—	10 (8.96%)
July, 16 to July, 31	3 (2.68%)	13 (11.64%)
Aug, 1 to Aug, 15	2 (1.79%)	15 (13.43%)
Aug, 16 to Aug, 31	13 (11.61%)	28 (25.00%)
Sept, 1 to Sept, 15	28 (25.00%)	56 (50.00%)
Sept, 16 to Sept, 30	28 (25.00%)	84 (75.00%)
Oct, 1 to Oct, 15	14 (12.50%)	98 (87.50%)
Oct, 16 to Oct, 31	6 (5.36%)	104 (92.86%)
Nov, 1 to Nov, 15	4 (3.75%)	108 (96.43%)
Nov, 16 to Nov, 30	1 (0.89%)	109 (97.32%)

revealed on rectal palpation are presented in Table 1. It was observed that only 10 (8.96%) buffaloes out of 112 experimental animals exhibited regular oestrous cycles till middle of July, however, behavioural symptoms of oestrus were not pronounced enough for detection.

From mid of July to mid of August ovarian activity was observed only in a few anoestrous buffaloes but at the end of August there was a sudden initiation of ovarian activity which perisisted through September and reached its peak during October. Thus, the percentage of cycling buffaloes at the end of August, September and October were 25.00 75.00 and 92.86 per cent, respectively. Of the 84, 28 and 8 buffaloes remained anoestrous at the beginning of September, October and November, ovarian activities were resumed in 56 (66.67%), 20 (71.44%) and 5 (62.50%), respectively, indicating that the month of October was the most favourable for reproduction in buffaloes. These results are in tune with those observed by Narasimha Rao and Sambasiva Rao (1970) and Luktuke *et al.* (1973), who also reported maximum ovarian activity in buffaloes during the month of October.

Three buffaloes (2.68%) remained anoestrous throughout the favourable breeding season i.e. in the months of September, October and November and on rectal palpation their ovaries were found hard and smooth. The reason of their being in true anoestrum could not be ascertained.

Thus it was concluded that only a few adult buffaloes were polyoestrous throughout the summer while in a large percentage of animals cyclic ovarian activity was elicited only during the favourable months i.e. September, October and November.

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I.J.A.R. 3 : 1 : 25—26

Effect of Consecutive Transplantation on the Embryo Survivality in Recipient Goats

K. P. Agrawal, I. V. Mongha and N. K. Bhattacharya

Division of Physiology & Climatology
Indian Veterinary Research Institute, Izatnagar-243 122, U.P.

ABSTRACT

13 Embryos (4-12 cell stage) recovered from 4 synchronized and superovulated donors at 72 hr after the onest of oestrus were transferred in the fallopian tubes of 8 synchronized recipients for the second time by surgical technique. 5 out of 8 recipients conceived ard 5 normal kids were born out of 13 embryos transferred. Consecutive transfer of embryo in the same recipient nannies seems to have certain derogatory effect on per cent conception and embryo survival to term.

*

Surgical technique of collection and transfer of embryo is likely to produce adhesions around the reproductive tract and even leads to infertility (seidel *et al.*, 1978). In caprine no information is available in this respect. The effect of consecutive surgical transplantations on the survivality of embryos in recipient nannies has been studied in this experiment.

Materials and Methods

8 Barbari nannies which were recipients once and gave birth to normal kids were used as recipients for consecutive transfer of embryos.

13 embryos, collected from 4 MGA synchronized and PMSG induced superovulated donors at 72 hr after the onset of oestrus were transferred (one or two per nanny) in the fallopian tubes of 8 synchrinized recipients. The conventional surgical techniques for collection and transfer of embryos were used (Agrawal *et al.*, 1979). The goats conceived as a result of consecutive transfer were allowed to carry the foetuses to full term.

Table 1. RECOVERY RATE AND STAGE OF EMBRYO AT 72 HR AFTER THE ONSET OF OESTRUS IN DONOR NANNIES.

No. of donors	4
No. of ovulation points	18
No. of embryos collected	15
(% embryo recovery)	(83.33)
No. of normal embryos	13
(% normal embryos)	(86.66)
Stage of embryo: 4 cell	4
8 cell	5
12 cell	4

Results and Discussion

The embryos recovered from the donors were of 4-12 cell stage (Table 1). 5 out of 8 recipients conceived and 5 normal kids were born from 13 embryos transferred (Table 2).

TABLE 2. EFFECT OF CONSECUTIVE TRANSPLANTATION ON THE EMBRYO VIABILITY IN RECIPIENT GOATS.

No. of recipients	8
No. of recipients conceived (per cent conception)	5 (62.50)
No. of embryos transferred	13
No. of kids born (per cent embryo viability)	5 (38.46)

Consecutive transfer of embryo in the same recipient resulted into 62.50% conception and 38.4% of the transferred embryos developed to full term as compared to 75 and 54.54% respectively when used for the first time (Agrawal *et al.*, 1979). It seems that consecutive transfer of embryo in the same recipient nannies has certain derogatory effect on per cent conception and embryo survival to term. Averill and Rowson (1958), however, have reported no effect of repeated transfers in the same recipient ewe on the conception rate. Adhesions around the reproductive tract resulting from the previous surgery are possibly the reasons for somewhat lower conception and embryo survival rates in recipients.

Acknowledgement

The authors are grateful to Director of the Institute for providing the necessary facilities.

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I.J.A.R. 3 : 1 : 27—28

Prenatal Losses in Indigenous, Exotic & Crossbred Cattle

O. P. Gupta, R. P. Verma, Uma Shanker, M. C. Sharma and R. R. Mishra

Livestock Production Research (Cattle & Buffalo)
Indian Veterinary Research Institute, Izatnagar-243 122 (U.P.)

ABSTRACT

The present study revealed that in a brucella free herd, the maximum mortality was due to stillbirth. The reasons may be due to hormonal imbalance, physical stress with unknown etiology. This was followed by accidents, congenital defects, premature birth, mummified foetus and micro-organisms like E. coli and Mycoplasma.

Prenatal losses are bound to occur in farms. Reports on the magnitude of prevalence of pre-natal losses in indigenous, exotic and crossbreds raised in India appear to be scanty (Shukla *et al.* 1980). Hence an attempt has been made to place on record the occurence and its etiology under Indian agro-climatic condition.

Materials and Methods

Data on pre-natal mortality in indigeneous (Hariana), exotic (Holstein-friesian/Jersey) and Crossbred (exotic × Indigenous) namely 3 Hariana halfbreds viz; Holstein-Friesian × Hariana ($\frac{1}{2}F \times \frac{1}{2}H$), Brown Swiss × Hariana ($\frac{1}{2}B \times \frac{1}{2}H$) and Jersey × Hariana ($\frac{1}{2}J \times \frac{1}{2}H$) and graded animals $\frac{1}{2}F \times \frac{1}{4}B \times \frac{1}{4}H$, $\frac{1}{2}F \times \frac{1}{2}J \times \frac{1}{2}H$, $\frac{1}{2}B \times \frac{1}{4}F \times \frac{1}{4}H$ and $\frac{1}{2}J \times F \times \frac{1}{4}H$ produced at Institute farm, where the animals were kept under conventional loose housing, feeding and manegerial conditions were collected. The causes of pre-natal mortality due to abortion and still birth including pre-mature births, mummified foetus etc. were studied.

On the basis of post-mortem findings the causes of deaths were categorised into 5 categories. Autolysed carcasses were excluded from this study. The causes were categorised as follows:

1. Congenital causes viz; congenital goitre or any anatomical abnormalities;
2. Accidents viz; Traumatic injury, dystokia, aplaxia;
3. Infectious causes due to micro-organisms viz. E. coli, Mycoplasma;
4. Causes due to Pre-mature birth/mummified foetus;
5. Non-specific causes or uncertain etiology.

The pooled data on pre-natal mortality was calculated in the two major factors causing this condition (i.e. abortion and stillbirth) of different genetic group in five consecutive groups.

Results and Discussion

The results have been presented in Table 1 & 2. Table 1 shows overall percentage distribution of pre-natal losses in cattle according to the cause of losses based on their sex pooled over the breeds. Out of 47 pre-natal losses, still births have the highest percentage (78.72%) in comparison to abortion (21.28%). The male calves were-adversely

affected with stillbirths. Roberts (1971) has reported 62% of the "Stillbirth" of male sex. Abortion was found to be much detrimental for female calves (12.5%).

Table 2 illustrated the distribution of pre-natal mortality in per cent in cattle by breed and cause of mortality, which revealed the overall mortality per cent according to different breeds. In a brucella free herd, out of 10 abortions, 80% abortions were due to non-specific causes, 10% due to E coli and 10% due to mummification of foetus. The probable reasons for prenatal losses are due to abortions, could be the deficiency of progesterone or trauma to embryo (Roberts, 1971). Out of 37 still births, 16 were male and 21 were female. In indigenous breed the reason for prenatal mortality was due to congenital causes (Group I) while in exotic breed the pattern was 57.14%, due to uncertain etiology (Group V), 23.81% due to accidents viz., traumatic injury, dystokia, aplaxia (Group II), 14.29% due to mummified foetus (Group IV) and 4.76% due to infectious causes. In crossbred group, 60.87% was due to non-specific causes, 21.74% due to trauma and dystokia (Group II), 8,70% due to congenital causes and 4.35% due to infection and mummified foetus. (Group III & IV).

In order to depict the overall relative impact of each of five categories of cause, following ranking in descending order was group V (55.32%), group II (21.28%), group I (10.64) group IV (8.51%) and group III (4.26%). Such high percentage of prenatal mortality due to non-specific causes might be due to hormonal, physical and stress factors. Table 2 has further indicated a breed difference for this condition. Roberts (1971) has reported that certain genetic defects of bovine foetus result into intra-uterine death which may cause abortion.

Acknowledgement

Authors are thankful to Director and Joint Director-cum-Head, Division of Pathology, I.V.R.I., Izatnagar for providing the necessary facilities.

TABLE 1. PRENATAL LOSSES IN CATTLE

Sex	Total No. of prenatal loss	Causes of prenatal loss	
		Stillbirth %	Abortion %
Male	17	94.12 (16)	5.89 (1)
Female	24	87.50 (21)	12.50 (3)
Unidentified sex	6	—	100.00 (6)
Overall	47	78.72 (37)	21.28(10)

TABLE 2. PRE-NATAL MORTALITY (%) IN CATTLE

Type of breed	No. of observations	Causes Group I	II	III	IV	V
Indigenous	3	100.0 (3)	—	—	—	—
Exotic	21	—	23.81 (5)	4.76 (1)	14.29 (3)	57.14 (12)
Crossbred	23	8.70 (2)	21.74 (5)	4.35 (1)	4.35 (1)	60.87 (14)
Total	47	10.64 (5)	21.28 (10)	4.26 (2)	8.51 (4)	55.32 (26)

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I.J.A.R. 3 : 1 : 29—30

SHORT COMMUNICATIONS

Post-Partum Reproductive Behaviour in Recurrent Embryorecipient Goats

K. P. Agrawal and N. K. Bhattacharya

Division of Physiology & Climatology
Indian Veterinary Research Institute, Izatnagar-243 122, U.P.

Consecutive transfer of embryos in the same recipient results in progressive decrease in the per cent conception and embryo survival rate in goats. The lower fertility in the second and subsequent transfers is often believed to be associated to previous surgical interventions and resultant adhesions (Seidel *et al.*, 1978). Information on the post-partum reproductive behaviour in the recurrent recipients is, however, meagre and it needs to be tested if the reproductive ability is actually depressed due to anatomical limitation. We, therefore, studied the reproductive potential in recurrent recipient *nanny* goats.

Post-partum oestrus was detected by parading vasectomized bucks twice daily in 10 nanny goats which had two surgical embryo transfers and 10 control goats. The nannies were covered by two artificial inseminations, one on detection and the second at 12 hours later. Differences in interval between first and second post-partum oestrus, interkidding period and conception rate were tested statistically according to the methods described by Snedecor and Cochran (1968).

Table 1. POST-PARTUM REPRODUCTIVE BEHAVIOUR IN CONTROL AND RECURRENT RECIPIENT NANNIES

Attributes	Recurrent	Control	Test applied and values
First post-partum oestrous interval (days)	35.20±8.70 (10)	34.60±5.81 (10)	t, 0.06
Interkidding period (days)	194.60±12.08 (6)	191.00±4.68 (7)	t, 0.27
No. of animals inseminated	10	10	—
No. of animals conceived with first insemination	6	7	Normal Deviation 0.91
% conception	60	70	

Figures in parenthesis are number of observations.
$P > 0.05$.

There was hardly any difference in the appearance of post-partum oestrus, inter-kidding interval and conception rate in recurrent recipients (Table 1). Obviously factors other than surgical one cannot be eliminated in causing progressive depression in embryo survivality on repeated transfers in goats. It is also certain that the recurrent recipients can be successfully used later in natural breeding.

Acknowledgement

The authors are grateful to Dr. C. M. Singh, Director, Indian Veterinary Research Institute for providing necessary facilities.

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I.J.A.R. 3 : 1 : 31—34

Testicular Neoplasia in The Bovines

S. G. Zanwar, P. D. Sardeshpande and B. R. Deshpande

Bombay Veterinary College, Bombay-400 012

Amongst the domestic animals, neoplasia of the male gonads are most frequently observed in the dog (Survashe *et al.*, 1968). From the bovines, there are only a few reports (Mc Entee, 1968; Dabholkar *et al*, 1967). This, at least in part, is due to the fact that a majority of the males in this species are castrated at the early age. Further in Western countries, the male bovines are sent to the abattoir when young, so that opportunities for the tumours to develop in latter do not arise. In buffaloes too, the position is similar and therefore no records are available of testicular tumours in them as well. In the following report, therefore twenty tumours of the testis are described, five of which are from the buffaloes.

Materials and Methods

The material for the present study was obtained from Deonar Abattoir, Bombay, where on an average, 500 cattle and buffaloes are slaughtered daily. In a period of six months 54-testicles from cowbulls and 97 from buffalobulls were collected for gross and histological study. The latter was made on 5-microns thick sections of 10% neutral formaline fixed tissues. The animals were of 9-14 years of age.

Observations

Neoplastic growths were found in 15 cowbulls and 5 buffalo bulls. The details are shown in Table 1 below.

Table 1. TESTICULAR NEOPLASIA

	Cowbulls	*Buffalobulls*
No. of testes examined	54	97
No. of testes with neoplasia		
i) *Descended testes*		
Unilateral	9	2
Bilateral	2	—
ii) *Undescended testes*		
Unilateral	4	1
Bilateral	—	2
Total	15 (27.77%)	5 (5.15%)

Present Address: 1) Research Officer, Raymond Woolen Mills, Research & Development Division

2) Head, Dept. of Path. Bact. & Para B.V.C.

3) Head, Dept. of Animal Reproduction & Surgery, B.V.C.

One of the buffalo-bull which showed bilateral neoplasia was a male pseudo-hermaphrodite. The testes were inguinally located and uterus masculinus, vestibule and the mammary glands were well developed. No ovarian tissue was traceable.

Except in one bull wherein a seminoma was encountered, all other tumours were of the sertoli cell origin. The biometrical details of the involved testes are shown in Table 2.

In the animal with unilateral neoplasia the unaffected gonad was invariably strophic.

In both the species, the testes with sertoli cell tumours presented a similar appearance in essential details. They were usually enlarged, firm, nodular and showed an irregular contour. Tunica albugenia was moist and shining with the blood vessels standing out prominently. Not infrequently adhesions were present between the tonic and the parenchyma. On incising the organs, a bulging out surface with greyish yellow lobulated tumour mass was noticeable. Epididymis was swollen and firm at the caput and the cauda.

Histologically, the tumour mass presented a picture typical of sertoli cell tumour with an adenomatous pattern. The seminiferous tubules were variable in shape and size and possessed a thick collagenous wall. They were occupied by the oval or elongated neoplastic cells resembling the sertoli cells. They possessed a plae cytoplasm which was often vacuolated. The nucleus was vesicular with fine chromatin and prominent nucleolus. The cells were arranged in two to three layers. Mitotic figures were scanty. Occasionally, spilling over of the tumour cells in the interstitium was evident. The stroma of the tumour was poorly cellular and variable in amount. Tendency towards hyalinisation was commonly seen.

In cases where the entire tumour parenchyma was not replaced by the tumour tissue, the survivir.g tubules were atrophic and invariably lined by sertoli cells only. Leydig cells were normal in number when tumour mass smaller but scarce when the growth was extensive.

In majority of the cases there was an extensive fibrosis of the epididymis. The tubules were atrophic and their cells desquamated or vacuolated. Occasionally spermiostasis and degenerated seminal material was noticeable in the lumen.

Seminoma was encountered in one testis in the form of two firm greyish-white nodules, 3-cm. in diameter and with a homogeneous pinkish cut surface. Histologically, the tumour showed a tubular pattern. The tubules were crowded with large polyhedral cells with a pale eosinophilic cytoplasm and a round vesicular nucleus. Mitotic figures were few. At a few places the tumour cells were seen to spill over in the interstitium. The stroma was moderate and poorly vascular. The adjacent non-neoplastic tissue revealed considerably atrophic seminiferous tubles with a thick collagenous wall. These tubules were poorly cellular mainly lined by sertoli cells.

Discussion

It is evident from the above that the testicular tumours are more frequently in cattle than in buffaloes. This view is lent credence by the absence of any other reports on tumours of testis from the latter species. Consistent with the observations by McEntee (1958) in cattle, Survashe *et al.* (1968) in dogs and Collins and Pugh (1965) in man, in the present study also, the afflicted animals were older.

Of the 20 tumours, seven were encountered in the undescended testes (58.3%) while the rest were in the descended gonads. Similar observations have been made in man (Collins and Pugh, 1965) and dog (Survashe *et al.* 1968). It was also observed that the unilateral neoplasia was a more common feature than a bilateral involvement. This compares well with similar observations in other species.

All but one of the tumours were of sertoli cell type. This is in agreement with the observations by Dabholkar *et al* (1967). However it contrasts with reports by McEntee (1958), Cohrs (1966) and McEntee (1970) who observed the Leydig cell tumours to predominate.

Interestingly enough one of the cases encountered in the present study was a male pseudohermaphrodite buffalo with both the testes inguinal in loaction and neoplastic. This animal showed enlarged mammary glands, uterus masculinus and a vestibule. The sertoli cell tumours are known to exert a feminising influence on the animal especially in the dog (Survashe *et al*, 1968). It is therefore justifiable to presume that the gynaecomastia observed in this animal was due to oestrogen elaborated by the neoplastic cells. There are no parallel observations in this species by other workers, though identical reports are available in canines (Frey *et al*, 1965 and Fraser *et al*, 1968).

TABLE 2. BIOMETRICAL OBSERVATIONS OF TESTICULAR NEOPLASMS IN COW-BULLS

Sr. No.	Case No.	Testicles with Epididymus (Cm) Wt (gm)	Length	Width	Thickness	Side	Diagnosis & Remarks
1.	CB-2	—	26.00	9.60	26.5(Circumference)	Right	Unilateral-Sertoli Cell-Tumour
2.	CB-7	173	8.00	1.70	2.80	Left	,, ,, ,, ,,
3.	CB-18	173	13.5	5.7	5·8	Right	,, ,, ,, ,,
4.	CB-20	—	22.5	7.8	11.2	Right	Bilateral ,, ,, ,,
			30.0	11.2	9.1	Left	
5.	CB-24	50	9.5	2.3	2.6	Right	Unilateral ,, ,, ,,
6.	CB-25	—	8.5	2.4	3.5	,,	,, ,, ,,
7.	CB-27	295	20.0	5.3	5.6	Left	,, ,, ,, ,,
8.	CB-28	400	14.5	6.11	7.1	,,	,, ,, ,, ,,
9.	CB-29	100	3.5	3.37	4.4	Right	,, ,, ,, ,,
10.	CB-33	—	45.0	36.5 — Circumference at the middle		Left	,, ,, ,, ,,
11.	CB-22	1325	25.0	37.0 — Circumference		,,	,, ,, ,, ,,
12.	CB-24	90	10.5	3.7	4.6	,,	,, ,, ,, ,,
13.	CB-19	Neoplastic growth of about 3-cm diameter				Right	,, ,, ,, ,,
14.	CB-35	Two firm circular nodules of about 3 cm in diameter				,,	,, Seminoma

TABLE 2 (*continued*) BIOMETRICAL OBSERVATIONS OF TESTICULAR NEOPLASMS IN BUFFALO-BULLS

Sr. No·	Case No.	Testicles with Epididymus (cm) Wt (gm)	Length	Width	Thickness	Side	Diagnosis and Remarks
1.	BB-11	—	18.5	9.95	10.95	Right descended	Unilateral Sertoli cell tumour
2.	BB-36	—	9.5	3.5	3.9	Left ,,	,, ,, ,, ,,
3.	BB-29	Neoplastic growth 3.5 cm in diameter monarchid				Right ,,	,, ,, ,, ,,
4.	BB-51	—	12.5	4.26	5.85	Right Cryptorchid	Neoplastic growth bilateral
			10.0	3.75	5.45	Left Hermaphrodite	Sertoli cell tumour

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I.J.A.R. 3 : 1 : 35—37

Schistosomus Reflexus in an Indian Goat

A. S. Nanda, R. D. Sharma and N. S. Bugalia

Department of Obstetrics & Gynaecology, College of Veterinary Science,
Punjab Agricultural University, Ludhiana-141004

Schistosomus reflexus is a congenital anomaly of fetus associated with skeletal defects and exposure of abdominal viscera and its occurrence is common in bovine but rare in ovine, Caprine and swine (Roberts, 1971). The incidence of schistosomus reflexus has been reported in bovine (Rai *et al.*, 1975, Bugalia *et al.*, 1982); in caprine (Bedford, 1967; Chakrabarti, 1981) and in ovine (Dennis and Meyer, 1965).

The present case is reported and described due to paucity of reports on schistosomus reflexus in an Indian goat.

History, Clinical Examination, Diagnosis and Treatment

A primigravida Beetal goat with a history of full term gestation and signs of labour since past six hours was reported at the P.A.U. Veterinary Clinics for treatment. Vaginal examination revealed complete dilatation of cervix, absence of pregnancy seal and rupture of allantoic and amniotic sac. The viscera of the fetus were palpable in birth canal and a hard mass appeared to be distorted thorax of the fetus was felt in uterus.

Further examination revealed dorso-sacral position of fetus. The head and all the four limbs were extended in the birth canal. Latter, the birth canal was lubricated with parachlor gel and attempts were made to correct head and neck. Alternate traction on legs also failed to relieve dystocia. Hence, caesarotomy was performed in left flank under local anaesthesia and a dead monster confirmed to be schistosomus reflexus was delivered.

Fig. 1: Angulation of spinal column and eventration of abdominal viscera.

Fig. 2: Kinking and ankylosis of spinal column visible on dissection.

Fig. 3: Enlargement of liver.

Results and Discussion

There was no evidence of gross tissue degeneration and mummification in monster. Necropsy revealed gross skeletal defects associated with open abdomen and exposed visceral organs and absence of genital organs (Fig. 1). Chakrabarti (1981) also reported absence of genital organs in a caprine schistosomus reflexus.

The monster was a sexless kid and confirmed typical description of schistosomus reflexus described by Roberts (1971). There was an acute angulation and ankylosis of spinal column causing

approximation of sacrum and cranium. The kinking and ankylosis of spinal colum was visible on disection (Fig. 2). The abdominal viscera, macroscopically normal, hung loosely with omentum and mesentry. The liver was enlarged with distinct lobes (Fig. 3). Similarly, Roberts (1971) and Bugalia *et al.* (1982) reported abnormal sized liver in bovine schistosome. However, Chakrabarti (1981) observed cystic liver in caprine schistosome monster.

Monstrosity often causes dystocia. Mutation, forced extraction and fetotomy are of limited value in monstrosities. Caesarion operation was attempted in present case due to failure of obstetrical manipulation. However, Chakrabarty (1981) successfully delivered caprine schistosome by correction and forced traction. Messervy *et al.* (1956) and Bugalia *et al.* (1982) also preferred caesarian section over fetotomy in bovine dystocia due to schistosomus reflexus. Herr (1979) recommended fetotomy in schistosomus reflexus calves. Roberts (1971) used forced traction and fetotomy in bovine schistosomes.

Summary

A rare case of caprine schistosomus reflexus in an Indian goat is reported.

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I.J.A.R. 3 : 1 : 38—39

Birth Weight and Age at Maturity in crossbred Cattle.

B. B. Srivastava, R. P. Verma, Uma Shanker and R. R. Mishra

Livestock Production Research (Cattle & Buffalo)
Indian Veterinary Research Institute, Izatnagar 243 122 (U.P.)

The economical loss due to delayed maturity may be minimized if causes for this condition can be investigated. The present study was, therefore, intended to assess the effect of birth weight on their age at maturity in different breeds of crossbreds (*Box taurus* × *Bos indicus*) under Indian agro-climatic condition.

Data on three halfbreds viz; Friesian-Hariana ($\frac{1}{2}$F × $\frac{1}{2}$H), Brown Swiss-Hariana ($\frac{1}{2}$B × $\frac{1}{2}$H) and Jersey-Hariana ($\frac{1}{2}$J × $\frac{1}{2}$H) belonging to All India Coordinated Research Project on Cattle were collected. The practice for recording of heat were made twice in a day (i.e. morning and evening) with the help of teaser bull. The heat detection in suspected animal was confirmed by rectal examination and vaginal inspection. On the basis of turgidity of genital organs, tone of uterus, opening of os cervix, clear and ropy mucus discharge etc. artificial insemina-tions were performed. As regards their birth weight, the animals were divided into three groups:

Group I: Animals having less than 20 kg. birth weight

Group II: Animals having 21 to 25 kg birth weight.

Group III: Animals having 26 kg or more birth weight.

The available data maintained at Institute farm were scrutinised to study the effect of birth weight on age at matu-rity, where the age at maturity was determined in the crossbreds by ascer-taining the age at first artificial inse-mination.

The average age at maturity in three Hariana half-breds in relation to their birth weight is given in table 1. It was found that the overall age at maturity irrespective of breed was minimum 652.88 ±15.21 days in Group I while it was maximum 716.78±19.73 days in animals of group III. However, a breed differ-ence was apparently observed. The breedwise overall age at maturity in crossbred cows was found to be lowest in crosses having Jersey blood while it was highest in crossbred having brown Swiss inheritance which was a peculiar breed characteristic (Robert's, 1971). The present study has revealed that the trend of maturity was in rising phase from 638.09, 641.23 and 696.0 days in Group I, II, and III respectively in lighter breed (Jersey halfbred) and 633.0, 720.76 and 717.87 days in Group I, II and III respectively in Holstein Friesian halfbred. While in the Brown Swiss crosses the age at maturity has declined from 837.67, 721.24 and 715.96 days in Group

I, II and III respectively. These differences might be due to breed characteristics.

The observations made in this study indicate that birth weight of various crossbred can be helpful in identifying the age at maturity.

Acknowledgement

We are thankful to the Director, I.V.R.I., Izatnagar for providing necessary facilities.

TABLE 1. BIRTH WEIGHT AND AGE AT MATURITY IN CROSSBRED (HARIANA & EXOTIC HALFBRED) CATTLE

Birth weight (group)	Average age at maturity (days) $\frac{1}{2}F \times \frac{1}{2}H$	$\frac{1}{2}B \times \frac{1}{2}H$	$\frac{1}{2}J \times \frac{1}{2}H$	Total
(I) Less than 20 kg	633.0 ± 61.08(4)	837.67 ± 39.08(3)	638.09 ± 14.38(34)	652.88 ± 15.21(42)
(II) 21 to 25 kg	720.76 ± 20.98(38)	721.24 ± 18.10(21)	641.23 ± 18.45(26)	697.49 ± 12.42(85)
(III) 26 kg & more	717.87 ± 32.98(30)	715.96 ± 24.28(25)	696.0 ± 45.18(3)	716.78 ± 19.73(58)

Figures in parenthesis indicate number of observations.

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Conception Rate With Frozen Semen

L. D. Mohanty, M. M. Mishra and S. V. Rao

Frozen Semen Bank, Cuttack, Orissa

ABSTRACT

A random sample survey at 10 different frozen semen artificial insemination centres was conducted by the Frozen Semen Bank staff to assess the conception rates by the use of deep frozen Jersey and F_1 Crossbred semen in indigenous and Crossbred cows of different blood levels in Orissa.

From 1257 cows that were followed (89.5%) out of 1365 fresh inseminations, the first insemination success was 62.2% and calf born rate was 54.4%. The incidence of prenatal loss was 3.62%. The overall conception and calf born rates for the fresh and the repeat inseminations together were 59.3% and 62.0% respectively. The inseminations per conception was 1.68.

*

An attempt was made to analyse the conception rate and calf born rate with frozen semen produced at Frozen Semen Bank, Cuttack (Orissa).

Materials and Methods

Artificial Inseminations were performed by trained Veterinarians and Para Veterinary staff, in indigenous and Crossbred cows, spread over ten randomly selected Frozen Semen Artificial Insemination Centres. These were opened during 1979-80 to 81-82 in Cuttack, Dhenkanal and Puri Districts of Orissa. Frozen semen of Jersey and Cross-bred bulls was thawed in warm water at 37°C to 40°C for twelve seconds in a dose rate of 30 millions of spermatozoa in 0.25 cc in tris diluent produced by Landshut method at the Indo-Danish Project, Frozen Semen Bank, Khapuria, Cuttack-10, was used for inseminations in the present study. Pregnancy diagnosis was performed at 7 to 12 weeks of gestation by actual rectal palpation. This related to the first inseminated cows (fresh) of the period from June, 79 to September, 81. Cows examined by this method were followed for calvings and each calf was verified by the supervising Veterinary Staff at the owners door. For this purpose the phenotypic characters of calves were taken into consideration. The estimations of conception rate and calf born rate to first (fresh) Insemination were done using the formulae:

1. Conception Rate $= \frac{\text{No. of cows found pregnant to 1st A.I.} \times 100}{\text{No. of 1st inseminated cows followed for pregnancy diagnosis}}$

2. Calf born rate $= \frac{\text{No. of calves born to first A.I.} \times 100}{\text{No. of first inseminated cows followed for pregnancy diagnosis} - \text{No. of pregnant cows not followed.}}$

Results and Discussion

The conception rate for the first inseminations ranged from 37.7% to 83.5% with a mean of 62.2%±12.2%. The conception rate of 37.7% at one of the centres affected the range greatly. For the rest 9 centres the range was 50.5% to 83.5%. Investigations for lower conception of that centre revealed that it was due to the use of a Crossbred bull semen having poor fertility. Further it was due to inseminating cows in improper time of heat. The conception rate to first inseminations and to the overall, being 62.2% and 59.3% respectively, did not vary much due to less number of repeater animals produced by the farmers for reinsemination. The inseminations per conception was ideal, being 1.68 only. The prenatal losses out of 883 pregnancies was found to be 32, i.e. 3.62% only, which is little higher than the 3% reported by Hawk and Bellows (1980). The total calves born to the followed 1222 1st inseminated cows was 758 being 62%, out of both 1st and repeat inseminations. Out of 1368 cows inseminated only 1222 cows could be finally followed for assessment of breeding efficiency and the per cent of follow up was 89.5%. Out of 758 calves born only 607 calves could be verified by supervising staff indicating 80% calf verification, and 10% calf mortality under field conditions. The calf born rate for the first inseminations ranged from 31.3% to 77.6% with a mean of 54.4%±14.5%.

Acknowledgement

The authors are thankful to the Director of Animal Husbandry, Dairy & Veterinary Services, Orissa, Cuttack for providing all the facilities. They are also thankful to the concerned Veterinarians and Livestock Inspectors for their co-operation.

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I.J.A.R. 3 : 1 : 42—43

Economics of Veterinary Clinical Services in Dairy Cooperatives

H. C. Gupta

Animal Husbandry & Extension
Kaira District Cooperative Milk Producers' Union Limited, Anand, Gujarat

The economics of Veterinary Clinical Services in any milk shed area can be visualized by the cost incurred in the entire veterinary operation vis-a-vis economic benefits achieved therefrom, directly or indirectly; wider the cost: benefit ratio, greater the economy flowing in the positive direction. The optimum economy will warrant a full adoption rate of clinical services by the milk producers with the highest level of treatment efficiency constantly maintained by the veterinary doctors—the latter will, though, spontaneously tend to lead to the former.

The basic and essential requirements to realise the optimum cost: benefit ratio i.e. to exploit the economics to its optimum level in the field of veterinary clinical services, are that the clinical services should be made available to the milk producers (i) at their doorsteps, (ii) on sound lines, (iii) economically, (iv) efficiently, (v) at proper level of intensity, (vi) at nominal or low cost and nonetheless (vii) with appropriate guidance/enlightenment to them as to how the sick animal has to be managed to recover at a fast rate, how the disease under treatment could possibly have been prevented and how its recurrence could be checked forthwith.

Due to the mass adoption rate of veterinary services by the milk producers in a dairy cooperative set-up, the total annual veterinary treatment expenditure may go as high as Rs. 70.0 lakhs (Amul instance) but when it is included in the price structure of milk, it spreads as thin as about 4 paise per litre of milk procured, which is quite insignificant to the milk producers, but it gives very important and useful veterinary services to them throughout the year to improve their milk production and productivity. This expenditure, as such, may be otherwise, too huge to be borne by a single agency, including the State Govts. for a single district.

Considering the economic benefits, if the veterinary treatment could effect an annual increase of even one per cent in milk production (by way of resumption of general health/normal lactation of the milch animal, saving milch animals from the jaws of deaths, and enhance the pace of milk production by infertility treatment), it will more than compensate the entire expenditure. In addition, if there is two per cent saving of adult animals by reduction in their mortality rate, it may further add some Rs. 70.0 lakhs in the milk producers' economy/year. Besides, the annual reduction in calf mortality by 2% every year, will give 2% additional replacement of milch animals and also further increase in annual milk yield to that extent.

The objective of the Veterinary Clinical Services is to keep the physical and

physiological condition of the entire animal population at optimum level all the time to optimise the milk production and productivity per animal per year at minimum cost and repeat the same performance with added efficiency year by year throughout the prolonged productive life of the cattle population. The dairy cooperative system (Anand Pattern) has a well-established animal husbandry set-up at the Union level, in which the rural resources (viz., rural man-power, leadership, infrastructures and the generated funds etc.) are all pooled and mobilised/utilized in the best interest of the milk producers' economy and welfare. Not only the economic benefits of these inputs and services are gained by the milk producers, their own village cooperative and Union alike, but these gains then begin to be ploughed in the reverse direction i.e. from the Union-Cooperative-Producers-to further enhance the producers' economic welfare. This process continues and the other things being equal, the developing economy keeps generating and flowing in the positive direction unto the rural masses, by whom these dairy cooperatives are actually owned and operated.

AMUL VETERINARY TREATMENT SERVICES (1981-82)

Sr. No.	Item	No. of cases during the year	Cases treated per Veterinary Doctor
1	Cases treated on weekly veterinary routes	1,45,199	2,070
2	Cases treated by emergency veterinary units	71,028	1,010
3	Cases treated for infertility	72,846	1,040
		2,89,073	4,120
4	Cases treated by veterinary first-aid workers in the villages	2,20,505	2,500 per veterinary first aid worker
	Total	5,09,578	6,620
5	Net cost involved in veterinary treatment work — About Rs. 70.0 lakhs		
	About Rs. 35/- per milk producer per year		
	About 4.1 paise/kg milk procured		
	About 1.5% of the cost of the milk		
	About Rs. 14/- per case treated.		

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Economics of Artificial Insemination and Calf Born From Liquid Semen and Frozen Semen

T. G. Radhakrishna, C. L. Ramanatha Gupta and N. Chandrasekhara Reddy

Frozen Semen Bank, Centralised Semen Collection Centre,
Hebbal, Bangalore-560 024, Karnataka.

A study was conducted with the available data of 1980-81 from selected Artificial Insemination Units of Intensive Cattle Development Scheme, Bangalore. To study the cost of one Artificial Insemination as well as that of one calf born where Liquid Semen and Frozen Semen are used have been studied separately. Sixteen Units using Liquid Semen and Sixteen Units using Frozen Semen for Artificial Insemination were selected for the present study. The Artificial Inseminations performed are all first inseminations and the calves born are based exclusively on the followup work conducted by each Unit.

The following factors were taken into consideration:

(a) *Frozen Semen:*

1. Number of A.I. done and calves born.
2. Number of doses utilised.
3. 10 per cent of the cost of Liquid Nitrogen refrigerator.
4. Cost of one Stainless Steel A.I. Gun.
5. Cost of 120 litres of liquid nitrogen at the rate of 10 litres per month per A.I. Unit at Rs. 3.00 per litre.
6. Cost of Frozen Semen at Rs. 3.00 per dose.
7. Pay and allowance of the staff of one A.I. Unit per annum (Each A.I. Unit consists of one Veterinary & Livestock Inspector and one Attendant)
8. Transportation cost.

(b) *Liquid Semen:*

1. Number of A.I. done and calves born.
2. Number of doses of semen despatched.
3. Cost of two semen shippers per A.I. Unit.
4. Cost of 75 Catheters per A.I. Unit per annum.
5. Cost of five 2 ml. syringe per A.I. Unit per annum.
6. Cost of two A.I. gun carriers.
7. Cost of packing per A.I. Unit per annum.
8. Cost of transportation per A.I. Unit per annum.
9. Pay and allowances of the staff of one A.I. Unit per annum.

Table presents the number of A.I. done, calves born, number of doses of semen supplied, total expenditure, cost of one A.I. and cost of one calf born for both liquid semen and frozen semen, respectively.

The cost of one A.I. with liquid semen ranged between Rs. 27.15 and Rs. 235.21 with an average of Rs. 60.85 whereas the cost of one A.I. with frozen semen varied from Rs. 9.32 to as high as Rs. 40.25 with an average of Rs. 18.63.

The cost of one calf born with liquid semen ranged between Rs. 89.54 and Rs. 1,110.80 with an average of Rs. 235.47 whereas the figures for frozen

TABLE. COST OF ONE ARTIFICIAL INSEMINATION AND ONE CALF BORN DURING 1980-81

Total A.I. Units	No. of A.I. done	No. of calves born	No. of doses semen supplied	Pay and allowances of the establishment	Cost of semen @ Rs. 0.73 paise per dose	Transportation charges	Total expenditure in Rs.	Cost of one A.I. in Rs.	Cost of one calf born in Rs.
(a) **Where liquid semen is used**									
16	4253	1099	34220	229960.00	24980.60	3840.00	258780.60	Av: 60.85	235.47
(b) **Where frozen semen is used**									
16	15883	5569	18294	235611.52	54882.00	6017.51	295911.03	Av: 18.63	53.13

semen being Rs. 24.71, Rs. 180.57 and Rs. 53.13 respectively.

It was observed that the cost of A.I. and that of calf born were inversly proportional to the number of A.I. done and calf born. In A.I. Units using liquid semen the cost enhancement was primarily because of more wastage of semen and reduced conception rates. Whereas, the wastage in case of frozen semen was either absolutely negligible or nil and the rate of conception being high, the cost per A.I. and calf born was kept at a considerably reasonable threshold.

The wastage in liquid semen was inevitable as the minimum number of doses of semen had to be despatched to A.I. Units irrespective of the fact that any A.I. was carried out or not. The low keeping quality of liquid semen especially of buffalo bull semen has added to the reduced conception rates. These factors have directly attributed for the increased cost of A.I. and calf born in A.I. Units using liquid semen.

Keeping the above factors in view, frozen semen technology, the initial cost of which is although higher is worth implementing. Besides, the plus factor in frozen semen is its good keeping quality and availability throughout. Even in some of the A.I. Units using frozen semen the cost was higher because of reduced number of A.I. carried out and low percentage of followup.

Although the cost of one A.I. and cost of one calf born are higher, the cost in both cases could be reduced if only the number of A.I. done are increased with due care towards motivation and extension education of dairy farmers.

The germ-plasm could have been best made use of had the liquid semen produced at present had been utilised for the frozen semen production wherein the number of bulls could be minimised which brings down the cost of one Artificial Insemination.

The technical staff incharge of A.I. Units in Intensive Cattle Development Scheme, consists of only Veterinary and Livestock Inspector who in-addition to doing A.I. work also attends to treatment of ailing cases, undertakes preventive vaccinations of all species of livestock, does followup of A.I. cases and does extension work in his jurisdiction so much so more than half of his services are utilized for work other than A.I. service as such when the total expenditure per Artificial Insemination Unit per annum is equally distributed between Artificial Insemination work and other veterinary services rendered by the Veterinary and Livestock Inspector, the cost of A.I. and calf born gets reduced by fifty per cent of what it is at present.

Acknowledgement

The authors acknowledge gratefully their indebtedness to Dr. G. M. Srikantaiah, Director of Animal Husbandry and Veterinary Services, Karnataka, for the encouragement and permission.

I.J.A.R. 3 : 1 : 46—49

Impact of Intensive Cattle Development Programme In Mehsana District.

B. K. Bhavsar and V. K. Kerur

Project Officers, Intensive Cattle Development Programme,
Dept. of Animal Husbandry, Gujarat State

To achieve a break-though in milk production, Intensive Cattle Development Programmes (ICDP) were started in 1966-67 under a special development programme, popularly known as crash programme, sponsored by Ministry of Agriculture, (Anon. 1977). These ICDPs were located in selected areas which had good potential & conditions to respond to cattle and dairy development programmes. The ICDPs were designed to provide cattle owners a package of improved practices in breeding, feeding, management & veterinary care. The programme envisaged intensive coverage of one lakh breedable cows & buffaloes per project to achieve the objective of increasing milk production through consistent and integrated efforts, (Anon, 1972). I.C.D.Ps also provided dairy Extension Services in order to promote & help organisation of village Milk Producers' Coop. Societies in the project area. These societies were affiliated to the District Milk Producers' Coop. Union & provided marketing facilities for the milk produced.

Mehsana district is situated in the Northern part of Gujarat State between 22° & 24° North Latitude and 70° & 72° East Longitude. The major part of the district is plain except Kheralu taluka in the North-East which is hilly & has uneven land. The land of Vijapur, Visnagar, Kalol & Mehsana talukas is most fertile. The climate of the area is extremely hot in summer & equally cold in winter. The average rainfall is 673 mms. Nearly 25% of the cultivable area of the District is under irrigation out of which 96% irrigation is through wells & tubewells.

ICDP, Mehsana started functioning from 1-10-1970 in the Mehsana District which is the home tract of Mehsani breed of buffaloes. Initially, 69 sub centres were opened & during 1973-74 all the 100 sub-centres of the project had started functioning in 9 talukas of Mehsana district as follows:

Table 1. DISTRIBUTION OF SUB CENTRES IN ICDP, MEHSANA

Taluka	No. of sub-centres
Vijapur	32
Visnagar	17
Mehsana	13
Kheralu	13
Sidhapur	10
Chanasma	5
Kalol	6
Patan	1
Kadi	3
	Total: 100

The period from the year 1970-71 to 1981-82 has been taken in to consideration for evaluation. The artificial and controlled breeding of cattle & buffaloes, sexual health control, feed and foodder development, dairy extension activities with milk production in the project area and

veterinary health coverage are the main aspects which have been considered for the impact.

I. *Breeding:*

The breedable population of cows & buffaloes which was 12,103 & 81,547 in the project area in the year 1973-74 increased to 21567 cows & 1,12,046 buffaloes by 81-82.

The breeding coverage was through artificial insemination. The Central Semen Collection Station, Mehsana functioning under ICDP, Mehsana caters to the needs of Murrah & Mehsani buffalo semen. The cattle & buffalo breeding programme was operating on liquid semen technology until Sept. 1980. Thereafter, the ICDP sub-centres were provided with frozen semen equipment & facilities for carrying out artificial insemination through frozen semen technology in a phased programme. From October, 1981 all the 100 subcentres of the ICDP, Mehsana have been operating on frozen semen technology and the Central Semen Collection Station (CSCS) Mehsana produces frozen semen of Murrah & Mehsani buffalo bulls. The CSCS is fully equipped to produce frozen semen and has produced nearly one lakh doses of frozen buffalo semen during 1981-82. The frozen semen of Holstein Friesian & Jersey bulls for cross breeding work is obtained from the Govt. Cross breeding Centre, Ahmedabad, Regional Artificial Insemination laboratory, Rajkot & NDDB A.I. laboratory at Bidaj.

It can be seen from the table II that more & more cattle owners have been taking advantage of artificial insemination & SHC facilities. Further the frozen semen technology has created great awareness among the cattle owners in the project area & there has been a rise of nearly 17000 inseminations during 1981-82 in comparison to the inseminations done in 1980-81.

It can also be seen from the Table II that the project has intensified & increased the coverage of animals under its SHC programme. From 4372 animals during 1970-71 the figure of animals provided SHC facilities has increased to 29559 during 1981-82. This also indicated increased awareness of the cattle owners.

At 34 subcentres of ICDP, Mehsana Murrah or Mehsani buffalo bulls have been located to provide natural services in a controlled manner to the cattle owners who insist on natural service. The no. of buffalo bull centres will be reduced in a phase wise manner and breeding facilities will be assured through frozen semen technology in near future as more & more cattle owners will get convinced to accept artificial breeding.

II. *Feeds & Fodder development:*

The fodder development programme, under ICDP has brought an awareness among the cattle owners of the district & majority of them have started growing improved leguminous & non-leguminous grasses like Lucern, Sweet sudan, Jowar-X-988, Oat Kent etc. This has become possible through fodder demonstration plots & improved seeds provided by ICDP, Mehsana to a large extent. During the year 1970-71 123 fodder demonstration plots were given at the cost of Rs. 5557 whereas during 1981-82, 580 fodder demonstration plots were given at the cost of Rs. 58000. The amount spent on subsidising the purchase of improved seeds increased from Rs. 10971 during the year 1970-71 to Rs. 49999 during the year 1981-82. Through the fodder demonstration plots & extension work cattle owners of the project area have become

TABLE II. WORK DONE DURING 1970-71 TO 1981-82 UNDER ICDP, MEHSANA

Year	A.I. done	SHC cases attended	Milk yield competitions held		No. of village milk producers coop. societies	Milk purchased in project area (in lakh litres)	No. of animals treated (in 000.s)	No. of vaccinations done (in 000.s)
			No. of animals participated	incentive prizes given (Rs) societies				
1970-71	3734	4372	580	2700	121	237.44	70.99	72.24
1971-72	3816	4524	843	14085	134	241.99	102.67	132.94
1972-73	5224	4579	891	14905	176	299.71	114.77	144.56
1973-74	6801	4564	1202	15330	201	298.23	144.48	214.67
1974-75	8496	5930	1268	18960	201	398.72	143.32	201.24
1975-76	16673	11116	1243	18980	213	444.10	141.37	203.26
1976-77	17635	12165	1218	19000	213	461.28	152.80	226.17
1977-78	18524	14050	1289	18990	213	506.72	149.12	251.37
1978-79	23478	19182	1421	20000	197 *	524.57	167.86	391.10
1979-80	25271	21439	1423	20000	197 *	893.30	165.22	434.86
1980-81	25272	25560	1351	20000	197 *	949.09	163.56	316.15
1981-82	42075	29559	1298	20000	205 *	979.84	174.65	247.33

* Some ICDP subcentres were shifted to villages with larger bovine population

convinced of the importance of feeding of green fodder to their milch cattle & buffaloes.

This has lead to use of 388090 rooted slips of NB 21 & Gujarati grasses, 72782 kg of Lucern & 359700 kg of other seeds for growing fodder in the project area during 1981-82

People have also become aware of feeding balanced concentrate feed & 204030 quintals of concentrated feed produced in the dairy sector was used by cattle owners of the project area during 1981-82

III. *Dairy Extension & Milk Production.*

ICDP, Mehsana organises milk yield competitions at subcentre & project level, cattle fairs & calf rallies, exhibitions & film shows, subsidise rearing of male calves from high yielding buffaloes & recording of milk of such buffaloes. Table II gives the no. of animals which participated in subcentre level & project level milk yield competitions & the amount spent on incentive prizes during 1970-71 to 1981-82.

It can be seen from the table II that milk yield competitions have become popular & a large no. of cattle owners participate in it every year. These competitions have been very useful to locate high yielding Mehsana buffaloes & cows. It also helps to select male progeny of such animals for rearing them for breeding purposes.

Table II also gives the no. of village milk producers' coop. societies in project area and milk purchased by them during the period 1970-71 to 1981-82. The figures do not include the milk utilised by cattle owners for their family use, milk sold by them to private agencies & milk produced by cattle owners who have not become members of the village milk producers' coop. society. This non-accounted milk produced is quite substantial in quantity.

It can be seen from the table that even though the no. of village milk producers'

coop. societies covered by the ICDP Mehsana have more or less remained constant the milk purchased by them have shown consistent & substantial increase over the years. Apart from other socio-economic reasons this also shows impact of integrated activities of ICDP, Mehsana in the dairy & animal husbandry activities which have become quite renumerative over the years.

IV *Veterinary health care*

All the 100 subcentres of ICDP, Mehsana are manned by livestock inspectors. These subcentres provide primary veterinary treatment, vaccination against diseases like Haemorrhagic Septicaemia, Rinderpest & Foot & Mouth disease. Technical Officers of the project help them in diagnosis & treatment of complicated cases.

Table II gives the no. of cases treated and vaccinations done during 1970-71 to 1981-82. It can be seen that ICDP, Mehsana has provided veterinary health coverage to the animals covered under project area & also the cattle owners have utilised these facilities in an increasing manner.

Summary

Intensive Cattle Development Programme in Mehsana district has endeavoured to increase milk production by providing programme for controlled breeding, feeds & fodder development, dairy extension activities & veterinary health facilities in the Mehsana District. The contribution made by ICDP Mehsana has been discussed in the paper.

Acknowledgement

Grateful thanks are due to Dr. T. N. Vaishnav, Director of Animal Husbandry, Gujarat State, Ahmedabad for the encouragement & guidance.

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I.J.A.R. 3 : 1 : 50—52

DEVELOPMENT CORPORATION OF KONKAN LTD. (A Govt. of Maharashtra Uudertaking)

A Brief Note on Dairy Development Project

Warden House, 5th Fl., Sir P. M. Road, Bombay-400 001.

The Development Corporation of Konkan Ltd. has been set up with a view to bring about an overall development of Konkan region comprising of four districts viz. Thane, Raigad, Ratnagiri and Singhudurga. Since the dairying is one such important activity which has tremendous growth potentialities the Corporation, has therefore launched a plan for Dairy Development in Konkan Region.

Bull-Mother Farm

The Project got off to a fine start with the arrival of 137 exotic calf as gift from the Australian Society, '*For those who have less*'. The first lot of cattle arrived on 29th Nov. 1976, consisting of 106 females (38 holstein and 68 jerseys) and 7 males (HF 6 and Jersey 1) Second lot of cattle was received on 29/1/78, consisting of 23 females (17 HF and 6 Jerseys) and 1 Jersey male. The exotic cattle which have been received have formed a nucleus herd for the Bull Mother Farm.

Under passing of the gift programme 68 exotic animals below 1 year (64 females and 4 males) have been gifted to other agencies during the last five years, which was a condition attached to the gift of Cattle.

Cross Breeding with Chilled Semen.

One of the main objective of the project was to upgrade local non descript eattle in the region by cross breeding the local cows with exotic bulls semen. As a first step towards this, artificial insemination programme with Liquid semen was started with the commissioning of AI Centres at Kosbad, Dahanu and Palghar on 1st June 1978, gradually increasing to 12 centres. We also sent chilled semen to our A.I. centres in Karjat taluka Dist: Raigad.

Frozen Semen Bank

A Dutch voluntary agency (CEBEMO) came forward to donate equipments sufficient for starting 100 A.I. centres and equipments and Machinery required for setting up a frozen Semen Bank. Two Liquid Nitrogen Plants one of 25 litres and another of 5 litres per hour were received in 1979. The 5 Ltrs. capacity plant was commissioned on 17th March 1980, supplying LN2 to 17 A.I. centres under Western Ghat. The freezing of semen from exotic pedigreed bulls commenced from 18-11-1980, thus establishing frozen semen bank. The 25 Ltr. capacity LN2 plant was commissioned on 18-5-1981. Medium straw frozen semen of HF & JY are produced and used in the A.I. units in Konkan region. We also sell frozen semen at Rs. 5/- per strow. and Liquid Nitrogen @ Rs. 10/- per litre for bonafide use in connection with Live-stock development.

Extension Activities

The Govt. of Maharashtra under their GR (Planning Deptt.) No. GT 1179/4/ AFRC-3 dt. 12.2.1980 and 10.3.1980 have

sanctioned 17 A.I. centres to DCKL under Western Ghat Scheme, 10 in Ratnagiri district and 7 in Kulaba district. These centres started functioning w.e.f. 1st April 1980. The centres are being manned by Lay inseminators i.e. educated youths from local villages trained by us in A.I. centres and frozen semen Technology and supervised by supervisors and Development Officers.

Each A.I. Centre under Western Ghat has to cover 2000 breedable cow population. Each centre will therefore be consisting of 4 to 5 AI sub-centres and one such AI sub-centre will be covering 300 to 400 breedable cows. Establishment of the sub-centres has been taken up in a phased programme. Likewise 43 AI subcentre are functioning under WG Scheme.

Additionally the Govt. of Maharashtra has sanctioned 12 AI centres in Ratnagiri District to DCKL under UNICEF programme, vide their social Welfare Cultural Affairs Sports and Tourism Dept. Resolution No. ADP-1080/8402/ D-K dt. 10th Nov. 1980. One more frozen semen AI Centre at Dairy project, Dapchari Tq. Dahanu, Dist: Thane has been sanctioned to DCKL by the Govt. and started functioning w.e.f. 1-4-81. The work done under cross-breeding programme of the extension activities is enclosed in the Annexure.

Training Programme

a) *Training of Lady Inseminators* — 8 weeks duration. The training programme was a must for providing training to the Lay inseminators who have to undertake the A.I. activities at their AI centres. So far 89 inseminators have been trained at unit No. 16.

b) *Training of Farmers in Dairy Management* — 10 days to 2 weeks on modern technical lines training is provided at institution for training of the farmers and cattle owners. Under this about 400 farmers have been trained in them to undertake Dairying as business to earn their livelyhood. So far we have trained 304 farmers with the coordination of the SFDA authorit'es from Raigad & Ratnagiri and AFPRO New Delhi.

c) *Training of Tribal families in Dairy Management* — On Similar line Practical training courses for tribal families for one week duration have been conducted and 30 families have been Trained so far. The programme was sponsored by the Dairy Development Department.

New Projects

1. *Fodder Development Banks.*

It is proposed to undertake fodder development bank with the assistance of AFPRO at (1) Vashi (2) Ainghar (3) Lanja (4) Kadav.

These fodder development banks will be tied upto the AI sub-centres run by DCKL through which fodder extension activities will be undertaken.

2. *Embryo Transplant and Freezing of Embryo in Cattle.*

We shall be undertaking soon a pilot project on Embryo transplant and freezing of embryo in cattle. The project will be in collaboration with British Council, Indian Society for the Study of Animal Reproduction and Bombay Veterinary College. The actual work is expected to be started by October 1982.

Address of our Dairy Development Project.

Development Corporation of Konkan Ltd.
Dairy Development Project
Unit No. 16, Aarey Milk Colony
Goregaon (east) Bombay-400 065.
Tele No. 691275.

DEVELOPMENT CORPORATION OF KONKAN LTD.

WORK DONE OF CROSS BREEDING PROGRAMME UNDER THE ENTHUSIASM ACTIVITIES OF THE DEVELOPMENT CORPN. OF KONKAN LTD. TILL END OF APRIL 1982

Sr. No.	Name of the District	A.I. Main centres	A.I. Sub-centres inclusive of Main Centres	No. of villages covered	No. of breedable cows available in the area	Total No. of Artificial insemination performed	Tota INo. of Cross bred calves born
1	THANE	13 DCKL Centres	13	64	4540	5962	963
		1 Dapchari centres	1	1	1071	3283	161
2	RAIGAD	7 (W.G.)	18	57	5710	2353	249
3	RATNAGIRI	2 (W.G.)	6	10	2820	978	126
		7 (Unicef)	7	49	2970	1670	183
4	SINDHUDURGA	8 (W.G.)	19	39	6887	2099	232
		5 (Unicef)	5	28	2397	248	1
	GRAND TOTAL....		69	246	26377	16593	1915

Activities:

1. Established Exotic Cattle breeding HF & JY. Breed.
2. Established Frozen semen bank with two Liquid Nitrogen plants.
3. Undertaken Cross breeding programme in Thane, Raigad, Ratnagiri and Sindhudurg dists (Konkan Region) of Maharashtra with frozen semen.
4. Undertake training of Inseminators, farmers.

   Total expenses of these courses are

   a) Inseminators training — 8 weeks duration Rs. 1500/-

   b) Farmers training in Dairy Management — 2 weeks Rs. 300/-

FROZEN SEMEN AND LIQUID NITROGEN FOR SALE

a) Frozen semen straw — medium straws of HF & JY Cross bred @ Rs. 5/- per strow.

b) Liquid Nitrogen @ Rs. 10/- per litre.

ISSAR NEWS

Recommendations made at the Plenary Session of the All India Symposium on Dairy Farming Today and Tomorrow and Problems of Reproduction in Farm Animals held on 22nd, 23rd and 24th Decemer, 1981 at the, Bombay Veterinary College, Bombay-400 012.

RECOMMENDATIONS

1. It is essential to convert the fallow land into grass land by sowing Styloxanthus species grasses and fodder trees. All the institutions including Government and semi government organisations are requested to ensure maximisation of fodder production.

2. It is recommended that existing grass lands should not be converted into non-agricultural lands. State Governments are requested to implement this recommendation.

3. Research in non-conventional feeds and fodder and also year round fodder cropping be intensified by the I.C.A.R. Institutes and Agricultural Universities.

4. It is recommended that the National Seeds Corporation and the State Seeds Corporations undertake seed production of quality legumes and grasses.

5. It is recommended that the molasses supplied for feeding cattle should be above Grade 'C' only. The Central and State Govts. are requested to implement it rigidly.

6. It is recommended that fodder banks be established to ensure stability of prices all over the country.

7. It is recommended that research on managemental aspects of infertility problems in cattle and buffaloes be intensified by Agricultural Universities and National Institutes.

8. It is necessary to establish norms on physiology of reproduction in buffaloes viz. during growth, puberty, sexual maturity, oestrous cycle, pregnancy, parturition and postpartum period.

9. It is essential that progeny-testing of bulls be undertaken immediately and suitable milk recording system be evolved by the ICAR for implementation all over the country. The ICAR should participate in progeny testing programme on organised farms located in various states.

10. It is recommended that the Government of India and I.C.A.R. review the restrictions imposed on the import of frozen semen of exotic bulls and make it more pragmatic.

11. It is recommended that every bull intended for Artificial Insemination should be subjected to a thorough andrological investigation prior to its location at the A.I. Centres for breeding purposes. The State Govts. are requested to implement this recommendation by creating a suitable infra-structure involving the Gynaecology Departments of State Agricultural Universities.

12. It is recommended that research on embryo-transfer in all species of domestic animals be undertaken and intensified by ICAR, Agricultural Universities, National Institutes and private organisations.

13. Research on problems of infertility due to anoestrous condition in buffaloes be initiated and intensified by the ICAR with centres located in Agricultural Universities.

14. It is recommended that service facility for feed analysis be extended to

the farmers by the National Institutes and Agricultural Universities.

15. Research on recycling of agriculture and animal waste products for animal feeding be undertaken and intensified.

16. It is recommended that there should be a separate section dealing with Andrology with snitable infra-structure in the Depths of Animal Reproduction in each Agricultural University.

17. The Indian Society for the Study of Animal Reproduction greatfully acknowledges the grant of Rs. 5,000/- accorded by the Indian Council of Agril. Research, New Delhi, for holding this symposium (1981-82). It is recommended that such financial assistance be forthcoming in years to come in order to foster the cause of Animal Reproduction .

18. It is strongly recommended that there should be a separate panel for Animal Reproduction in the ICAR. with an Asstt. Director General (Animal Reproduction) for coordination of research in Animal Reproduction at the national level.

ISSAR Fellowship Awards:

The Fellowship of the Indian Society for the study of Animal Reproduction was bestowed upon the following dignitories for their meritorious contribution towards Animal Reproduction.

Seth Mannohhai Doongursee, Dr. G. B. Singh, Dr. A. S. Kaikini, Dr. M. R. Marathe, Dr. S. N. Luktuke and Dr. K. K. Vyas received the ISSAR. Fellowship Award at the hands of Dr. R. M. Acharya, Dy. Director General, Indian Council of Agri. Research, New Delhi at the inaugural function of the All India Symposium on Animal Reproduction held at Bombay on 22nd December, 1981.

ISSAR is happy to learn that the Indian Veterinary Association has bestowed the Fellowship Award on Dr. G. B. Singh, one of the founder members of ISSAR. ISSAR congratulates Dr. G. B. Singh, Professor Emeritus Punjab Agril. Univ. Ludhiana on this unique honour and wish him all the best.

Obituary

The members of ISSAR deeply mourn the sad and untimely demise of Dr. C. K. S. V. Raja, Prof. of Animal Reproduction, Kerala Vety. College Mannuthy, on 9.10.82. He was one of the founder members of ISSAR and took keen interest in the activities of ISSAR. He was instrumental in forming the Kerala Chapter of ISSAR.

He had established the Dept. of Animal Reproduction and raised it to the status of post-graduate Dept. in 1960's only. He had his training under late Prof. Emer. Nils Lagerlof of Sweden and was responsible for recording infertility problems in bovines, goats and swine. He had unique achievement of establishing a good rapport with the Directorate of A. H. & Vety. Services, Kerala State in respect of Sexual Health Control programme & infertility investigatcns. His passing away right in harness has snatched away a young, active and experienced Scientist in the field of Animal Reproduction. May his soul rest in peace.

THE INDIAN JOURNAL OF
ANIMAL REPRODUCTION
(SOUVENIR ISSUE)

Official Organ of the Indian Society
for the Study of Animal Reproduction

Vol. 3 No. 1 FEBRUARY 1983

All India Symposium on
Recent Research Trends in Factors Influencing Fertility in Livestock

Organised By

The Indian Society for Study of Animal Reproduction

In Association With

The Department of Veterinary Gynaecology & Obstetrics
College of Veterinary Sciences
Haryana Agricultural University, Hissar and The I.C.A.R.,

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Prof. & Head, Gynaecology & Obsts.
College of Vety. Sciences
H. A. U., Hissar-125 004

Abstracts of Papers for Presentation

SESSION : I

I.J.A.R. 3 : 1 : 56

Cytogenetic Studies of Murrah Buffalo-Bulls

A.K. Sharma, N.K. Vijaykumar, S.K. Verma, S.K. Khar, R.C. Gupta and N.K. Khurana

Department of Gynaecology & Obstetrics, College of Veterinary Sciences
Haryana Agriculture University, Hissar-125004

Cytological studies of 300 buffalo-bulls of Progeny Testing Farm, Hissar was carried out by culturing whole blood samples using T.C. 199 media (Difico). Although no chromosomal abnormalities were observed in these animals, but in a few cases polyploidy and aneuploidy of chromosome were observed. Autosomal monosomy (59, XY) was recorded in one of the bulls studied with a frequency of 0.9 per cent. Trisomies were not seen in the present study.

Studies on the General Characteristics of Caprine Fetal Fluids

R.A. Luthra, R.C. Gupta and S.K. Khar

Dept. of Gynaecology & Obstetrics, H.A.U., Hissar

The general characteristics of the caprine fetal fluids, like colour, pH, consistency, were studied in 12 goats at different stages of gestation. The colour of the allantoic fluid changed from light yellow to light brown and intense brown with the advancement of gestation, whereas the amniotic fluid changed to a colourless fluid. The consistency of the allantoic fluid remained watery throughout gestation, whereas the amniotic fluid became mucoid and gelatinous in later stages. No significant changes were observed in the specific gravity of both the fluids with increasing gestation, however, appreciable changes in the pH of the two fluids were observed with the advancement of gestation.

I.J.A.R. 3 ; 1 : 57

Enzyme Immuno-Assay (EIA) for Progesterone in Blood of Dairy Cattle—A Test for Field Use

S.K. Gupta, R.L. Dhoble and A. Rai

Indian Veterinary Research Institute, Izatnagar, U.P.

During the last two decades with the development of microestimation technique for steroid hormones advances in the field of clinical endocrinology could be made. Out of the various methods, Radioimmunoassay (RIA) was the one which has been widely adopted. However, RIA can be carried out only at laboratories which are specially equipped with adequate facilities for this purpose. Recently simple Enzyme-Immuno Assay (EIA) have been reported to successfully utilized, with equally dependable results.

The requirements, procedure, merits and limitations of EIA for progesterone in blood of dairy cattle are discussed. The preliminary observations suggest that EIA for progesterone can be used successfully in dairy cattle. Further more, EIA of progesterone in blood of dairy cattle can also differentiate the non-pregnant and pregnant cows.

Changes in the Pattern of Circulating Prostaglandin $F_2\alpha$, Luteinizing Hormone (LH), Estradiol-17β and Progesterone around Estrus and Ovulation in Buffaloes *(Bubalus bubalis)*

G.C. Jain and R.S. Pandey

Reproductive Physiology Laboratory,
National Dairy Research Institute, Karnal-132 001

Patterns of circulatory $PGF_2\alpha$, LH, estradiol-17β and progesterone were examined in three pleuriparous lactating Murrah buffaloes, daily on Day − 5, − 4, − 3, − 2, − 1, +2 and +3; 4 hr on Day 0 and 2 hr on Day +1 to observe the changes in the hormonal profiles before estrus, during preovulatory, ovulatory and post-ovulatory periods. The hormones were estimated by radioimmunoassay techniques. The average levels of $PGF_2\alpha$ ranged between 0.506 and 1.753 ng/ml from Day 2 before estrus to Day 3 after estrus with a significant difference ($P<0.05$) from Day +3 with Day +1 at 0500 hr of estrus symptoms. However, all major peaks were shown at the end of estrus and before ovulation on day +1 at 1500 and 1700 hr. The LH levels in all animals greatly fluctuated ($P<0.05$) in a pulsatile manner among days and time intervals of collection and the peaks were observed on different days of estrus. Two buffaloes showed peaks of 5.0 ng/ml and 39.71 ng/ml on Day +1 (Ovulatory day). The overall mean plasma estradiol-17β concentration ranged between 3.79 to 30.37 pg/ml

($P<0.05$) during estrus and ovulation with a major peak on Day 0 at 0700 hr and two other peaks of 22.48 and 21.39 pg/ml on Day 1 at 1500 and 0700 hr followed by another three minor peaks of 15.40, 14.83, and 14.54 pg/ml on Day 1, Day 2 and Day 0 at 0300, 0900 and 0900 hr, respectively. However, no significant difference was observed between animals and collection intervals on least square analysis of variance. The progesterone concentration was found maximum (0.726 ± 0.225 ng/ml) on Day 3 before estrus which gradually decreased to a maximum of 0.224 ± 0.032 ng/ml ($P<0.01$) on Day 1 of estrus of 0900 hr (around ovulation) and increased slightly on Day 2 after estrus indicating the beginning of the formation of CL. The correlation between $PGF_2\alpha$ and LH was positive ($r=0.307$ to $r=0.742$) during the first 24 hr of estrus exhibition (Day 0) and negative ($r=0.165$ to $r=-0.981$, $P<0.05$) on Day 1, whereas, the correlation between $PGF_2\alpha$ and estradiol-17β was negative ($r=-0.985$, $P<0.05$) during the later part of estrus and positive ($r=0.985$; $P<0.05$) on Day 2 before estrus. The correlation between $PGF_2\alpha$ and progesterone was negative on Day -2, -1, 0 and $+1$ of estrus and positive and significant ($r=0.746$ and $r=0.945$, $P<0.05$) at the end of Day $+1$. The interrelationship between LH and estradiol-17β was positive and significant ($r=0.999$) $P<0.01$, $r=0.805$ and $r=0.999$, $P<0.01$) on Day -1, 0 and $+1$ of estrus, whereas it was negative ($r=-0.995$ $P<0.01$, $r=-0.938$ and $r=0.499$) on day -2 and $+1$ of estrus with estradiol-17β and progesterone. The studies suggested that the size of estradiol-17β levels accompanied by the increase in $PGF_2\alpha$ and LH and decrease in progesterone levels were probably responsible for the act of estrus and ovulation in buffaloes.

Polypeptides from Ram Testis in the Regulation of Fertility

Natwar R. Kalla, S. Zarabi, R.K. Sharma and R.K. Vyas

Department of Biophysics, Punjab University, Chandigarh.

Luteinizing hormone receptor binding inhibitor (LH-RBI) has been isolated from the aqueous extract of ram testis using Sephadex column chromatography. Sephadex G-75 fraction I was found to inhibit the binding of I_{125} LH to rat testis receptors. Further purification of G-75-I fraction on G-200 column gave four fractions (I-IV), the maximum inhibitor activity to inhibit I_{125} LH binding to rat testis receptor was associated with the fraction I only. Fraction II gave marginal inhibition only, whereas fractions III and IV did not have any inhibitory effect on I_{125} LH binding to rat testis receptors. Our findings suggest that LH-RBI isolated from ram testis is a protein having molecular weight more than 10,000 Daltons. Sephadex G-75 fractions III-IV were found to inhibit the binding of I_{125} FSH to rat testis receptors.

Short term Variation in Peripheral Plasma Testosterone Among Growing buffalo male Calves and Mature Bulls

ANIL K. SURI and MOTI LAL MADAN

Animal Physiology, National Dairy Research Institute
Karnal (Haryana)-132001

To study the circulating androgene levels during growth and development in buffalo bulls, a study to quantitate the plasma testosterone was taken up in prepubertal and mature male buffalo. Blood plasma samples were collected at 12 mo. and 16 mo. of age in growing calves around 24 hrs at 4 hours interval and in mature bulls around 24 hrs at 2 hour interval. Plasma samples were quantified by using sensitive RIA technique. Each buffalo calf showed characteristics pattern of testosterone. The mean concentration of testosterone ranged from 0.15 ± 0.01 to 0.25 ± 0.04 ng/ml and 0.17 ± 0.02 to 0.22 ± 0.03 ng/ml at 12 mo. and 16 mo. of age during 24 hr period. In mature bulls, the mean testosterone plasma concentration ranged from 0.50 ± 0.29 to 1.84 ± 0.39 ng/ml. The lowest mean value was obtainedin the morning (8 AM) with value of 0.65 ± 0.38 ng/ml and the highest value was 1.79 ± 0.67 ng/ml in the evening (8 PM). Besides there were other episodic increases in the hormone levels during the 24 hours and each animal showed around 4 peaks. There was significant variation in testosterone among adult bulls ($P<0.01$) but there was no significant difference in growing calves in which no episodic pattern of the hormones was observed. The hormone variation around 24 hours could possible be due to inherent rhythms within the animals initiated around sexual maturity in these animals.

The present findings give evidence that the plasma testosterone levels in growing calves in low and the episodic pattern is related to the Pubertal functioning of the hypothalamic-hypophysial-gonadal axis.

Peripartum Plasma Progesterone and Plasma Prostaglandin Levels in Buffaloes

B.S. PRAKASH and M.L. MADAN

Animal Physiology, National Dairy Research Institute
Karnal (Haryana)-132001

Jugular blood samples were collected from 5 buffaloes on days 30, 15, 5, 2 and 1 prepartum, on the day of parturition, and at regular six-hourly intervals upto day 3 postpartum. Plasma progesterone and PGF levels were estimated from these samples by RIA procedures.

The mean progesterone values obtained at day 30 prepartum was 1.82 ± 0.13 ng/ml showed a gradual decline thereafter, with mean values of 1.56 ± 0.13 ng/ml, 1.4 ± 0.57 ng/ml, 1.21 ± 0.11 ng/ml at 15,5, and 2 days prepartum respectively. On day 1 prepartum the mean progester-

one level dropped sharply to 0.77±0.20 ng/ml. A further drop was observed at calving when a mean of 0.32±0.10 ng/ml was recorded. Thereafter the hormone concentration tended to remain low upto day 3 postpartum, showing minor fluctuations.

The mean plasma PGF levels showed little variation on days 30, 15,5 and 2 prepartum when the values recorded were 0.60±0.11 ng/ml, 0.75±0.08 ng/ml, 0.72±0.2 ng/ml and 0.71±0.06 ng/ml respectively. A substantial rise on day 1 prepartum followed by an abrupt increase on the day of parturition was observed in the PGF hormone concentration. The mean levels recorded for the two days were 1.86±0.52 ng/ml and 4.16±0.27 ng/ml respectively. A small drop to a mean of 3.39±0.36 ng/ml was observed at 6 hrs postpartum which declined gradually with minor fluctuations to a mean level of 1.3±0.23 ng/ml at the end of 72 hours postpartum.

Plasma Estradiol 17β, Progesterone and Cortisol Among Anestrus Rural Animals

M.L. Madan, S.M.K. Naqvi, C.V. Trieu, A.K. Suri and B.S. Prakash

Animal Physiology, National Dairy Research Institute
Karnal (Haryana)-132001

True anestrus animals were selected from among rural buffaloes for investigating the endocrinological profile in these animals. Regular blood samples were drawn from these animals for 24 days. Plasma estradiol 17-β, progesterone and cortisol was estimated using standard immunoassay techniques. Plasma estradiol levels among all animals were either undectably low or ranged between 10.00 pg/ml and 37.50 pg/ml. The plasma cortisol level, in all animals ranged between 0.40 and 5.90 ng/ml. There were no significant differences among animals with respect to cortisol, but animals differed with respect to estradiol 17-B. Some animals had progesterone levels consistantly low (0.14 to 0.36 ng/ml) while in others gradual changes during the experimentation reaching levels upto 4.0 ng/ml were recorded. The data identifies two conditions of anestrus resulting from different endocrinological patterns.

I.J.A.R. 3 : 1 : 61

Post-partum Plasma Progesterone and Cyclicity Among Buffaloes

S.M. Naqvi, A.K. Suri, B.S. Prakash and M.L. Madan

Animal Physiology, National Dairy Research Institute
Karnal (Haryana)-132001

In order to investigate the circulatory plasma progesterone relation to post-partum reproductive and productive activity among buffalo, progesterone was estimated by a sensitive Radio-immuno-assay from blood samples obtained from animals post-partum. The average concentration of progesterone on day 7, 15, 22, 30, 37 and 45 days post-partum was 0.59 ± 0.1, 0.46 ± 0.17, 0.52 ± 0.18, 0.45 ± 0.13, 0.92 ± 0.23 and 1.29 ± 0.43 ng/ml respectively. The mean plasma progesterone was higher on day 7th than on 15th and remained low upto 30th day. Beyond this day post-partum progesterone showed significant increase in levels. Progesterone profile in first post-partum estrous cycle differs from those in normal cycles. Asynchrony of behavioural, morphological and endocrine events was observed in early post-partum period. When progesterone values on different days were related to the productive ability of buffaloes, the values of low yielder buffaloes were constantly higher than high yielder, however, the mean differences between the two were not significant.

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Production and Characterization of Antisera Against Hypophysial and Thyroidal Hormones

M.L. Madan, A.C. Mathur and M.L. Khurana

Animal Physiology, National Dairy Research Institute
Karnal (Haryana)-132001

Production and characterization of specific antisera against hormonal compounds is a pre-requisite for any sensitive immunoassay technique of hormonal quantitation. Antisera has been raised against ovine follical stimulating hormone (OFSH) bovine luteinizing (bLH), bovine prolactin (bPRL), Tri-iodothyronine (T_3) and thyroxine (T_4) using two experimental protocols of subcutaneous and intradermal antigen administration route. While for hypophysial hormones the adjuvant hormones complex was prepared by directly homoganizing the respective hormones with Freund's adjuvant, for the thyroidal hormones, hormone-BSA conjugates were prepared by active esterification before emulsification with adjuvant. The antisera obtained was tested by immuno-diffusion and immunoelectrophoretic techniques and cross reactivity checked. The titre for the antisera raised and also tested further by comparative binding studies using isotopically labelled (125 I) antigen for each hormone. The radio-iodinated antigen binding has been worked out at different antisera dilutions. The antisera has been used for various assay systems, and the reliability of Radioassay methods employed determined.

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I.J.A.R. 3 : 1 : 62

Progesterone and Estradiol-17B Concentrations in Blood Plasma of Buffaloes during Different Reproductive Disorders

HARJIT KAUR, S.P. ARORA and AJAY SAWHNEY

National Dairy Research Institute, Karnal-132001

Six Murrah buffaloes in group I were fed as per NRC requirements and the same number in group II were kept at low level of nutrition. Blood samples were collected from all the buffaloes while showing estrus, anoestrus or even pregnancy, for estimation of progesterone and estradiol-17B. Progesterone levels were consistantly low during anoestrus period (<1.0 ng/ml), but, peak occurred on day-10 of the next following estrus indicating that luteal activity preceded the first estrus after a prolonged anoestrum. The estradiol-17B levels did not show any distinct trend during anoestrus and subsequent estrous cycles. The conception rate at first service was 66.67% in group I and 16.67% in group II buffaloes. The mean progesterone concentrations during early pregnancy were 6.12 ± 0.21 and 5.31 ± 0.29 ng/ml in groups I and II respectively which was persistent. However, plasma progesterone drop was recorded in buffaloes which aborted or showed foetal resorption, abrupt in the former case and at a slow rate in the later case.

Plasma Progesterone Levels in Different Reproductive Stages of She Buffaloes

RAJ PAL, S.V. VADNERE and P.C. SANWAL

G.B. Pant University of Agri. & Tech., Pantnagar.

Mean blood plasma progesterone levels in pre-pubertal, pubertal noncycling and pubertal cycling buffalo heifers and pregnant, lactating and induced lactating buffaloes were observed to be 0.53 ± 0.06, 0.37 ± 0.11, 1.56 ± 0.23, 2.01 ± 0.03, 0.56 ± 0.19, 0.48 ± 0.10 ng/ml of blood plasma respectively. The plasma progesterone values in pubertal cycling and pregnant stages were found to be significantly different from each other as well as from other reproductive stages. No significant differences were observed in progesterone values between prepubertal and pubertal noncycling heifers and between lactating and induced lactating buffaloes. Low progesterone levels in prepubertal, pubertal noncycling, lactating and induced lactating stages were due to absence of cyclic ovarian activity.

I.J.A.R. 3 : 1 : 63

Plasma Biochemico-Hormonal Estimations in Obstetrical Conditions in She Buffaloes

RAJPAL and S.V. VADNERE

Dept. of Gynaecology & Obstetrics, College of Veterinary Sciences,
G. B. Pant University of Agri. & Tech., Pantnagar, Distt. Nainital (U.P.)

In obstetrical conditions of retention of placenta and vaginal prolapse in buffaloes, the mean blood plasma values of total proteins, Alkaline phosphates; Cholesterol; Copper; Zinc; Iron and Progesterone were observed as 6.67±0.18; 8.20±0.64 gl/dl; 9.26±0.25; 8.14±0.36 k units/dl; 235.60±18.79; 203.06±5.40 mg/dl; 146.94±18.79; 73.38±11.86 ug/dl; 358.00±16.45; 342.00±26.40 ug/dl; 304.15±22.50; 192.59±19.46; 0.92±0.03 and 1.45±0.23 ng/ml respectively.

The cause of these high mean plasma values of total proteins, cholesterol and progesterone in obstetrical conditions may be attributed to the high levels of circulating hormones-estrogen and progesterone in such conditions.

Serum Testosterone and Thyroid Hormones Levels in Relation to Age and Sexual Development of Cross-Bred Bulls

S.P. AGARWAL, V.K. AGARWAL, NARINDER SINGH and P.K. DWARKANATH

Department of Veterinary Physiology,
Haryana Agricultural University, Hissar.

Blood samples collected from crossbred males of different age groups varying from 1 month to 4 years of age were analysed for testosterone, thyroxine and triiodothyronine by radioimmunoassay. The testosterone levels varied from non-detectable or a few picogram per ml at 1-2 months of age to 3.98 ng/ml in pubertal bulls. The pre and peripubertal bulls had a concentration of 1.4 ng/ml in the serum. The mean concentration of T_4 and T_3 varied from 26.7 to 60.5 ng/ml and 0.5 to 1.1 ng/ml, respectively, in animals under different age groups. The T_4 and T_3 levels were low at 1-2 months of age, elevated with age and attained peak levels at 8-12 months of age; thereafter the levels remained stable. T_4:T_3 ratio was almost constant through all stages of growth and development. The results indicated a testosterone level of 1.5 ng/ml as an index of impending puberty and a role of thyroid hormones in attaining puberty in crossbred bulls.

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Oestrus Synchronisation With Prostaglandins and Its Application In Early Breeding of Cattle

N. Baishya and G.S. Pope

National Institute for Research in Dairying,
Shinfield, Reading RG$_2$ 9AT, England, U.K.

The uterus is probably involved physiologically in the natural regression of the bovine corpus luteum (CL) with the release of a luteolytic factor known as the prostaglandin $F_2\alpha$ ($PGF_2\alpha$) and if so, is one of the complex of hormones controlling the timing of oestrus and ovulation. $PGF_2\alpha$ or its synthetic analogue cloprostenol when administered as a single dose to cattle at a particular stage (5-16 d) of the oestrous cycle causes rapid functional and morphological regression of the CL, resulting in a marked fall of circulating progesterone level followed by follicular growth, oestrus, pre-ovulatory peak of LH and ovualtion within 3-5 days. Extensive investigations have been directed towards detailed study of the course of this induced luteolysis and also towards evaluating suitable method(s) for the practical use of $PGF_2\alpha$ and cloprostenol in dairy cattle breeding programme.

In a series of experiments with $PGF_2\alpha$ and cloprostenol in Friesian heifers and lactating cows it is evident that more than 90% of the treated heifers exhibit oestrus within 96 h after the second of two injections of cloprostenol given 11 d apart and about 70% became pregnant to A.I. 72 h (single) or 72 and 96 h (double) after the second injection which is comparable to pregnancy rates of similar cattle inseminated at the naturally occuring oestrus. But the control of the timing of oestrus in lactating dairy cows by means of two injections, similar to the regime applied in heifers results in about 60-65% showing oestrus 48-96 h after the second injection with the pregnancy rates of about 35-40%.

For dairy heifers, cloprostenol treatment results in normal level of fertility rate after a fixed time A.I., eliminating the problems of heat detection but in dairy cows, the lower pregnancy rates have been obtained because (a) cows are inseminated earlier during post-partum period, (b) some cows may not have resumed normal oestrous cycles after calving and (c) some cows respond abnormally to treatment. Despite the lower pregnancy rates in cows, cloprostenol treatment may result in a reduced calving to conception period, indicating a good prospect of using PG treatment in early breeding of cattle.

I.J.A.R. 3 : 1 : 65

Serum Progesterone Levels as an Index of Early Pregnanoy in Buffaloes

A.S. Nanda, O.P. Takkar and R.D. Sharma

Department of Obstetrics and Gynaecology, College of Veterinary Science
Punjab Agricultural University, Ludhiana-141004 (India)

Investigations were carried out to study the serum progesterone levels on the day of estrus, day 20 and 23 in buffaloes which were latter inseminated and did not come in heat. Blood serum samples were collected from thirty buffaloes and were stored at — 20°C till processed for progesterone. Average progesterone concentration on the day of estrus was to be 0.42 ± ng/ml whereas the progesterone levels in the pregnant buffaloes fluctuated between 1.20 to 2.90 ng/ml and 1.00 to 4.30 ng/ml serum, on day 20 and 23, respectively. The predictions of pregnancy on the basis of progesterone concentration on day 20 and 23 were found to be 75% and 83.3%, respectively. Subclinical endometritis, early embryonic death, unusual length of estrous cycle, subestrus and anestrus seems to interfere with exact diagnosis of pregnancy in buffaloes.

Immunological Approach for Pregnancy Diagnosis in Buffaloes

Suresh Chander and R.C. Gupta

In order to explore the possibility of developing an immunological test for early pregnancy diagnosis in buffaloes, investigations were carried out on pregnancy specific antigens in this species. With the help of antiserum raised in rabbits against foetal membranes and foetuses of buffaloes at two months of gestation, at least one foetal tissue specific soluble antigen could be demonstrated. However, neither this antigen nor antibodies against this foetal antigen could be detected in the maternal circulation during pregnancy.

Peripheral Serum FSH, LH, Prolactin and Progesterone levels during various phases of reproduction in 'Non-Descript' cows and their cross-breds.

D.R. Pargaonkar, A.S. Kaikini, A.H. Sheth and (Mrs.) U.M. Joshi

Peripheral serum FSH, LH, Prolactin and progesterone hormones levels were estimated during the various phases of reproduction in Non-Descript (native) cows and their cross-breds. The native cows were found having weak endocrine constitution and the cross-bred heifers were found having higher trend of hormonal levels. The hormonal levels in Non-Descript cows and their cross-breds are being reported for the first time in the country.

I.J.A.R. 3 : 1 : 66

"Circulating levels of Progesterone in Pregnant Buffaloes" (Surti breed)

M.M. Pathak, C.D. Das, K. Janakiraman and G.P. Talwar

Reproductive Biology Research Unit, Gujarat Agricultural University, Anand Campus, Anand-388 110.

Progesterone concentration in blood serum was estimated by Radioimmunoassay. The blood samples were collected from fertile heat through 2 hr post-partum covering entire pregnancy. The overall average for progesterone during pregnancy was 2.82 ng/ml. All the animals except one, showed fall in progesterone concentration on second day post-Oestrus. Leaving that particular animal out, the average levels at, Oestrus and on Day-2 were 3.57 and 2.89 ng/ml., respectively. The Day-2 is the period around ovulation, subsequent to this the corpus luteum is in formative stages. Progesterone concentration showed a nonsignificant dip on Day-2 and then increased in circulation reaching the peak on Day-15 post-breeding with one more noticeable fall on Day-5. The fall in the levels on Day-5 may be due to the degeneration of luteal tissue and this stage may correspond to process of shedding the Zona pellucida, which is a pre-requisite for implantation.

Major spread of the gestation (Day 65 to Day 245) showed fairly low pregesterrone level with oscillating fluctuations. This indicates that low concentration of progesterone is sufficient to maintain the pregnancy after implantation. The average level of progesterone in early gestation was 4.10 ng/ml and that of mid-gestation was 1.69 ng/ml. The latter is considerably high compared to the averaged concentration prevailing at the normal luteal phase of the cycle.

There observed a specific and remarkable increase in the progesterone level during last month of gestation (4.15 ng/ml average). This rise started 25 days prior to calving and remained high till the day of parturition. It fell down significantly 2 hr pre-calving (2.91 ng/ml) and further decreased immediately after calving (1.26 ng/ml). Fall in the progesterone level and increase in oestrogen (Estradiol-17B) prior to calving perhaps maintained the ratio, required for labour initiation and normal parturition.

In the present study circulating levels of progesterone are mapped out, probably for the first time. The concentrations revealed appreciable oscillations against specific stage of pregnancy establishment and parturition. A pre-ovulatory rise in the progesterone concentration was noteworthy and reveal the participation of progesterone right from that time through all stages of pregnancy.

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Pineal Activity in Relation to Ovarian Structures and Breeding Seasons in the Water buffalo

M. Parameswaran and K. Janakiraman

Reproductive Biology Research Unit, Gujarat Agricultural University,
Anand Campus, Anand-388 110.

Pineal gland is known to be inhibitory to the reproductive system. With the objective of studying the biochemical changes in the pineal gland as influenced by seasons and to correlate with ovarian function the glands were harvested from surti buffaloes immediately after slaughter Nucleic acids and proteins were estimated according to standard procedures. Very high levels of DNA were present in follicular and luteal phases in low breeding summer season compared to respective phases in Winter. The ratios of RNA to DNA and Protein to DNA were highest at luteal phase, lowest in smooth phase and intermediate in follicular phase in Winter. The reverse was true for summer season. The results suggest that phases of oestrous scycle and breeding seasons influence pineal activity.

However pineal weight did not show correlation with body weight, phases of oestrous cycle or breeding seasons. Earlier histological studies in pineals from buffalo heifers have suggested greater mitotic activity in summer as evidenced by increased nuclei count and decceased calcarious matter.

Alkaline Phosphatase Activity in the Buffalo (Surti) Male Gonads

Lalita V. deshpande and K. Janakiraman

Reproductive Biology Research Unit, Gujarat Agricultural University,
Anand Campus, Anand-388 110.

Alkaline Phosphatase (AKP) activity in the biopsied testicular tissue of male buffalo calves was measured from birth to 600 days of age. The mean AKP activity ranged from 8.3 to 23.3 KA units/g of testicular tissue. Mean testicular AKP activity was high at birth (20.45 units/g) and correlated well with the high serum AKP levels at birth (mean 54.08 KA units/100 ml) recorded in earlier studies. Mean testicular AKP levels increased further at the age of one month (23.36 KA units/g). Both in testicular tissue and serum, AKP activity decreased till day 390. Unlike serum, in which enzyme activity decreased further, it increased to peak values at puberal period i.e. at 420 days (18.28 KA Units) and 450 days (19.35 KA units/g) in testicular tissue. The peaks in the testicular AKP activities at birth and during puberal periods were matched with the peak in serum testosterone levels during these periods, as recorded earlier. Puberal peaks in testicular AKP were not reflected in serum but associated with testosterone levels.

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Influence of Climate on the Relation of Total Reducing Sugars to Physical Characteristics of Buffalo Semen

O.P. Dhanda, M.L. Madan and M.N. Razdan

A study involving 5 Murrah bulls of 5 to 5½ years of age was conducted in order to establish the influence of climatic variables on total reducing sugars and physical characteristics of semen and the interaction of these elements with both during different seasons of the year. Fructose, total reducing substance (TRS) and ascrobic acid were estimated from neat semen. Before the estimation of these parameters, a part of each semen sample was examined for per cent motile sperms, per cent live spermatozoa and live and dead count. The correlation between various periods of the year and biochemical and physical characteristics were worked out. The results indicated that values for per cent motile sperms, live spermatozoa and live and dead count were maximum during cold closely following by mild cold and minimum in hot season. Almost similar trend was observed in terms of fructose, total reducing substances and ascorbic acid. However, the differences between periods in respect of total reducing substances and ascorbic acid were not statistically significant. Various correlation showed a definite impact of temperature and humidity on these parameters.

Clinical and Hormonal Studies in Bovines after Estrus Synchronization with 'PRID' Vaginal Spirals

V.P. Dixit, S.K. Khar, F.L. Seiciu and S. Voicescu

H.A.U., HISSAR.

PRID Vaginal spirals containing 2·3 gm. Progesterone and 10 mg. estradiol benzoate were used for estrus synchronization in 50 cows with varying durations of anestrus and 50 heifers of Holstein-Friesian breed, adapted to Romanian conditions. The animals were twiceinseminated at 48 and 72 hours after spiral removal. Five cows and five heifers, randomly selected, were bled by Jugular venipuncture on days 0, 1, 3, 6, 10, 12 and 14; and plasma assayed for estradiol-17 beta and progesterone levels. 21 out of 43 cows (48.8 %) and 32 out of 42 heifers (76.2 %) conceived after two inseminations. The plasma progesterone levels registered a significant increase in both cows and heifers, 24 hours after spiral introduction; thereafter declining steadily. The peak estradiol-17 beta levels were obtained on day 2 in heifers and day 3 in cows. These levels maintained a steady decline thereafter with the lowest values obtained on day 12. 48 hours later, these values increased significantly compared to day 0.

I.J.A.R. 3 : 1 : 69

Synchronization Studies on local and crossbred Cattle under Field conditions by using progesterone impregnated coils, Implants and prostaglandin F2α

SANJAY LOKHANDE, M.R. BHOSREKAR, Y.P. PHADNIS, P.H. JOSHI and D.V. RANGNEKAR

The Bhartiya Agro Industries Foundation, Urulikanchan

A tiral was undertaken by using progesterone impregnated sylastic coils with a gelatin capsule containing oestradiol benzoate. Implants having progesterone and prostaglandin F2α (lutalase)

The heifers and cows were selected and the sylastic coils were introduced in the anterior part of vagina with the help of vaginoscope the thread of the coil kept hanging outside vulva. The implants were introduced beneath skin at the back of ear. and prostaglandin F2α was given as intramuscular injection.

It was seen that all treated cows and heifers showed heat symptoms good to moderate and all were inseminated on predetermined time. The conception rate in coil group is excellent ranging from 54 to 66 per cent. Whereas in the implant group the conception rate ranged between 36 to 51 per cent while the PGF 2α showed the poorest results in heifers of crossbred and local breed conception rate being 26 and 23 per cent, respectively.

This is advantageous in respect of saving in calving to conception interval over controls as well as in saving botheration of heat detection.

SESSION : II

I.J.A.R. 3 : 1 : 70

Bacteriological Studies on Cases of Repeat Dreeders and Metritis in Bovines

B.R. Benjamin, V.K. Yadav, M.R. Ansari and M.K. Naidu

Indian Veterinary Research Institute, Izatnagar, U.P.

Attempts were made to study the prevalence of various bacterial organisms encountered in forty-six repeat-breeding and problem bovines presented at local Field Station, IVRI, Izatnagar, for diagnosis and treatment. The Predominant organisms isolated were, *Staphylococcus aureus*, *Escherichia coli*, *Corynebacteria* and *Achromobacter* spp. from cases of repeat breeding. Detailed bacteriological examination of the material collected from cases of metritis and cervicitis showed the involvement of *Pseudomonas pyocyanea*, *Corynebacterium pyogenes* and *Staphylococcus aureus*.

Antibiotic sensitivity tests for the isolates were carried out and it was observed that majority of the organisms were sensitive to oxytetracycline and tetracycline. The results obtained in the study may be of help in instituting suitable therapeutic measures.

Studies on Post Partum Anoestrus Condition in Surti Buffaloes

I.M. Shah, F.S. Kavani and S.B. Kodagali

Department of Gynaecology and Obstetrics
Gujarat Veterinary College, Anand-388 001.

Anoestrus condition influences the economics of milk production. The present work was undertaken to study the true anoestrus condition in Surti buffaloes, to assess the efficacy of an indigenous drug "Prajana" in induction of oestrus and fertile oestrus and to study the effect of season and body weight on reproductive performance.

In treatment group of 56 buffaloes with Prajana treatment, oestrus was induced in 46 (82.14%) buffaloes with mean oestrus induction interval of 15.48±3.55 days and 27 buffaloes conceived with mean interval of 31.95±9.14 days. In control group of 8 buffaloes, four buffaloes exhibited oestrus with mean interval of 31.25± 2.90 days but none of them could conceive. Statistically the treatments have been proved to have significant effect on oestrus induction. The results of Prajana injection and capsule group are almost same. There is no significant difference for results of oestrus and fertile oestrus induction between low breeding season (March to August), and high breeding season (September-February).

Body weight has been found to have effect on oestrus and fertile oestrus induction. As the body weight increases, the percentage of animals induced with oestrus induction and fertile oestrus are in increasing order.

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Assessment of Ovidnct Patency in Repeat Breeder Buffaloes

F.S. KAVANI and S.B. KODAGALI

Department of Gynaecology & Obstetrics, Gujarat Veterinary College, Anand.

In the present study 72 repeat breeder buffaloes were included and tested by air infusion using the insufflation apparatus. The buffaloes under study had repeated to an average of 8.2 services (range, 5 to 25) without pregnancy. The uterine catheter was passed up to the body of the uterus and air was infused. The back flow of the air was prevented. When pressure was raised and maintained at 200 mm/Hg., the test was indicative of tubal occlusion. An initial rise and then fall to a base line pressure signified patency of at least one of the fallopian tube.

Out of 72 buffaloes examined the test revealed 14 (19.45%), had bilateral tubal blocks. The infusion pressure groups were, 0-49, 50-99, 100-149, 150-199 and 200 and above mm/Hg. The average No. of services required under each group were 6.27 ± 0.47, 5.95 ± 0.28, 7.38 ± 0.59, 9.88 ± 1.18 and 13.36 ± 1.53, respectively. Analysis of variance showed significant difference on the measure of infusion pressure, and the number of services required. The mean number of services required under these groups differed significantly under DMRT.

The correlation between infusion pressure and No. of services required were studied. The over all correlation coefficient between air pressure and No. of services required was 0.31. However with each group the value of correlation coefficient was negative and low except in group first in which it was positive.

It can be inferred that infusion pressure has significant effect on No. of services required in repeat breeder buffaloes. However for such type of work still more detailed observation and studies are required to draw a definite conclusion.

Clinical Trials with 'Mastalone — U' Single Vs Double Dose

H.J. DERASHRI, F.S. KAVANI, S.P. NEMA and S.B. KODAGALI

Department of Obstetrics and Gynaecology
Gujarat Veterinary College, Anand-388 001.

Infertility in farm animals is of major concern to dairy farmers. Infection plays a major role by increasing the intercalving period and decreasing the production during the life-time of the animal. To combat the infection, clinical trials with Mastalone-U (single and double dose) were carried out in 98 (forty six buffaloes: 1st degree endometritis; 52 buffaloes: 2nd degree endometritis) Surti buffaloes.

Out of 29 buffaloes having 1st degree endometritis, when treated with double dose Mastalone-U, 22(75.86%) became pregnant with a mean fertile oestrus interval of 29.67 ± 19.64 days. Out of 17

buffaloes treated with single dose Mastalone-U, 11(64.71%) became pregnant with a mean fertile oestrus interval of 44.50±23.00 days. There was no statistically significant difference in the number of resulting pregnancies between these two groups. Also, the fertile oestrus interval in both the groups did not differ significantly.

Out of 35 buffaloes having IInd degree endometritis, when treated with double dose Mastalone-U, 24(68.57%) became pregnant with a mean fertile oestrus interval of 24.15±12.91 days. Out of 17 buffaloes treated with single dose Mastalone-U, 6(35.29%) became pregnant with a mean fertile oestrus interval of 47.00±30.69 days. There was statistically significant difference in the fertile oestrus interval (24.15±12.91) days Vs 47.00±30.69 days) between these two groups, post treatment. Also, the number of resulting pregnancies differed significantly 24(68.57%) Vs 6(35.29%).

From the above results it is apparent that double dose of Mastalone-U has beneficial effect in the second degree of uterine infections. This is evident from number of resulting pregnancies and the fertile oestrus interval.

Utero-Vaginal Prolapse in Gir Cows and Their Two Generation Crosses

S.P. Shukla and H.K.B. Parekh

All India Coordinated Research Project on Cattle, Livestock Farm Adhartal, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur-482004.

The study was conducted on 745 cows during last 10 years period. The animals included 315 Gir(G) cows and its crosses of 175 Holstein Friesian ($\frac{1}{2}$HF $\frac{1}{2}$Gir) and 75 Jersey ($\frac{1}{2}$J$\frac{1}{2}$G) females which were of first generation. From these first generation crosses, the following 3 bred cows 65$\frac{1}{4}$HF$\frac{1}{4}$J$\frac{1}{4}$G, 60 $\frac{1}{2}$J$\frac{1}{4}$HF$\frac{1}{4}$G and 55 $\frac{1}{2}$ Brown Swiss (BS) $\frac{1}{4}$HF$\frac{1}{4}$G females were produced. Study includes the incidence of utero-vaginal polapse in primiparous and multiparaous during different reproductive stages, recurrency of the condition, effect on milk production, reproductive performance and mortality rate subsequent to malady.

It was observed that the overall incidence of utero-vaginal prolapse was 3.29 per cent. Significantly more ($P < 0.01$) incidence of utero-vaginal prolapse (5.36%) was recorded in Gir females in comparison to their subsequent crosses. The incidence rose significantly ($P < 0.01$) from 0.80 per cent in primiparous cows to 3.38 per cent in pluriparous. The incidence of utero-vaginal prolapse during different reproductive phases i.e. prepartum, post partum and during heat was 1.08, 2.42 and 0.54 per cent, respectively.

The milk production and the expression of first post partum heat was not affected by utero-vaginal prolapse; while service period, number of AI per conception and calving interval was severely affected by utero-vaginal prolapse. The cows which became infertile or sterile subsequent to utero-vaginal prolapse was 72 per cent. The mortality rate was 16.66 per cent in Gir cows,

100 per cent in $\frac{1}{2}J \times \frac{1}{2}G$ and 20 per cent in $\frac{1}{2}HF \times \frac{1}{2}G$ cows.

It was concluded that the Gir cows were more prone to utero-vaginal prolapse in comparison to their subsequent crosses. The subsequent reproductive efficiency was severely affected in utero-vaginal prolapse cases.

Effect of Vaginal Administration of Fertivet in Anestrous Buffaloes

S.R. Pattabiraman, V.N. Seshagiri, T.G. Devanathan and T.M. Thangaraj

Department of Clinics, Madras Veterinary College, Madras 7.

Oral administration of Fertivet was reported by several workers to induce estrum in cows and buffaloes. Recently intra abomasal injection of the drug was tried to reduce the cost per treatment.

In the present report two tablets of "Fertivet" was powdered and suspended in 10 ml of distilled water and then deposited near the vaginal fornix with the help of a catheter by rectovaginal Technique.

In all 34 she buffaloes with the history of prolonged post partem anestrum and with no palpable corpus luteum on repeated clinical examinations were included in the study. Of which 24 formed the treatment group and the rest 10 formed the control group. All the animals were examined daily for the five post treatment days and again on 10th day for the development of corpus luteum.

In the fertivet treated group 22 animals (91.6%) responded within five days. In majority of the animals (18/22) the response was noticed within 2 to 3 days. The most characteristic and consistant change was development of uterine tone by 2nd day which gradually subsided by 5th day post treatment. Eventhough the follicular development was noticed in all the treated animals only 18(81.8%) animals revealed palpable courpus luteum on 10th day post treatment. Only 4 animals (18%) manifested signs of heat while the rest were all silent.

It is considered that vaginal administration of 2 tablets of Fertivet induces ovulatory silent estrum and the results compare favourably with other modes of administration of the drug.

I.J.A.R. 3 : 1 : 74

Biochemical and Haematological Status of Blood in Anestrus Crossbred Cows

R.B. Prasad, K.G. Kharche and O.P. Shrivastava

Department of Veterinary Obstetrics and Gynaecology
College of Veterinary Science and Animal Husbandry, Jabalpur, (MP)

Study was conducted on 80 anestrus crossbred cows maintained at the Military Dairy Farm, Jabalpur (M.P.). Cows that did not exhibit estrus for 90 days or more postpartum, were selected for study. The experimental animals were of the age between 4 to 12 years with an average of 8 years. Blood was collected from the external jugular vein with all aseptic precautions from each experimental animal. For the estimation of blood chemical constituents the serum was carefully separated and kept in the deep freeze at — 15°C until assayed. Far the haematological studies the blood was collected in a vial containing anti coagulant.

The blood glucose concentration ranged from 32.37 to 102.0 with an average of 65.43 mg per cent in anestrus cows as compared to 45.87 to 89.32 mg per cent with an average of 66.39 mg per cent on day of estrus. The serum calcium levels at estrus and during anestrus averaged 10.18 and 9.98 mg per cent respectively. The phosphorus to calcium ration decreased to 1:1.31 *at estrus, while it was* 1:1.33 *in anestrus animals*. The cholesterol concentration in anestrus cows ranged from 107.95 to 321.89 mg per cent with an average of 224.44 mg per cent as compared to 163.68 to 327.95 mg per cent with an average of 245.42 mg per cent on the day of estrus.

The haemoglobin concentration ranged from 7.0 to 13.8 g per cent with an average of 10.61 g per cent on the day of estrus while in anestrus the average value was low (10.54 g per cent) and ranged from 6 to 13.8 g percent. The mean total leukocyte count (10.33×10^3 cells (CV MM) in anestrus cows was high as compared to that of the day of heat (10.09×10^3 cells/cu mm). The mean differential leukocyte count of neutrophil and lymphocyte (30.83 and 64.08 per cent respectively) was slightly higher as compared to the count (30.61 and 61.38 per cent respectively) when the animals were in anestrus.

I.J.A.R. 3 : 1 : 75

Response of non-hormonal agents on on Sexual behaviour and Semen Quality in Jersey bulls

S.M. KHAN and K.G. KHARCHE

Department of Veterinary Obstetrics & Gynaecology,
College of Veterinary Science & A.H., Jabalpur-482 001 (M.P.)

The study was done for six months (October, 81 to March 82) on eleven Jersey bulls belonging to the Central Semen Station, Intensive Cattle Development Project, Jabalpur (M.P.). All the bulls were kept under uniform feeding and management practices during the entire period of investigation. On the basis of individual performance four bulls were segregated as unsound and treated under two treatment groups of two bulls each. Reaction time was recorded as 80.00±11.07, 68,00±12.44 and 48.33±6.96 seconds in pre, during and post treatment periods respectively in the bulls of Saxon groups. The corresponding values in the bulls of Tentex forte and Speman groups was recorded as 190.00±21.85, 101.25±29.53 and 89.16 ±16.19 seconds respectively. Apparently reduction in reaction time in the bulls of both the groups was observed during and further more in the post treatment periods. A remarkable improvement in libido was recorded during and furthermore in the post treatment periods in the bulls of both the treatment groups.

Improvement in reaction time characteristics of libido, volume/density, Gross motility, mass motility, M.B.R.T. Initial pH, Sperm concentration and percentage of abnormal sperms were recorded during and also in post treatment periods in the bulls treated with Saxom and combined therapy of Tentex forte and Speman powder. Apparantly improvement in semen characteristic was noticed with Saxom and combined therapy of Tentex forte and Speman with significant improvement in Gross motility, reduction in percentage of abnormal spermatozoa and M.B.R.T. with Saxom therapy. However, significant improvement in Gross motility with the combined therapy of Tentex forte and Speman was noticed.

Studies on Causes and Treatment of Anestrus in Crossbred Cows

R.S. PRASAD, K.G. KHARCHE and O.P. SHRIVASTAVA

Department of Veterinary Obstetrics & Gynaecology,
College of Veterinary Science and Animal Husbandry, Jabalpur (MP).

Study was conducted on 80 anestrus crossbred cows maintained at the Military Dairy Farm, Jabalpur (M.P.). Cows that did not exhibit estrus for 90 days or more postpartum were selected for study. Gynaeco-clinical examination was done twice in a cycle at an interval of 10 to12 days. Rectal examination was done for ascertaining the ovarian activity and the genital status of the animals. Pregnant cows as well as those showing clinical and palpable pathological changes of the

reproductive tract were excluded. The experimental animals were of the age between 4 to 12 years with an average of 8 years. The parity ranged from second to sixth calver. For observing the response to remedial measures, three drugs were selected and tried as detailed below:

(1) Fertivet tablet (Ar-Ex Laboratories)
   (A) Fertivet tablets
   (B) Fertivet tablets with copper sulphate
(2) Secrodyl injection (Allenburys)
(3) Lugol's iodine combined with Utero ovarian massage.

To evaluate the efficacy of the lines of treatments mentioned above, a control group consisting of 20 anestrus cross-bred cows was maintained and no treatment was given to the animals of this group. In treatment group 20 anestrus animals were treated with each drug.

The ovaries were smooth in 65.0 per cent cows, 18.75 per cent cows had persistent corpus luteum, 2.50 per cent cows had corpus luteum of the estrous cycle and 15.0 per cent cows had cystic ovaries. Tonicity of the horns differed markedly during different stages of the estrous cycle. There was no apparent anatomical or pathological derangement of the reproductive tract in the experimental cows. Percentage of animals showing heat was 60.0, 80.0, 60.0, 45.0 and 10.0 in fertivet, F.V.T. with copper sulphate, secrodyl, lugol's iodine combined with utero-ovarian massage and control group while the conception rate was 50.0, 62.5, 41.67, 44.44 and 0 per cent respectively.

Studies on the Efficacy of some Post Service Intrauterine Infusions on the Conception Rate of Repeat Breeding Cattle

R.C. Gupta and A.K. Sinha

Dept. of Gynaecology & Obstetrics, College of Veterinary Sciences,
Haryana Agricultural University, Hissar-125004, HARYANA.

The intrauterine treatment for repeat breeders has been a subject of considerable controversy with reports of success as well as failures. The present communication deals with the results of intrauterine treatments with different drugs infused postinsemination. The study was conducted on 397 repeat breeding cross-bred cattle maintained at College of Animal Sciences Farm, H.A.U. Hissar. The drugs infused were lugol's Iodine solution, Streptopenicillin, single and double doses of Mastalone-U Pfizer Limited and only distilled water infusion. The control group received no infusion. The efficacy of streptopenicillin, Lugol's solution and single and two vials of Mastalone-U and of distilled water infusion was compared on the basis of conception rate with that of control. The results indicated that there was not statistically significant difference between the treated and untreated control groups except that treatment with double vials of Mastalone U the conception rate significantly low. The results indicated that the efficacy of intrauterine infusion post A.I. may be of little value in increasing the conception rate.

I.J.A.R. 3 : 1 : 77

Clinical Evaluation of Magestrol Acetate and Ethinylestradiol* For Treatment of Anoestrous Buffaloes

Uma Shanker and R.P. Verma

Livestock Production Research (Cattle & Buffalo)
Indian Veterinary Research Institute, Izatnagar-243 122.

Twenty six Murrah buffaloes of the Institute Farm who were reported anoestrus due to smooth and inactive ovaries were taken for this clinical trial. Sixteen were kept in treatment group and ten as control. A dose of 10 mg Magesterol acetate and 0.06 mg Ethinylestradiol in 2 ml oily base through i/m route were given for two successive days in treatment group. In control group, two ml normal saline were given through i/m route for two successive days. All the 26 animals were shown to a teaser buffalo bull morning and evening for a period of 15 days post treatment.

Following treatment, out of 16 buffaloes, 15 (93.75%) came in estrus within 7.26± 0.24 days (range 3-15 days). The intensity of induced estrus on external appearance was slightly weaker than natural estrus but the estrus fern pattern was normal. The overall incidence of ovulation at induced estrus was observed in 12 (75%) buffaloes. The overall conception rate at induced estrus was (13.33%). Six (40%) animals showed subsequent cycle length after induced estrus at 22 days (range 22-25 days) and one (6.66%) animal showed the short cycle. In control group, two (20%) animals came into estrus but non-conceived.

* Secrodyl Injection, Allenburys, Glaxo Laboratories (India) Limited, Bombay.

Treatment of Suboestrus in Buffalo Cows (Bubalus bubalis) with Prostaglandin Analogue

B. Neduncheralathan, K.S. Narashiman and V. Venkataswami

Department of Obstetrics and Gynaecology,
Madras Veterinary College, Madras 7.

Successful induction of oestrus monitored by its different parameters within four days of injection of a single dose of cloprostenol in twenty one of the twenty-five graded Murrah buffalo cows (84 per cent) with a history of a post service anoestrus is reported. Amongst parameters studied which showed parallelism between the induced and spontaneous oestrus, the notable was the vulvar lip thickness which could be relied upon as a common yard stick for determining heat. Of the twenty one animals that were in heat and inseminated, only seven constituting 33.33 per cent conceived, which can be regarded as an acceptable level of fertility in buffaloes treated with Prostaglandins.

I.J.A.R. 3 : 1 : 78

Clinical Andrological Investigations in Surti Buffalo Bulls

S.P. Nema and S.B. Kodagali

Department of Obstetrics and Gynaecology
Gujarat Veterinary College, Anand-388 001.

A study on 32 Surti buffalo bulls (Bubalus bubalis), located at A.I. centres was undertaken on clinical andrological aspects. The buffalo bulls were in the age group of 26 to 131 months. They were thoroughly examined for general and special sexual health. Out of them two bulls (6.25%) had low sex libido, one buffalo bull (3.125%) had an umbilical hernia and four (12.5%) others had mild testicular torsions. One buffalo bull (3.125%) consistantly gave lower ejaculate volume (1.16 ± 0.17 ml.).

A total of 100 ejaculates were collected from 30 buffalo bulls. Out of them 38 proved to be static (initially non motile) samples. Three buffalo bulls (9.375%) repeatedly gave static ejaculates.

Based on the overall sexual performance these 32 bulls could be grouped into I, 13 bulls (40.625%) with excellent sexual function II, 11 bulls (34.375%) within normal limits of sexual function III, six bulls (18.75%) with questionable sexual function and two bulls (6.250%) in poor sexual function group.

The problem of arrested motility warrants, further detailed investigations. Involvement of genetical factors though not fully investigated cannot be ruled out.

Efficacy of Garlic (Allum Sativum) Treatment Against Non-Specific Uterine Infections in Repeat Breeding Cows

G.M. Garg, S.V. Vadnere and V.D. Sharma

Department of Gynaecology & Obstetrics, College of Veterinary Sciences,
G. B. Pant University of Agriculture & Technology, Pantnagar, Distt. NAINITAL, U.P. (INDIA)

Twelve repeat breeding cows, having no apparent abnormalities of the genital tract but harbouring microbes in their reproductive tracts, were treated with garlic extract. Following 2 to 3 intrauterine infusions with 20 ml of 1:5 garlic extract, cervical mucus samples from all the animals were found to be microbiologically negative and seven (58.33%) of them became pregnant. The causes of nonconceptions are discussed.

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I.J.A.R. 3 : 1 : 79

Studies on Follicular Patterns in Buffalo-Heifers

GURDIAL SINGH, S.S. SHARMA and G.B. SINGH

Department of Obstetrics & Gynaecology, College of Veterinary Science
Punjab Agricultural University, Ludhiana-141004 (India)

Studies based on frequent rectal palpations for nine months, in sixty-one Murrah buffalo heifers (7 postpubertal + 24 attained puberty during the study + 30 prepubertal) were undertaken to observe the patterns of exhibition of large follicles (0.80 cm) on the ovaries of prepubertal, peripubertal and postpubertal heifers. The average sizes of large follicles in prepubertal, peripubertal and postpubertal heifers were 1.25, 1.35 and 1.36 cm., respectively. In 65.39 per cent of the postpubertal heifers midcycle follicles (0.80 cm) could be successfully palpated from day 9 to 13 of the estrous cycle. Moreover, the development and atresia of large follicles in heifers were found to be a continuous processes and follicles were exhibited on the ovaries regularly at intervals of 10-11 days.

Compatibility Between Serum Progesterone Profile and Clinical/ Rectal Palpation Findings in Normal Cycling and Subestrous Buffaloes

F.S. CHAUHAN, R.D. SHARMA and G. B. SINGH

Department of Obstetrics & Gynaecology, College of Veterinary Science
Punjab Agricultural University, Ludhiana-141004 (India)

Investigations into compatibility between progesterone profile and rectal palpation findings on 6 normal cycling and 42 subestrous buffaloes were conducted. Serum progesterone levels in normal cycling buffaloes ranged from 0.04 to 0.42 ng/ml in follicular phase and 0.5 to 2.81 ng/ml during luteal phase. Compatibility between progesterone profile and palpation of follicle and corpus luteum in normal cycling buffaloes was observed to be 100% and 83%, respectively. Serum progesterone levels during follicular and luteal phases in subestrous buffaloes were comparable to those of normal cycling buffaloes. High compatibility (100%) was observed between progesterone profile and palpation of follicle. However, compatibility between progesterone profile and palpation of CL ranged from 66.6% to 83.3% in subsestrous buffaloes. Over 83% compatibility was observed between progesterone profile and clinical observation on induced luteolysis in buffaloes. It was observed that $PGF_2\alpha$ was effective at 30 mg i/m dose level. A low compatibility (50%) between progesterone profile and clinical observation on induced luteolysis with 2.5 mg and 5.0 mg i/u or i/c $PGF_2\alpha$ dose level suggests that either the doses were inadequate or deposition of the drug was not at proper place. The study has demonstrated the utility of hormone assay concurrent with clinical findings in the diagnosis and treatment of subestrous buffaloes.

I.J.A.R. 3 : 1 : 80

Blood Glucose and Serum Protein Levels in Cows Retaining Fetal Membranes

J.C. Dutta and Y.G. Dugwekar

Department of Obstetrics & Gynaecology, College of Veterinary Science,
Punjab Agricultural University, Ludhiana-141004 (India)

The blood glucose levels were estimated in 15 cows retaining fetal membranes (FM) and 15 cows without FM retention. The mean blood glucose levels of 49.73 $\pm$1.40 mg per cent on 270th day of gestation in cows retaining FM was lower than control animals (59.31$\pm$2.92 mg per cent). Further, there was a rise in the blood glucose levels in both the groups of cows at 12 hours post-partum and by 10th day post-partum the values came down to the pre-partum level. However, on all the days of sampling the cows with retained FM had significantly lower blood glucose levels than the control group.

The mean levels of serum total proteins, albumin, globulin and A/G ratio on 260th day of gestation were 5.94$\pm$0.30; 2.95$\pm$0.16; and 2.99$\pm$0.22 gm% and 1.01$\pm$0.16, respectively, in cows retaining FM and 6.72$\pm$0.27; 3.28$\pm$0.17; and 3.44$\pm$0.15 gm% and 0.97+0.27. respectively, in cows not retaining FM. These levels remained almost unchanged till 10th day post-partum in both the groups. The levels in cows not retaining FM remained higher than those retaining FM till 10th day post-partum, however, the differences were not statistically significant.

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Genital abnormalities in indigenous and exotic female pigs : Prevalence, gross and microscopic appearance

S.A. Singh, K.C. Nath, C.K. Rajkonwar and A.K. Chakraborty

Histopathological study was carried out on 82 indigenous and 38 exotic female pig genital organs collected from the local slaughter houses of Gauhati and A.I.C.R.P. on pigs, College of Veterinary Science, A.A.U. Gauhati. Out of 82 indigenous and exotic genital organs respectively 34.15 and 47.37 per cent revealed abnormalities. The incidence of ovarian, tubal and mixed ovarian and tubular abnormalities was 8.54, 7.32 and 18.29 per cent respectively in indigenous and 13.16, 10.53 and 23.58 per cent respectively in exotic pigs. Ovarian abnormalities were single cyst, multiple small cyst, multiple large cyst, cystic corpora lutea, paraovarian cyst, ovaro bursal adhesion, oophoritis, intra-ovarian haemorrhage and haemosiderosis in the frequencies of 1.22, 3.66, 0.00, 3.66, 15.85, 4.88, 14.63, 3.66 and 3.66 per cent respectively in indigenous and 5.26, 10.53, 2.63, 2.63, 31.58, 5.26, 10.53, 5.26 and 2.63 per cent respectively in the

exotic. Small ovarian cysts did not reveal pathological change on microscopic examination while atrophy of the ovarian stroma was the important pathological change observed in multiple large cysts. Oophoritis, intro-ovarian haemorrhage and haemosiderosis were apparent on microscopic examination only. Abnormalities involving the tubular part were hydrosalpinx, fibroma molle, pyosalpinx, cystic endometrium, segmental aplasia, granular vulvo-vaginitis, persistent hymen, subserous cyst, salpingitis, endometritis, papillary hyperplasia, haemosiderosis, melanosis, metaplastic changes, cervicitis and vaginitis in the respective frequencies of 2,44, 1.22, 0.00, 6.10, 2.44, 4.88, 2.44, 2.44, 12.20, 20.73, 13.41, 2.44, 0.00, 6.10, 14.63, and 18.29 percent in indigenous and 0.00, 0.00, 2.63, 7.89, 2.63, 5.26, 13.16, 0.00, 7.89, 15.79, 10.52, 0.00 2.63, 7.89, 13.16 and 23.68 per cent in exotic. Papillary hyperplasia, haemosiderosis and metaplastic changes of the epithelium were apparent on microscopic examination only and were associated with inflammatory changes. Inflammatory changes were typical in salpingitis, cervicitis, endometritis and vaginitis. Denudation of the mucous membrane was observed in salpingitis and endometritis.

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Abnormalities in boar spermatozoa

MADAN K. TAMULI and C.K. RAJKONWAR

Deptt. of Gynaecology, Obstetrics & A.I., College of Veterinary Science,
Assam Agril. University, Khanapara, Gauhati-781022. ASSAM.

A total of 126 semen ejaculates were collected from five Landrace boars. Different types of head abnormalities, mid-piece abnormalities, tail abnormalities and acrosomal abnormalities of spermatozoa were studied in semen smears and recorded under a detailed classification. The incidence of total head abnormalities, mid-piece abnormalities, tail abnormalities, major sperm cell defects and acrosomal abnormalities were 2.01, 17.01, 1.20, 2.92 and 3.11 per cent respectively which varied significantly ($P<0.01$) from boar to boar.

A comparative Study on the Treatment of Chronic Endometritis with Prostaglandin and Antibiotics

F.S. CHAUHAN and O.P. TAKKAR

Department of Obstetrics & Gynaecology, Department of Animal Science,
Punjab Agricultural University, Ludhiana-141 004 (Punjab)

Investigations into the treatment of chronic endometritis on 49 crossbred cows and buffaloes were conducted. The animals were divided into 3 groups. Group I and II received 5.0 mg prostaglandin (Lutalyse, Upjohn Ltd., U.K.) twice at 11-12 days apart during estrus and luteal phase (group I) and luteal to luteal phase (group II). On induced estrus the animals were not inseminated and sexual rest was given. On subsequent estrus they were inseminated. Group III was treated with Mastalone 'U' (Pfizer Ltd) i/u for 3 consecutive days during

estrus. On next estrus they were inseminated. Fertility results were compared between two groups. Overall conception rate in cows following treatment in group I, II and III was 66.6, 100.0 and 85.5 % respectively. Whereas, conception rate in buffaloes was 44.4, 30.7 and 57.1 % in group I, II and III, respectively. These results have shown that antibiotics treatment has given better results as compared to prostaglandin treatment.

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Vesiculectomy in Buffaloes

D. JOHN

Scheme for the Control of Abortion in Cattle,
Tiruchirapalli, Tamilnadu.

Technique of vesiculectomy with relevance to research and therepeutic value has been described.

Ovariectomy in granulosa Cell tumor by Ischio-rectal fossa

D. JOHN

Technique of ovariectomy by Ischiorectal fossa has been described.

"Pyogenic infection of the genital tract with Stricture of the Vagina in a Crossbred heifer"

K.S. NARASIMHAN, D. JOHN, T. RAJASEKARAN and S.A. ASOKAN

The present communication is intended to place on record a rare condition of cavitation of and filling up of genital tract including the uterus and the cervix with purulent material due to vaginal stricture in a crossbred heifer. Because of this condition, the animal showed symptoms of unabated tenesmus for sometime. The vaginal septum was incised and the passage widened by blunt dissection. About six litres of purulent material was drained. Histopathalogical examination of the biopsied endometrium revealved necrosis of the surface epithelium with leucocytic infiltration, atresia of the endometrial glands and distension of the remaining endometrial glands. The purulent material on cultural examination revealved proteus species. The authors believe that the vaginal stricture could have been the outcome of a forced natural service, which would have possibly caused trauma, cicatrization and infection.

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Testicular Degeneration due to suspected Aflotoxicosis in Murrah Buffalo Bulls (Bubalus bubalis)

K.S. Narasimhan, V. Venkataswami, B. Neduncheralathan D. John and D. Kathiresan and H.C. Shamanna

Two young Murrah buffalo bulls belonging to a cooperative Milk producers federation were reported to be non servers. They showed such symptoms as were highly suggestive of aflatoxicosis. One of them eventually died. Haematological estimations of its blood revelead low haemoglobin value and a low serum protein level while the biochemical estimations showed a high level of S.G.O.T. and S.G.P.T. The serum from the other bull showed a high level of S.G.P.T. The histopathological examination of the biopsied testes showed evidence of severe testicular degeneration. Liver tissue of the dead animal revealed diffuse fibrosis and hyperplasia of the bile ducts which are highly suggestive of chronic and prolonged intoxication probably due to afalatoxicosis.

Lymphocytic infiltration in the bovine endometrium in relation to fertility

A.K. Sinha, J.M. Nigam and D.N. Sharma

Deptt. of Gynaecology & Obstetrics. College of Veterinary Sciences, HAU, HISSAR 125004

Extent of lymphocytic infiltration in the endometrium of bovines during standing estrus has been found to be associated with the fertility of the animal. A technique for the scoring of lymphocytic infiltration in the endometrium has been developed. It was observed that fertility of the animal reduced when the lymphocytic infiltration score (I.S. value) was above 0.5 and increased significantly ($P < 0.01$) when the I.S. value decreased below 0.5. In cases of endometritis majority of endometrial samples (58.55%) showed an I.S. value above 0.5. The use of this technique for the diagnosis of subfertility and endometritis has been discussed.

A case of occlusion of uterine passage

K.C. Achar

A. I. Officer, A. H. Dept. Gangtok.

A case report on occlusion of uterine passage and its method of handling has been described.

SESSION: III

Studies on the uterine involution in goats

P. Baru, S.K. Khar and R.C. Gupta

HAU, Hissar.

The uterine involution in goats was observed to be complete by day 19 post kidding. The changes in the uterine size, shape, weight and thickness of the uterine wall were rapid till day 7 post kidding, following which they continued at a slower rate. Morphologically the uterine caruncles also appeared to be completely involuted by day 19. However, the histological picture of the uterine structnres was completely restored by day 26 post kidding.

Management factors to puberty and inter-calving periods

K. Janakiraman

Reproductive Biology Research Unit, Gujarat Agricultural University,
Anand Campus, Anand-388 110.

All farm born Calves are weaned at birth. Colostrum is fed around 15 minutes. The calf rearing system followed gives a weight gain of 440 g/per day from birth through maturity. Farm born calves showed ovaries with palpable follicles from 9th month onwards. (majority from 10th month). Ovulation could be detected by 13-14 months and even earlier. Regular cycles with established C.L. were observed by 15-16 months of age with a body wt of 230-240 kg. Like the females males were also seen to reach maturity around 16 months (fertile service) with a body weight of 260-280 kg.

The corpus luteum of pregnancy goes down completely by 5-7 days after parturition. Fresh follicular activity starts at this. By the end of 2nd week post-partum well developed follicles are palpated and first heat (as detected by the frequent urination) is shown within the 1st month (around 25 days) in most cases. Uterine involution is completed on an average by 29 days (range 25-35). The second heat which occurred around 50 days post-partum was used for breeding. Endocrine status was also studied during this period. Both puberty and inter-calving periods are factors very much dependent on management factors. In Surti buffaloes very optimum levels are obtained which are of economic importance.

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I.J.A.R. 3 : 1 : 85

Influence of Bulls and the Periods of Inseminations on Fertility in Surti Buffaloes

S.B. Kodagali and N. Madhu Rao

Department of Gynaecology & Obstetrics
Gujarat Veterinary College, ANAND-388 001.

Under the conditions prevailing where the study was undertaken on a data of 500 fresh artificial inseminations with 44 bulls, the difference in fertility between the bulls was significant where as the difference between the periods was not significant. This points out to the rearing intensities practised in buffaloes and the need to use high fertile bulls and removal of the economically low fertile bulls.

Studies on Post partum Anoestrous Condition in Surti buffaloes with relation to season and body weight and trials with "Prajana"

I.M. Shah, F.S. Kavani and S.B. Kodagali

Gujarat Agricultural University, Anand.

The present study reported on the trials of Prajana injections & capsules for treatment of anoestrous buffaloes is on the effect of season and body weight in induction of oestrus and fertile oestrus.

With Prajana treatment oestrus was induced in 82.14 per cent animals with the mean oestrus induction internval of 15.48 days and 48.21 per cent animals conceived within the average period of 31.25 days.

There is no significant difference between low breeding and high breeding season for oestrus and fertile oestrus induction.

Body weight has been found to be related with oestrus and fertile oestrus inductions.

I.J.A.R. 3 3 : 1 : 86

Tips to Improve Herd Fertility

K.C. Kachar A.I. Officer,

Department of Animal Husbandry, Gangtok.

Some of the management practices to improve the reproductive efficiency of the herds.

(a) Close observation and maintenance of uptodate records and genetic problems.

(b) Attention to calf feeding.

(c) Adequate quantity of balanced feed to animals.

(d) Timely detection of heat and breeding at proper time.

(e) Optimum dry period.

(f) Regular pregnancy test to find out difficult breeders.

(g) Sanitary measures.

Effect of "M-2 Tone" Therapy on Expulsion of After Birth and Involution of Uterus in Cows and Buffaloes

C.V. Dindorkar, A.S. Kaikini and D.B. Alone

University Department of Post-Graduate Studies in Animal Reproduction and Gynaecology, Punjabrao Krishi Vidyapeeth, AKOLA-444 104.

21 Cows and 24 buffaloes were selected for the present study, of which control group in case of cows consisted of 8 and 6 animals in case of buffaloes. All these animals were in advanced stage of pregnancy and free from any genital infection. After normal parturition, "M-2, Tone" (Charak Co.) liquid was administered to each experimental cow/Buffalo. Time required for the expulsion of placenta and involution of uterus were recorded in minutes and days respectively Control animals did not receive any treatment. The average time required for expulsion of placenta in experimental and control group of Cows/Buffaloes was non-significant. There was highly significant difference in the time required for involution of gravid cornua in cows. Difference in the time required for involution of gravid and non-gravid cornua in buffaloes was non-significant.

I.J.A.R. 3 : 1 : 87

A Method to find out the Diameter of Seminiferous Tubule

D. JOHN

Scheme for Control of Abortion in Cattle, Tiruchirappalli.

The tubular diameter of seminiferous tubule is measured in quantitative and qualitative spermatogenesis. About 1 cubic centimeter of testis is taken and placed in a Homogeniser, adding about 100 cc of normed saline. The tissue is now subjected to slow speed and short duration homogenisation for about 1-2 minutes. The tubules are cut like chaffs of straw and the diameter is measured by placing a small drop of sediment in a glass slide and examining it under microscope, with the aid of an ocular micrometer, already caliberated. The method is simple and the specimen is as natural as possible as it is not subjected to processing or freezing.

Studies on Estrus and Estrus Behaviour in Cross Bred Cows

C.V. DINDORKAR, A.S. KAIKINI and V.R. BHANGALE

University Department of Post Graduate Studies in Animal Reproduction and Gynaecology, Punjabrao Krishi Vidyapeeth, Akola Pin-444 104.

A total of 30 normal healthy and regularly cycling cross-bred animals were selected for the present studies. Two estrus periods and two estrus-cycles of each animal were studied. The estrus behavious and aggresiveness observed in the cross breds were 33.33; 53.33 and 13.33 per cent in Intense, Intermediate and weak types of estrus, respectively. The other symptoms like excitement, bellowing, loss of appetite, micturition, peculiar movement of the lumbo-sacral region and licking of other animal were much pronounced and or moderately seen in 86.66 per cent of cases, while only 13.34 per cent of cases showed weak behavioural symptoms of estrus. Male like copulatory behaviour was found pronounced in 33.33 per cent cases. In 46.66 per cent cases it was occasionally seen and in 20.00 per cent cases it was not observed. Signs of extreme nervousness were observed in 26.66 per cent cases, whereas 46.66 per cent cases showed moderate nervousness. In 71.66 per cent cases, the on-set of estrus was in morning hours, while 28.33 per cent cases showed estrus in the evening hours.

I.J.A.R. 3 : 1 ; 88

Glutamic Oxaloacetic Transaminase (Got) Enzyme Levels, Pre and Post Freezing in Initially "Flat" and Motile Semen Samples from Surti Buffalo Bulls

V.R. Jani, G.A. Prabhu, H.J. Derashri and S.B. Kodagali

Deptt. of Gynaecology & Obstetrics, College of Veterinary Science
Gujarat Agricultural University, Anand. 388 001

Seventeen semen samples from five Surti buffalo bulls were processed for the estimation of GOT enzyme levels in seminal plasma, pre and post freezing. Each semen sample was split diluted in two dilutors viz., Tris fructose yolk glycerol (TFYG) and Lactose fructose yolk glycerol (LFYG). The enzyme estimation was then carried out.

The results of this study revealed that there were significantly ($P<0.01$) more values of GOT enzyme in freezethawed samples as compared to pre-freeze levels. Out of 17 semen samples, five were "static" i.e. without initial spermatozoal motility. The GOT values obtained pre-freeze in such static samples were relatively more than the similar values obtained in initially motile semen samples, which showed still more increase in levels in freeze-thawed samples. The mean levels of GOT enzyme in seminal plasma, pre and psot freeze in motile semen samples and initially "static" samples were 7.65 i.u., 12.63 i.u. and 12.1 i.u. and 19.1 i.u. per litre, respectively.

From the limited observations made on static semen samples and their pre and post freezing seminal plasma GOT levels, it appears that the level of GOT is indicative of the possibility of sperm cell damage in initially "flat' semen samples from buffalo bulls, which may be prohable aetiology for non motile huffalo in semen samples. More intensive studies are necessary on this aspect.

Semen Characteristics and Fertility of Jersey Bulls in Tropics

S.M. Khan and K.G. Kharche

Department of Vety. Obst. & Gynaecology,
College of Veterinary Science & A.H. Jabalpur-482 001 (M.P.)

The experiment was conducted from October 81 to April 82 on Seven Jersey Bulls of Intensive cattle development Project, Jabalpur (MP). Ten ejaculates from each hulls were used for assessment of semen quality. The semen used for A.I. was diluted (EYC-1:20) and preserved at 5°C temperature for 72 hours.

The average value for volume (4.08 ± 0.34 ml) colour/density in the scale of 0-3(2.43 ± 0.15), Gross motility in the scale of 1-3 (2.47 ± 0.17), Mass motility in the scale of 1-4 (3.64 ± 0.15), pH (6.64 ± 0.04), M.B.R.T. (4.92 ± 0.45 mins), Individual motility (80.00 ± 2.08 per cent) Sperm Concentration (935.7 ± 77.90) mil-

lions/ml),Live sperm (85.35±1.99 per cent) and average sperm abnormality (14.03±1.50 per cent) was recorded.

Significant negative correlations were found between concentration and colour-density, sperm concentration and M.B. R.T.; and between volume and sperm concentration. A significant positive correlation was found between individual motility and percentage of live sperms. Decline in per cent of live sperm and individual motility, and increase in the percent age of abnormal sperm in EYC diluted semen preserved at 5°C temperature for 72 hours was recorded.

The overall observed conception rate (60-90 days non returned) was 72.84 per Cent with its arcsin value as 58.56. The fertility declined linearly between 1-3 days preservation. There was apparant fall in the fertility of Jersey bull semen between 1 and 2 days of preservation but fertility dropped markedly between 1 or 3 days of preservation.

It is thus evident that gross motility reflects concentration and viability of sperm cells in the ejaculate. A fairly good correlation exist between motility and fertilising capacity of sperm. Proportion of live sperms is not associated with semen out put but reflects integrity of semen storage mechanism operating mainly in the epididymis. From 48 hours of preservation of semen in EYC at 5°C a significant decrease of C.R. was noted.

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Sexual Behaviour and Reproductive efficiency of Cross-bred Cows

M.M. Singh and K.G. Kharche

Department of Vety. Obst. & Gynaecology,
College of Veterinary Sciences & A.H., Jabalpur-482001 (M.P.).

Study was conducted on ½, ¾ and 5/8 Holstein Friesian × Tharparkar cows from the livestock farm of this college. Seventy two oestrus periods of Fifty six normally cycling cows were studied. The feeding and management of the animals was uniform during the period of study (Dec. 81-July 82). Almost all the visual signs, palpation characteristics of internal genitalia and out pouring of cervico-vaginal mucus presented a definite trend of decline in their frequency or intensity of occurrence from intense to weak oestrus cases. Ovary was oval, spheroidal and flat in 69.44, 26.39 and 4.17 per cent, cases respectively. Follicles were found developed in 86.11 per cent and developing in 13.89 per cent cases respectively. Right ovary was three times more active than left. Cystic follicles and functional corporalutea were not present in normally cycling animals. The average length of oetrous Cycle was 21 days with no significant genetic group differences. The occurrence of intense intermediate and weak oestrus was 20.8, 52.8 and 26.4 per cent respectively. Genetic make up of the animal did not effect the total score but intensity of oestrus affected it significantly.

The quality of mucus discharge was affected by the intensity of oestrus. Thick bright and continuous pattern of arborization were highest in occurrence respectively in intense and intermediate oestrus group, jointly forming a majority on overall basis. In three intensity groups the statistical differences among average values were found significant for relative viscosity, pH, Spinnbarkeit and Sodium content of C.V.M. and were found non significant for electrical conductivity, water content, potassium content and T.Rs. of C.V.M.

The average number of services per conception were 2.35 with no difference amongst the three genetic groups of animals. However, there was significant difference between mean total scores of cows conceived and cows that did not conceive in corresponding oestruses. More number of services required per conception in present study might be due to breed variation, managemental conditions, A.I. procedures and environment. Sixty to ninty days non return rate was found to be 71.43 per cent which was 5.36 per cent more than pregnancy diagnosed on rectal examination, sixty days post insemination. Six cows out of 72 (Cows) were identified as problem cows. The Herd Reproductive status was found to be 86.27 per cent as against 70 per cent for average herd.

Effect of Varying Concentrations of Sugars On Keeping Quality Of Bovine Semen at 5°c

R.G. Agrawal and K.G. Kharche

Department of Vety. Obstetrics & Gynaecology,
College of Vety. Sci. & A.H., Jabalpur, M.P. 482001.

The effect of five different sugars with 3 different levels which were added in eggyolk-citrate (2.94%) diluter were studied on the keeping quality of bovine semen at refregeration temperature. The keeping quality of semen was measured by spermatozoal motility, which was recorded at 2,24,48,72 and 96 hours intervals.

The 6 healthy bulls maintained at the livestock farm, Jabalpur were used for collection of semen. Five ejaculates from each bull were made at weekly interval.

The levels of sugars were 1.0, 1.5 and 2.0% for glucose; 1.0, 1.6 and 2.25% for lactose; 0.5, 0.75 and 1.0% for fructose; 0.5, 1.0 and 1.5% for xylose; and 0.75, 1.25 and 1.75% for arabinose. The control was eggyolk-citrate (2.94%) without any sugar.

The analysis of variance was done to elucidate the differences between treatments, which were different types of sugars with different levels. The herrarical analysis among bulls within treatment and among observations within treatment-within bull was done. The results revealed a highly significant difference among treatment indicating a particular type of sugar with particular level showed the maximum sperm motility. No difference among bulls was recorded indicating that the bulls were the random sample of bovine specie.

The mean sperm motility in control group was 60.33 %. The sperm motility gradually declined with increase in levels of sugars both in case of lactose and glucose. Although the lactose showed better sperm motility results as compared to glucose at different levels, but they were not significantly different from each other at each level.

The highest mean sperm motility recorded was 66.43 % with arabinose at 1.25% level, where the xylose and fructose following to arabinose. It was observed that higher levels of fructose, xylose and arabinose gave higher sperm motility in contrast to glucose and lactose which showed poor sperm motility with increasing concentration except xylose at 1.5 % and arabinose at 1.75 % level.

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Appraisal of Breeding Efficiency and its Association with Milk Production in Buffaloes

O.P. Sharma

G.B.P. Univ. of Agri. & Tech. Pantnagar.

A critical analysis of data on 932 murrah & Grade buffaloes sired by 93 bulls, maintained at 9 M.litary farms during the period 1960 to 1975, was done using Least Square analyses in order to eliminate effects due to unequal subclass numbers, farm (location) and months. The farm effects were found significant for B.E., first, second and third lactation milk yield. The respective least square means were 82.94$\pm$1.41 %, 1833.74$\pm$19.19, 2013.34$\pm$23.13 and 2040.93$\pm$22.33 kg respectively.

Heritability of B.E., first, second and third lact. milk yields respectively were 0.046$\pm$0.048, 0.14$\pm$0.06, 0.041$\pm$0.047, and 0.112$\pm$0.056. Genetic correlations of B.E. with first, second and third lactation milk yield were $-$ 0.22 $\pm$ 0.43, $-$ 0.07$\pm$0.76 and 0.38$\pm$0.43 whereas respective phenotypic correlations were 0.03$\pm$0.18, $-$ 0.01$\pm$0.18 and 0.05$\pm$0.18. These lower magnitudes of correlations indicate low degree of association either at genetic or phenotypic scale in first two lactations. However, genetic association of B.E. with third lactation clearly indicate higher lactation yields can be achieved by selecting buffaloes exhibiting higher breeding efficiency.

Management of dairy animals for improved reproductive efficiency

A.E. Nivsarkar, H.S. Pandey and S.K. Gupta

Indian Veterinary Research Institute, Izatnagar, U.P.

The management of dairy animals under Indian conditions has so far been based on lactating and non-lactating groups. This commonly leads to incomplete observations, the animals being not detected regularly for oestrus or subjected to A.I. and pregnancy diagnosis etc. The ultimate result is the poor reproductive performance of the herd. In the recent past new concepts in managing dairy cattle for reproduction have been recommended in order to achieve improvement in reproductive performance (Britt, 1978). It is proposed here to outline a management system for our conditions which may prove benefitial.

A start is made with a group of animals as lactating for whom the feeding and management requirements would be identical. These animals will then be grouped as breeding ones to include all animals over 60 days after calving. They would then be divided as mid-lactation pregnant animals and mid-lactation non-pregnant animals The mid-lactation non-pregnant animals would again be separated as late lactation pregnant and late lactation non-pregnant animals. Thus most of our problem animals of the herd would get collected in the late lactation non-pregnant group. Among these the animals to be attended for reproductive problems or to be culled could easily be identified.

The advantage of the above system will be that all the animals in the group are subjected to a similar feeding system being the lactating animals. They are also available for close observations for oestrus, A.I. and pregnancy diagnosis. In case of buffaloes in particular, where (the reproductive performance is at a very low ebb) large number of replacements is usually through purchase, the above management would help obtaining higher reproductive efficiency.

Effect of Glycerolisation Procedures ou Post thaw Motility of Buffalo Spermatozoa

N. Bhandari, R.A.S. Chauhan and Abraham Mathew

College of Veterinary Science and Animal Husbandry, Mhow (M.P.)

The semen from 5 Murrah buffalo bulls was glycerolated in four various steps using Tris egg yolk dilutor. The final level of glycerol was 6.4%. After glycerolisation and dilution, the semen was equilibrated for 5 hours at 5°C in a cold handling unit. Subsequently it was frozen in liquid nitrogen using french straws. The post thaw motility was observed under a phase contrast microscope.

The maximum post thaw motility (37.4%) was observed when glycerolisation was done in two steps.

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I.J.A.R. 3 : 1 : 93

Reproductive Performance of Infertile Cattle Induced to Lactation

M.A. Nowshahri and S.N. Maurya

Department of Gynaecology & Obstetrics,
College of Veterinary Sciences, Pantnagar, 263 145.

Thirty five infertile cattle were included in the present s udy to evaluate the effect of induced lactation on reproduction. Twenty one animals were allotted to experimental group and 14 to the control group. Animals were divided into groups namely: Gr. 1- Cystic Ovary, Gr 2- Persistant Corpus Luteum, Gr. 3- Subactive/Inactive Ovaries and Gr. 4- Repeatbreeder. Lactation was induced in experimental animals by administration of diethylstilboestrol (@ 7 mg/100 kg body wt) and progesterone (20 mg/100 kg body wt) for 12 days followed by prednisolone (@ 20 mg/animal/day) on day 13 to 15 and reserpine (@ 3 mg/animal/day) on day 17 to 19.

Fourteen out of 21 animals (66.6 per cent) in experimental group conceived within 45 days after the last reserpine injection. In control group only one animal (7.1 per cent) conceived till 120th day of post-therapy. There was no physical injury in any animal due to oestral activities. The hormonal regime reported for induction of lactation could be of special importance in handling the infertility problems in cattle of high genetic value.

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Studies on certain factors affecting conception rate in crossbred cows

Jaswant Singh, B.K. Singh and M.P. Singh

Department of Gynaecology & Obstetrics,
Ranchi Veterinary College, Ranchi.

The study was conducted on 77 crossbred cows. All the animals included in the experiment were apparently normal and free from genital diseases. The animals were divided into five groups — one for control and four for different treatments. The control group in which no treatment was given and only insemination was done, consisted of 18 animals. The treatment groups were named as ampicillin group, oxytocin group, clitoral stimulation group and udder massage group and consisted of 18, 12, 14 and 15 animals respectively. In the ampicillin group, 500 mg of ampicillin in 5 ml solution was given intrauterine, one hour before insemination. In the oxytocin group, 50 I.U. of oxytocin was injected

intramuscularly, 5 minutes before insemination. Clitoral stimulation was done for 10 seconds, 5 minutes before insemination. Udder massage wsa done for 2 minutes, 5 minutes before insemination, with the help of a towel soaked in a lukewarm water and squeezed thereafter. Insemination was done with almost identical and good quality semen during mid heat in every case.

The conception rate in control group was noted to be 44.44 % where as conception rates obtained in ampicillin, oxytocin, clitoral stimulation and udder massage groups were 77.78, 83,33, 78.57 and 80 % respectively.

The conception rates obtained in ampicillin, oxytocin and udder massage groups were significantly better han that in the control. The difference in the conception rates of clitoral stimulation and control group was also nearly significant. But it was observed that no treatment was superior to the other so far as conception rate was concerned.

Post-Partum Ovarian Activity and Resumption of Oestrous Cycle in Jersey Cattle Under Farm Condition of Assam

S. Das, C.K. Rajkonwar and N. Baishya

Department of Gynaecology, Obstetrics & A.I., College of Veterinary Science,
Assam Agricultural University, Khanapara Campus, P.O. Gauhati-781022, Assam.

Rectal palpation of the ovaries and observation of behavioural symptoms of oestrus in 264 Jersey cows in the Indo-Australian Cattle Breeding Project, Barapetta, Assam, revealed that complete regression of the corpus luteum of pregnancy and development of palpable ovarian follicles occur 7.97 ± 0.28 and 13.93 ± 1.22 days respectively after calving. The normal oestrus was resumed on an average of 36.88 ± 1.76 days post-partum. It was observed that with the increase of lactation number the interval from parturition to the resumption of oestrus decreased. The difference in the interval from parturition to resumption of oestrus, however, did not differ significantly ($P>0.05$) in different lactations.

I.J.A.R. 3 : 1 : 95

Evaluation of Processed Wheat Straw along with Three Protein Supplements in Haryana Heifers for Their Reproductive Performance

B.B. Singh, C.S. Barsaul and M.L. Chaturvedi

Department of Animal Nutrition, College of Veterinary Science & Animal Husbandry, C.S.A. University of Agriculture and Technology, Mathura Campus, Mathura.

A semi balanced processed wheat straw was made by impregnation of a mixture containing 3 kg Urea, 20 kg molasses, 1 kg each of chalk, common salt and mineral mixture along with 20 litres waters over 100 kg wheat straw, fed to the animals of treatments II, III and IV *ad lib* except in treatment I which was control where *ad lib* wheat straw along with 2.5 kg conventional concentrate mixture was fed. In the treatments II, III and IV, 0.8 kg gwar meal, 1.0 kg mustard cake and 15 kg leguminous fodder were offered respectively as protein supplements. Energy rich concentrate mixture was used in treatments II, III and IV in order to make comparable with control. The actual plane of nutrition in all the treatments were comparable to the N.R.C. recommendations.

From these experiments it was observed that the age at onset of oestrus, number of services required per conception, age at conception, birth weights of offsprings were having non significant difference among four treatments. The parturition was normal in the animals of all the treatments. In order to select the best treatment on the basis of reproductive performance and in the weights of dam before and after parturition it was concluded that the treatment III was the most suitable treatment for obtaining the optimum reproductive performance in the heifers.

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Studies on the Feasibility of Extending Bovines Semen with Freeze Dried Extender

Somnath Roy and R. Roy Chaudhury

Department of Animal Gynaecology & Obstetrics, Bengal Veterinary College, Bidhan Chandra Krishi Viswavidyalaya, 37, Belgachia Road, Calcutta-700037.

Statistically significant variations in respect of percentage of live spermatozoa and percentage of spermatozoa with normal acrosome between the three extenders namely, egg yolk glucose citrate (EYGC) extender, reconstituted freeze dried egg yolk glucose citrate extender kept in a refrigerator (FDER) and reconstituted freeze dried egg yolk glucose citrate extender kept at room temperature (FDERT) could not be found out. It appeared that the three extenders were equally efficient to preserve bull spermatozoa.

I.J.A.R. 3 : 1 : 96

Studies on keeping quality of Heterospermic goat semen and its influence on conception rate

M.P. Sinha, B.K. Singh and Balraj Singh

Department of Gynaecology and Obstetrics, Ranchi Veterinary College, Ranchi.

The keeping quality of heterospermic goat semen was studied up to 96 hours of preservation and the influence of pooling of semen from different sires on conception rate was also observed. The heterospermic semen samples were prepared by mixing semen obtained from Black Bengal and Saanen bucks. Heterospermic and homospermic semen samples (separate unmixed semen of Black Bengal and Saanen buck) were compared for certain seminal attributes such as total motility %, progressive motility %, live sperm % and pH. The total motility, progressive motility and live sperm % were higher in mixed semen as compred to the homospermic controls at all hours of preservation. A highly significant difference was also observed in the motility %, progressive motility %, live sperm % and pH of heterospermic and homospermic semen samples.

Heterospermic samples gave a higher conception rate (68.75 %) than the homospermic samples (50 and 58.33 %).

Semen Production in Relation to Age and Body weight of Buffalo-Bulls

K.S. Bedi, R.K. Biswas, G.B. Singh and Y.G. Dugwekar

Department of Obstetrics & Gynaecology. College of Veterinary Science.
Punjab Agricultural University. Ludhiana-141004 (India)

The present study reports the age and body weight of buffalo-bulls during which the spermatozoan production attains and sustains maximal levels. The study incorporates data on 51-farm-reared Murrah bulls and their crosses of different age and body weights to evaluate various seminal attributes.

Spermatozoan production per ejaculate increased gradually till 84 months of age and then declined. The sperm concentration of semen reached its maximum during 45 to 54 months and decreased with further advance in age, while semen volume maintained a plateau from 36 to 71 months and rose sharply at 72 to 84 months, before declining subsequently.

In relation to body weight the sperm output revealed an increasing trend from 370 to 500 kg body weight, remained unchanged till 550 kg and then gradually fell which coincides with higher (84 months) age. The sperm concentration gradually increased till 450 kg. body weight, maintained upto 500 kg. body weight and thereafter started declining at higher body weight. The semen volume steadily increased upto 500 kg. boy weight and maintained the level till 550 kg. before declining in heavier bulls with concomitant rise in sperm concentration. The other seminal attributes did not show any specific trend with age or body weight.

IJAR. 3 : 1 : 97

Reproductive Efficiency of Holstein-Friesian Bulls in Punjab

D.N. Mohanty, R.K. Biswas, G.B. Singh and Y.G. Dugwekar

Department of Obstetrics & Gynaecology, College of Veterinary Science,
Punjab Agricultural University, Ludhiana-141004 (India)

Reproductive efficiency was studied in 17 Holstein-Friesian bulls varying between 13 and 65 months of age under tropical conditions of Punjab comprising analysis of various seminal attributes, biometrics of the testis, biochemical test of semen and fecundity rates.

The mean sperm concentration, individual sperm motility and live sperm count ranged from 1070.00±90.01 to 1482.85±115.88 millions/ml, 68.00±4.50 to 73.03±0.50% and 76.95+1.55 to 81.20±1.54%, respectively showing gradual enhancement with advancing age from 20 to 65 months. Scrotal circumference had high significant correlations with individual motility, live sperm count, sperm concentration and spermatozoan head abnormalities while testicular volume was highly correlated with individual motility, live sperm count and sperm concentration. Significant differences were obtained in bulls of different age groups with regards to total acrosomal and midpiece defects though sperm head defects did not vary significantly.

The methylene blue reduction time, initial fructose content, fructolysis indices for first and second hours and ascrobic acid content of semen were 6.96±0.69 minutes, 749.07±6.09 (mg/100 ml of semen), 1.57±0.07, 1.21±0.07 and 5.66 ±0.26 (mg/100 ml of semen) respectively.

Among the semen characteristics studied, mass activity, individual sperm motility, live sperm count, methylene blue reduction time, ascorbic acid content and fructolysis index (first hour) were found to correlate significantly with fecundity rates of breeding bulls.

The results suggest that the parameters included would be effectual in evaluating bulls of comparable age for breeding purposes.

Peripartum Osmotic Fragility of Erythrocytes in Dairy Cows

Tariq Ahmed, R.K. Biswas and R.D. Sharma

Department of Obstetrics & Gynaecology College of Veterinary Science
Punjab Agricultural University, Ludhiana-141004 (India)

Osmotic fragility of Red Blood cells in periparturient dairy cows has been studied. The resistance of RBC to osmotic stress decreased with advancing parturition and fell maximally on the day of parturition. However, osmotic resistance of Red Blood Cells improved *post partum*. Possible mechanisms which might contribute to altered susceptibility of RBC to osmotic stress near parturition and the clinical utility of Erythrocyte osmotic fragility test in periparturient animals will be discussed.

I.J.A.R. 3 ; 1 : 98

Testicular Size In Relation to age of Growing Buffalo-Bulls

K.S. Bedi, G.B. Singh and Y.G. Dugwekar

Department of Obstetrics and Gynaecology College of Veterinary Science
Punjab Agricultural University Ludhiana-141004 (India)

Studies on scrotal circumference, testicular length, width, thickness and volume of Murrah and Nili Ravi buffalo-bulls and their crosses of different ages were undertaken to establish the norms of biometry of buffalo testes and its relationship with age. In all 180 buffalo-bulls varying from 8 to 136 months of age were studied. All the measurements were recorded thrice at three months intervals.

The scrotal circumference and the testicular measures of buffalo-bulls were less than those of dairy-bulls or beef-bulls of comparable age. The scrotal circumference varied from 15.62 cm to 32.45 cm and increased linearly with age, however, the correlations of scrotal circumference with varying ages were mostly non significant becuase of the fluctuations in the scrotal circumference within the age groups. The scrotal growth per month varied from 0.25 to 0.75 cm and was more consistent upto 43 months of age.

The length, width and thickness of buffalo testes varied between 4.33 to 9.12 cm, 2.96 to 6.58 cm and 2.95 to 6.89 cm for the right testes and 4.38 to 9.33 cm, 3.04 to 6.74 cm and 3.02 to 6.96 cm for the left testes, respectively. The average increase per month for these parameters ranged from 0.24 to 0.71 cm, 0.23 to 0.41 cm and 0.25 to 0.75 cm, respectively and it was more marked till 43 months of age. The testicular volume varied from 86.60 to 352.49 cm^3 and showed a linear increase with age. Overall correlations of all testicular measures with age were highly significant however, in individual age groups the testicular measures varied significantly resulting in non-significant correlations. The right and left testes did not reveal any significant difference in their measures at various ages.

A Study on Birth - Pattern in Haryana Cows

S.K. Chaudhary and R.B. Singh

Animal Production Research Institute, Pusa, Bihar

Birth-pattern up to five calvings in 80 Haryana cows maintained at cattle Farm, Pusa was studied. It was observed that 8.75% and 12.50 % of the cows had given mostly female and male births respectively consecutively upto five calvings. The percentage of cows giving alternate and mixed births was found to be 16.25 and 36.25 respectively.

The possible causes of various types of birth-pattern were discussed.

I.J.A.R. 3 : 1 : 99

General Health Condition and Lactational Status in Relation to Conception in Rural Buffaloes

S.K. Agarwal, L.N. Purbey and S.N. Luktuke

Indian Veterinary Research Institute Iza nagar 243122 (U.P)

The study was conducted on 498 buffaloes presented for pregnancy check up at the rural Sexual health control camps around Izatnagar, U.P. which revealed buffaloes with good, fair and poor physical condition as 15.26 %, 59.84 % and 24.9 % respectively. Pregnancy result was the lowest (24.21 %) in the buffaloes with poor body condition and was the highest (61.86 %) in those having good physical condition. Estimation of haemoglobin in a small group of buffaloes during oestrus receiving insemination showed significantly higher value in buffaloes experiencing fertile oestrus as compared to the values in those in which conception failed. Poor nutritional status under field condition may largely be responsible for lower physical status reducing the fertitliy. Pregnancy result was low (37.50%) in dry as compared to 67.36% in those in milk.

Studies on effect of seasons on semen quality and preservation in Red Dane bulls

V.B. Saxena and S.S. Tripathi

College of Veterinary Sciences, G B. Pant Krishi Evam Praudyodic Vishwavidyalaya, Pantnagar, Nainital-263145

The effect of seasons on semen volume, sperm motility, sperm concentration, total sperm/ejaculate, live spermatozoa, total live sperm/ejaculate, abnormalities of head, mid-piece and tail of spermatozoa, total sperm abnormalities, resistance to 1 % sodium chloride, methylene blue reduction time and preservation of semen at room temperature of Red Dane bulls was studied. The study revealed that the volume of semen, total sperm/ejaculate and total live sperm/ejaculate were highest during spring season. In this season, the total sperm abnormalities and anbormalities of head of spermatozoa were also the lowest (9.44 and 1.75 per cent respectively). The autumn had maximum values for live spermatozoa and resistance to 1 % sodium chloride whereas the values for abnormalities of mid-piece of spermatozoa (2.33 %) and methylene blue reduction time (248.33 sec) were lowest in this season. The study also revealed that various attributes of preserved semen were also superior during autumn, spring and winter seasons as prevailing in Tarai area of Uttar Pradesh. The initial semen quality had a bearing on semen preservation and its extent varied during different seasons. High atmospheric temperature accompanied with high wind velocity rate and rainfall adversely affected semen quality and preservation.

I.J.A.R. 3 : 1 : 100

Comparative study of different room temperature dilutors

H.P. Gupta and S.S. Tripathi

College of Veterinary Sciences,
G.B. Pant University of Agriculture & Technology, Pantnagar, 263 145.

A comparative study was conducted to evolve a suitable room temperature dilutor for semen of Red Dane bulls. 12 ejaculates (6 from each bull at weekly interval) from 2 healthy bulls were collected and examined for volume, sperm motility, total number of sperm/ejaculate, livability and abnormalities. Certain biochemical constituents like fructose, lactic acid, sodium, potassium, inorganic and phospholipid phosphorus, total lipids and protein were estimated in fresh seminal plasma to find out interrelationship and their impact on preservability of semen in different medium. Semen samples were diluted in six dilutors, viz, Russian dilutor (RD), RD-glycine, RD arginine, RD glutathione, caproic acid (CA) and CA-glutathione @ 1:30. Diluted semen samples were stored at room temperature and evaluated for sperm motility, livability and abnormalities at 24 hrs intervals upto 72 hrs. The RD-glutathione was found to be comparatively better dilutor on the basis of laboratory trials but fertility trials are to be conducted. CA-glutathione failed. The preservability of the semen in the glutathione medium was significantly negatively affected by the ejaculate volume of the semen.

Serum biochemical profile in Surti buffalo calves: Relation to colostrum feeding

Arvind V. Patel, Anne Jansen, Mukund M. Pathak, M. Parameswarn and K. Janakiraman

Reproductive Biology Research Unit, Gujarat Agricultural University,
Anand Campus, Anand-388 110.

The immunoglobulins in colostrum provide passive immunity to the newborn calves. The Practice of feeding colostrum differ from farmer to farmer. In the present experiments effects of feeding colostrum at different intervals after birth on the serum constituents was studied. Newborn buffalo calves were weaned at birth. They were fed colostrum at 15-30 mts, 2 hrs and 4 hrs after birth. Biochemical estimates were measured in blood serum collected at different intervals in the new born calves.

The % of γ-globulins increased in all the calves soon after feeding the colostrum. The higher levels were maintained for longer periods in calves fed colostrum 15 mts or 2 hrs after birth. In calves fed

later the increase in γ-globulins occurred later and remained high for a shorter period only. The % of free cholosterol increased immediately after birth in all animals and remained high for the first three days. Increase in free cholesterol (%) as a result of colostrum feeding was apparent only when the feeding was done 15 min after birth. Alkaline phosphatase activities were high in the early hours after birth and fell to lower levels 24 hrs later. Feeding of Colostrum resulted in greater increase in alkaline phosphatase activity. No significant changes in the levels of Calcium, Magnesium and Copper were evident in the neonatal period. It is suggested colostrum be fed to the calves as close to birth as possible as this helps them to be disease resistant and attain early sexual maturity.

Sex chromatin as a useful tool for detection of freemartinism in bovine twins

Ms. S. Bhatia and V. Shanker

National Dairy Research Institute, Karnal, Haryana.

An attempt was made to detect freemartins among seven pairs of heterosexual twins by studying their sex chromatin patterns at birth. Sex chromatin examination revealed the presence of sex chromatin (drumstick) bodies specific for females in both male and female calves except three female calves which exhibited the absence of sex chromatin appendages in their blood smears. Common blood circulation, especially the chimerism of neutrophils, the basic factor responsible for freemartinism in females was suggested due to the presence of drumsticks in all the male co-twins examined in the present investigations. A follow up case study of seven female co-twins revealed six of them to develop into freemartins and the seventh animal was culled out from the herd due to its abnormal growth. The diagnostic role of sex chromatin studies in the investigation of freemartinism will be briefly reviewed and possible cytological explanations for the absence/low frequency of sex chromatin bodies in freemartins will be discussed.

IV. Received Late

Knobbed Defect of Sperm Head of Possible Viral Origin in a Jersey Bull

G.B. Haranath, A.V. Narasimha Rao and K.L. Dutt

Indo-Swiss Project, Visakhapatnam, Andhra Pradesh.

Elevated levels of a morphological abnormality of the sperm 'Knobbed' head have been observed concurrently with poor seminal quality of ejaculates in a Jersey bull aged 3 Years. The bull prior to the appearance of this head defect donated an average volume of 3 ml. of semen under 2 collections/week regimen with an average initial motility of 74%, post thaw motility of 51% and a total abnomral sperm count of 7%. The period of lowered semen quality associated with appearance of the sperm head defect lasted for 2 months. During this period, the initial progressive motility gradually declined to 34% and post thaw motility to 15%. The incidence of knobbed sperms varied from 11.8 to 11.5 per cent and that of total abnormalities from 22.0 to 29.5 per cent while other ejaculate parameters such as libido, seminal volume, sperm concentration and live count remained unaltered. Further, the fall in semen quality was discerned only when the proportion of knobbed sperms reached a level of above 10 per cent. Then this period was followed by steady improvement in semen quality and decline in knobbed head and other structural abnormalities of sperm cells.

On perusal of the clinical record of the bull, it was found that the bull was vaccinated against Foot and Mouth disease 6 weeks prior to the appearance of the sperm defect. The knobbed defect which was akin to other sperm head defects such as "Crater' defect and 'Diadem' defect was attributed to disturbed spermiogenesis. In the literature, virus like particles have been reported to be observed within such nuclear defects. Suspecting the possible viral origin of this defect in the vaccinated bull, the bull was challenged with injections of Dexamethasone a synthetic glucocorticoid known to cause a recrudescence of viral infections in the bovine, at 16 mg/day for 7 consecutive days. During the period of treatment, there occurred a rise in the proportion of sperm having the defect to 20.5% which further rose to an average of 28% in the first post-treatment month and then a slow decline to 24.8% in the 2nd month and 17.5% in the third month. The temporary increase in the level of knobbed head defect in response to dexamethasone treatment supports the suggestion that the defect may be viral in origin, but in no way establishes its validity.

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Effect of consecutive transplantation on the embryo survivality in recipient goats

K.P. Agrawal, I.M. Mongha and N.K. Bhattacharyya

Division of Physiology and Climatology,
Indian Veterinary Research Institute, Izatnagar-243122 (U.P.)

Thirteen embryos (4-12 cell stage) recovered from 4 synchronized and superovulated donors at 72 hrs after the onset of oestrus were transferred in the fallopian tubes of a synchronized recipients for the second time by surgical technique. 5 out of 8 recipients conceived and 5 normal kids were born out of 13 embryos transferred. Consecutive transfer of embryo in the same recipient nannies seems to have certain derogatory effect on per cent conception and embryo survival to term.

Post-partum reproductive behaviour in reeurrent recipient goats

K.P. Agrawal and N.K. Bhattacharyya

Division of Physiology and Climatology,
Indian Veterinary Research Institute, Izatnagar-243122 (U.P.)

The first post-partum oestrus interval, inter kidding period and conception rate from artificial inseminations in 10 recurrent recipients and 10 control nannies were studied. Differences in first post-partum oestrus interval, inter kidding period and conception rate between recurrent recipients and control nannies were insignificant ($P>0.05$). It is certain that the recipients can be successfully used in breeding naturally or through artificial insemination.

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Modified McIllvaine and Tris buffers Diluents for Preserving Ram Semen

R.S. Srivastava and D.B. Kalra

Central Sheep & Wool Research Institute, Avikanagar.

Diluents having good buffering capacity and property of protecting easily oxidisable delicate cell membrane of the vigorously active spermatozoa can be used to serve the purpose of preserving/storing ram semen at low temperature for some time. Modified McIllvaine and Tris buffers with egg yolk and glucose on different pH levels range (from 6.5 to 7.4) were titrated against lactic acid solution and also used for diluting the ram semen@1:1 for storing at refrigeration temperature. It was observed that out of the whole range of different diluents, the one containing modified McIllvaine buffer having pH 7.4 could maintain pH above 7.0(7.06) after having neutralised lactic acid (2 mg/ml), more than any of the diluents, included in the experiment. This diluent also showed the capacity of maintaining the integrity of the spermatozoa with respect to their per cent mobility as well as their morphological status and liveability and over all pH of the stored semen for more than 24 hours, better than other diluents tried. Changes in the behaviour of the spermatozoa and pH etc. have been discussed.

Oestrus Induction, Ovulation and Fertility in Anoestrus Ongole Cows Treated with a Gonadotrophin Releasing Hormone Alone or in Conjunction with a Progestagen or Prostaglandin F2 Alpha

A.V. Narasimha Rao, A. Narsiamha Rao, D. Satyaprasada, T.B. Suryaprakasam and K.L. Dutt

Indo-Swiss Project Visakhapatnam, A.P.

Clinical trials were conducted to evaluate the efficiency of a synthetic Gonadotropin Releasing Hormone (Receptal, Hoechst Co.,) in inducing ovulatory oestrus in post-partum anoestrus (true) Ongole Cows with or without simultaneous use of a progestagen (PRID, Abbott Co.,) or prostaglandin F2 alpha (Lutalyse, Upjohn Co.,).

Twenty five calved Ongole Cows which remained anoestrus without any palpable ovarian structures from 66 to 178 days at the Indo-Swiss Project, Visakhapatnam (A.P.) were subjected to one of the four following treatments.

Group (1). The Ongole Cows were injected with 5 ml Receptal (20μ g Buserelin) intramuscularly in two divided doses

at 12 hr interval.

Group (2) Five Cows received GnRH as in group 1) plus 25 mg prostaglandin F2 alpha i.m. after 24 hours.

Group (3) Five cows were treated as in group 1) plus 5 mg prostaglandin F2 alpha injected in to the submucosa of vestibule after 24 hours.

Group (4) Five cows were inserted with an intravaginal coil of PRID and a Capsule containing 10 mg Oestradiol Benzoate. The coil was withdrawn after 7 days and one day before removal a single intramuscular injection of 5 ml Receptal was given.

Detection of oestrus and ovulation was done by using teaser bulls, observation of oestrus sigrs and daily palpation of genitalia. The cows were inseminated 12 hours after expression of oestrus with frozen semen by recto-vaginal technique. Pregnancy was detected by palpation per rectum 45 days post-insemination.

In group (1). 6 (60%) treated cows responded with oestrus and ovulation (2 silent heats) at intervals of 9 to 21 days of treatment, while one cow showed milk signs of oestrus without ovulation and 3(30%) cows failed to respond to the treatment. Of the 6 responded cows, 3 cows (30%) conceived, one in the induced oestrus, two in the subsequent cyclical oestrus while three cows (30%) reverted back to anoestrus condition.

In group (2) all the 5 (100%) treated cows ovulated (2 silent heats) within 3 to 11 days of the treatment. None of them conceived in the induced oestrus and 3 cows resumed Cyclical activity, while two cows (40%) became anoestrus.

In group (3) all the 5 (100%) treated cows ovulated (3 silent heats) during a period of 15 to 17 days after last injection. One cow (20%) conceived in the induced oestrus, two cows showed cyclical oestrus and two cows (40%) failed to cycle.

In group (4) all the 5 (100%) treated cows exhibited oestrus within 3to 4 days followed by ovulation. Three cows (50%) conceived, one in the induced oestrus, and two in the cyclical oestrus and the remaining two resumed ovarian cyclicity.

Superovulation in Pre-Pubertal and Pubertal Goats

H.K. Phookan and O.P. Dhanda

Superovulation in pre-pubertal (9-10 months) Beetal and adult normally cycling Beetal as well as Black Bengal does was attempted. Each animal in pre-pubertal experimental group (5) was treated with a single dose of 500 I.U. PMSG. The second group consisting of 10 does each of Beetal and Black Bengal was subjected to progesterone treatment before PMSG administration in order to control estrous cycle. Every doe received 10 mg of progesterone daily for 18 days. PMSG in two dose levels i.e. 750 I.U. and 500 U.I. was injected one day prior to the last injection of progesterone. All the does which showed heat were subsequently mated. The females in pre-pubertal group were sacrificed on day 5th of service while adult animals were resorted to laparotomy. The results indicated that