INVESTIGATION ON THE PATHOLOGICAL CONDITIONS IN THE GENITALIA OF FEMALE GOATS

By

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THESIS

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DECLARATION

I hereby declare that this thesis entitled "INVESTIGATION ON THE PATHOLOGICAL CONDITIONS IN THE GENITALIA OF FEMALE GOATS" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship, or other similar title, of any other University or Society.

Mannuthy,
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K. RAMACHANDRAN.

CERTIFICATE

Certified that this thesis entitled "INVESTIGATION ON THE PATHOLOGICAL CONDITIONS IN THE GENITALIA OF FEMALE GOATS" is a record of research work done independently by Sri. K. Ramachandran, under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to him.

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IN LOVING MEMORY

OF

Dr. T.R. BHARATHAN NAMBOOTHIRIPAD

INTRODUCTION

INTRODUCTION

Economic prosperity of any country is closely related to her animal wealth. One of the greatest requirements of today in our country is to increase and improve animal production to open a new vista of freedom from the fear of hunger for our growing population.

Reproductive efficiency is a major factor in economic livestock production. Increasing production performance will depend upon the successful measures taken for eliminating infertility brought about by one or more factors. Improving reproductive efficiency begins with an understanding of the normal reproductive process and the problems which can befall it (Bowen, 1979).

Among ruminants, cattle and sheep have received considerable attention, essentially because of their importance in temperate regions. Recently buffaloes have also attracted enlightened interest all over the world. However the situation regarding goats is one of near total neglect (Devendra, 1979).

The recognition of goat as "poor man's cow" for the landless labour and socially backward members of the society coupled with its capacity to make use of vegetation under diverse ecological situations, make this animal distinctly superior among ruminants in tropical countries.

India has the highest goat population in the world with lowest productivity (Taneja, 1979). According to 1972 census, 68 million goats of the country constitute about 19 per cent of the world goat population (National Commission Report, Govt. of India, 1976).

Goat husbandary is an important livestock enterprise in Kerala. According to the livestock census (1977) the goat population in Kerala was about 16 lakhs, which stood second to cattle population (Farm guide, 1980). The one and only breed of livestock that Kerala possesses is a breed of goat viz., Malabari goat. Recently a lot of emphasis has been given for the improvement of this breed by cross-breeding with Saanen and Alpine. Eventhough considerable improvement in production potential of our goat population has been effected by scientific breeding and improved husbandary practices, impaired fertility continues to remain a great deterrent to progressive goat farming.

Though many published reports account for the pathological conditions affecting the genitalia of the cow (Lagerlof and Loyd, 1953; Perkins et al., 1954; Anderson and Davis, 1958; Dawson, 1958, 1963; Zemjanis et al., 1961; Mylera, 1962; McEntee, 1970; Nair, 1973) and the ewe (Gibb et al., 1955; Pokudin and Shakhotin, 1956; Barret et al., 1961; Bennets et al. , 1964; Turnbull et al., 1966; Jubb and Kennedy, 1970; Nair and Raja, 1972; Rao and

Abdulla Khan, 1974; Adams, 1973, 1975, 1976) only very few reports are available on goats (Lyngset, 1968; Nair and Raja, 1972; Singh and Rajya, 1977; Das et al., 1979).

The present work was therefore taken up with the object of assessing the incidence and nature of pathological conditions of genitalia of female goats by gross and histopathological examination of the organs collected at random from the abattoir.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Pathological lesions or diseases of the reproductive system in sheep and goats are similar in most cases to those in cattle (Roberts, 1971). Gustafsson and Holmberg (1966) found a frequency of 6.4 per cent malformations and other pathological changes in the genitalia of sheep. Based on the information obtained from goat breeders, Lyngset (1966) reported that about 4 per cent of the goats were culled due to sterility. An overall incidence of 6.8 per cent of pathological changes of one from or other was recorded in goats (Lyngset, 1968). Nair and Raja (1972) encountered an overall incidence of 2.15 per cent and 1.6 per cent pathological lesions in the genital organs of goats and sheep respectively. Rao and Abdulla K (1974) recorded 7.58 per cent lesions in the genitalia of ewes. Although it is often assumed that sheep are relatively fertile animals, an annual loss from infertility of about 5 to 10 per cent has been reported in Brita (Arthur, 1975). An overall incidence of 21.45 per cent pathological lesions in the genitalia of goats was observe by Singh and Majya (1977). Pathological conditions and malformations of the reproductive tract of indigenous she goats of Sri Lanka amounted to be 11.4 per cent (Abeyratne et al., 1979). Das et al.,(1979) recorded an incidence of 17.99 per cent pathological conditions in non-gravid genitalia and 4 per cent in gravid genitalia of goats.

Persual of literature reveals number of reports on the incidence of intersex in goats (Eaton, 1943; Asdell, 1944; Divekar, 1953; Kondo, 1954; Kaikini and Puranik, 1964; Raja, 1965; Mc Geady and Fitzpatrik, 1978). Asdell (1944) linked the incidence of intersex with pollnoss in goats. However, Divekar (1953) reported an intersex in a horned goat. Similarly, the incidence of hermaphroditism has also been reported in sheep (Gerneke, 1965; Wilkes et al 1978; Adams, 1979).

Feldman (1932) recorded several leiomyoma affecting the uterus of sheep. Davis et al.(1933) reported a single case of leiomyosarcoma of the uterus in sheep. Tunnicliff (1949) described a virus disease in sheep, where epidermal lesions were observed on the glans penis and propuce in males together with vulvo-vaginitis in ewes. An incidence of 6.5 per cent abnormalities was recorded in the vagina of ewe by Gibb et al.(1955). Rare occurrence of granulosa cell tumours of ovaries and leiomyoma of the uterus of sheep was reported (Cotchin, 1956; Moulton, 1961). Monlux et al. (1956) reported lymphosarcoma or reticulum cell sarcoma, myeloma and squamous cell carcinoma of the vulva of ewes. Pokudin and Shakhotin (1956) reported acute necrotic vaginitis in ewes. Barret et al. (1961) observed uterine cysts in 96.5 per cent of ewes. Ulcerati vulvitis was described in Australia by Southcott and Moule (1961). A case each of teratoma of ovary and

leiomyoma of uterus in sheep was recorded by Brandly and Migaki (1963). Lloyed and Nairn (1964) observed a significant association between the degree of cystic endometrium and the number of years in which an ewe failed to lamb. Bock and Gardiner (1965) reported that cystic endometrial hyperplasia was the most important cause of sheep infertility in Western countries. Turnbull et al. (1966) reported an incidence of 5 per cent uterine cysts in ewes. Gustafsson and Holmberg (1966) recorded 2.2 per cent par ovarian cysts in ewes.

A detailed investigation with regard to malformations and pathological changes of the genital tract of goats was undertaken by Lyngset (1968). He observed various pathological conditions of ovaries, bursa, salpinx, uterus, cervix, vagina and vulva. Various conditions encountered in the ovaries were ovarian cysts (2.4%), hypoplasia of ovary (0.1%) and abscess (0.1%). The incidence of cysts was more in the right ovary. Cysts in the bursae and mesosalpinx were recorded in 1.1 per cent of the genitalia A single case (0.1%) of cystic enlargement of the tube was also recorded. Corkscrow formed uterine horns in which twisting was complete and impossible to unwind was observed in 0.1 per cent of genetalia examined. Anastamosis between the bladder and uterus was also found in 0.1 per cent of the genitalia. Other conditions recorded in uterus were hydrometra (0.3%), metritis (0.6%) and macerated foetus (0.6%

He also recorded polyp in cervix (0.2%), fibroma (0.1%) arising from the dorsal vaginal wall and one case (0.1%) each of stricture of vagina characterised by marked narrowing about the middle of the vagina and inflammation of the vagina with peri-vaginal abscess. Thickening of the Gartner's ducts and hermaphroditism were recorded respectively in 0.3 per cent and 0.6 per cent of genitali examined. Anderson and Sandison (1969) recorded one case each of fibroma and fibroleiomyoma of the uterus in sheep. Bhaskaran and Sivadas (1969) recorded various patho logical conditions in the genitalia of she goats. The different conditions of the ovaries recorded were follicula cysts (4.12%), hypoplasia (3.94%), Varicosity of veins (0.59%), arterio-sclerosis (2.35%), haemorrhage (0.59%), peritoneal adhesion (0.59%) and fibrosis (1.77%). They also observed, fibro muscular thickening (2.35%) and par ovarian cysts (3.35%) in the broad ligament. Par ovarian abscess was found in 2.35 per cent of the genitali Various disorders observed in the uterus were, uterus unicornis (1.18%), Macerated foetus (1.18%), tortuous vessels (3.35%), Haemorrhage in she uterus (1.18%), squamous metaplasia of the lining epithelium (1.18%), focal endometritis (1.18%), focal purulent endometritis (1.18%) chronic catarrhal endomertitis (1.18%), cystic enlargement of the secretory tubules (7.06%) and fibrous thickening of the subinteria of the vessels in the uterine wall (4.7%)

Gardiner and Hairn (1969) observed cystic endometrial hyperplasia in sheep grazing on oestrogenic pasture. Jubb

and Kennedy (1970) suggested that uterine cysts may be found in the ove during post-partum involution. Dieter (1972) observed cystic degeneration in 2.4 per cent of the ovaries studied. Damodaran and Parthasarathy (1972) reported leiomyoma of the uterus in goat.

Nair and Raja (1972) studied in detail the incidence of various pathological conditions affecting the female genitalia of goats. An incidence of 0.482 per cent pathological lesions of ovaries was reported. Cystic ovarian degeneration was recorded in 0.322 per cent of ovaries and occured in both right and left ovaries. A single instance (0.053%) of ovarian abscess with complete ovario-bursal adhesion in the left ovary was recorded. Par ovarian cyst was observed in 0.107 per cent of the genitalia examined and their distribution was bilateral in one case and unilateral in the other. Ovario-bursal adhesion was observed in 7 cases (0.376%) of which 5 were bilateral with complete encapsulation. They were always found in association with other pathological conditions. Unilateral adhesion was observed in two cases, of which one was complete and was observed together with ovarian abscess. Partial unilateral adhesion associated with hydrometra was observed in the other.

They also recorded one case each (0.053%) of hydrosalpinx, cyst in the fallopian tube, salpingitis and perisalpingitis. Hydrosalpinx was bilateral and involved

the entire length of the tube. The tube appeared about six times the normal size and contained semisolid mucous exudate. There was also a complete bilateral salpingo-ovario-bursal adhesion. Salpingitis and perisalpingitis were encountered in the same genitalia. The tubes were hard, cord like and approximately six times the normal size. Lesions of complete bilateral salpigo-ovario-bursal adhesions, metritis, perimetritis and parametritis were also seen in the same genitalia.

Pathological changes of the uterus were recorded in 1.7 per cent of all the cases studies. They observed macerated foetus (0.753%), Pyometra (0.322%) and Hydrometra (0.161%). The occurrence of macerated foetus was bilateral in 71.5 per cent cases and unilateral in 28.5 per cent cases. Maceration was observed in the late stage of gestation only in one instance. Bilateral hydrometra was observed in two cases and left sided unilateral hydrometra in another case. Metritis with accompanying perimetritis and parametritis, haematic mummification, extensive haemorrhage in the inter-cotyledonary space, thick yellow pus in the cups of the maternal caruncles, and uterine rupture were encountered in one case each. Necrotic foetal cotyledons were seen loosely attached to the partially involuted maternal caruncles in two (0.107%) non-gravid genitalia.

Nair and Raja (1972) made a study on the pathological conditions affecting the genitalia of ewes. They encountered a single case of ovarian abscess in the left ovary. Par ovarian cysts were observed in 0.190 per cent of the genitalia examined. Unilateral cysts and cyst associated with pyometra were also observed. Ovario-bursal adhesion was found in 5 cases (0.476%) of which 3 (60%) were bilateral seen in association with mummification.

Macerated foetus was observed in 0.753 per cent of the genitalia and the occurrence in the right and left horns were 60 per cent and 40 per cent respectively. Pyometra and Hydrometra were recorded in 0.190 per cent and 0.095 per cent of cases respectively. Pyometra involved both the horns in one case and the left horn in another. In Hydrometra the left horn was 1½ times the normal size and contained copious thin mucous exudate. An incidence of 0.289 per cent haematic mummification and 0.095 per cent inter-cotyledonary haemorrhage was recorded in their study. Local perimetritis resulting in adhesion of the uterine horns at the intercornual space, was observed in one gravid genitalia.

Adams (1973) reported that cysts in the uterus were common in old ewes due to the ingestion of oestrogenic clovers. Cottew et al.(1974) described granular vulvovaginitis in goats. Singh et al.(1974) described gross

(0.48%), polycystic ovaries (0.24%) and proliferative oophoritis with adhesion (76.77%) in the ovaries of sheep. An incidence of 17.03 per cent par ovarian cysts and 0.48 per cent abscess in the broad ligament was observed. Other conditions observed were metritis (0.72%), macerated foetus (0.24%), perimetrial abscess (0.24%), thrombosis of the uterine vein (0.48%) and foetal resorption (0.24%).

Chand and Chauhan (1975) recorded cystic endometrial hyperplasia in 16 sheep and 8 goats. Ramadan and Hassan (1975) recorded a leiomyoma arising from the inner mucosa of the cervix in goat. Vandegraaff (1976) reported 3.1 per cent incidence of squamous cell carcinoma of vulva in Merino ewes. Webb and Chick (1976) reported, ulcerative lesions on the ventral commissures of the labia and poster vagina of approximately 2 mm in diameter associated with necrotic and purulent material adherent to the labia of the vulva in ewes. Kaikini and Deshmukh (1977) observ a case of uterine leiomyoma in a pregnant goat.

Singh and Rajya (1977) made a detailed study of the pathological conditions in the female genitalia of goats and recorded 61 cases (1.61%) of ovarian cysts of which 46 (1.2%) were follicular cysts and the remaining 15 (0.39 luteal cysts. Oophoritis characterised by nodular elevations on the surface of the ovaries was reported in 5 cases (0.13%). Par ovarian cysts were observed in 21 cases (0.55%). Bilateral hydrosalpinx and adhesions consisting of encapsulated ovaries, fallopian tube and

bursa ovary, were also reported. Uterus didelphys was observed in one goat and hydrometra in two other animals. Macerated foetus was observed in about 0.47 per cent and acute, sub acute and chronic endometritis in 1.5 per cent of genitalia examined. They also recorded granular vulvo-vaginitis (14.3%), ulcerative/necrotic vulvo-vaginitis (0.94%) and cystic Gartner's ducts (0.98%).

Abeyratne et al. (1978) in a study of the pathological conditions of genitalia of indigenous goats in Sri Lanka, reported cystic ovaries (1.6%) and ovarian hypoplasia (0.4%) in the ovaries. Parovarian cysts (3.2%), bursal adhesion (0.6%) cystic oviducts (0.2%) and segmental aplasia of oviduct (0.2%) were also observed. An incidence of 0.8 per cent clinical endometritis, 0.2 per cent each of pyometra, mummified foetus, macerated foetus and endometrial hyperplasia and 0.4 per cent of prolapsed cervical rings were also recorded.

Rao et al. (1978) observed two cases of thrombosis of veins in the uterine broad ligament. Smith (1970) reported that hydrometra or mucometra was relatively a common event in the goats and was often accompanied by marked abdominal distension and occured post-breeding or post-freshening.

Das et al. (1979) observed ovarian cysts (31.33%), haemorrhage in the ovary (1.34%) and malformed ovaries

(1.34%) in goats. They also reported ovario-bursal adhesion (2.67%), par ovarian cysts (0.4%), cysts in the fimbria (0.4%), encapsulation of ovaries (3.33%) and utero-fallopian melanosis (2.2%). Incidence of inter-cotyledonary haemorrhage, cystic endometrium (0.4% each), adhesion of horns (1.11%), pyometra (0.6%), metritis (1.6%), Meterrhogia (0.6%) and utero-tubal melanosis (2.22%) was also recorded. A single case of cyst in the vagina of a gravid genitalia of goat was also observed.

MATERIAL AND METHODS

MATERIAL AND METHODS

The material for the present study comprised of 900 genitalia, inclusive of 42 gravid ones, of adult female goats, collected from the slaughter house, Corporation of Cochin, Ernakulam. The age, breed or the breeding history of the slaughtered animals were not known.

Gross examination:

Immediately after the exposure of the viscera, the whole genitalia with the broad ligament was removed by severing its attachments.

The genital organs were first subjected to detailed examination for gross pathological lesions. The ovaries and bursae were examined for adhesions and encapsulation. Salpinx were palpated from the utero-tubal junction to the infundibulum for gross changes in size and consistency. The serous surface of the uterus, cervix, vagina, vulva and the broad ligaments were examined for lesions. The ovaries were bisected at the greater length and examined for lesions not discernible from the surface. The salpinx was dissected out from genitalia at the utero-tubal junction. Then the patency of the tube was tested by injecting Methylene blue solution from the utero-tubal end. The genitalia was finally incised through the dorsal surface to expose the mucous membrane and the nature of the

contents were duly recorded.

Histo-pathological examination:

Representative samples of tissues from the grossly affected and from those suspected to be affected were taken and transferred to formaline-saline (Luna, 1960). The tissue pieces were processed by standard procedure (Humason, 1972). Sections of 5 to 7 microns thickness were cut and stained by Haemotoxylin-Eosin stain (Humason, 1972).

Special staining by Van Gieson's method was adopted wherever found necessary. Staining by Vankossa's method was also adopted for demonstrating calcium deposits in tissues (Humason, 1972). The results of the findings were tabulated.

RESULTS

The various pathological conditions encountered in the genitalia of female goats during the course of the present study are presented in Tables I, II, III and IV.

A total of 940 genitalia was examined of which 48 (5.053%) showed various pathological lesions. While most of the genitalia manifested only a single pathological condition, in a few instances, two or more lesions were evident in a single genitalia. Thirty two (3.368%) genitalia revealed various pathological lesions of the ovaries.

OVARIAN HYPOPLASIA:

Incidence:

The incidence of this condition was found to be 0.316 per cent. All the cases were unilateral involving the left ovaries in two cases and the right in the third.

Macroscopic pathology:

The ovaries were small, flat and firm. The surface was smooth and did not reveal any follicle, developing or degenerating corpous luteum or luteal scars (Fig. 1). The development of the tubular genitalia was normal.

Microscopic pathology:

The affected ovaries were composed more of medullary connective tissue and blood vessels with a thin investment of cortical tissue. Organisation of the germinal epithelium into secondary graaffian follicles was absent. But very few ovigerous cords and primary follicles could be observed (Fig. 2). Most of the cortical follicles were atretic with degenerating oocyte. Few corpora albicans were also found.

CYSTIC OVARIAN DEGENERATION:

Incidence:

Cystic ovarian degeneration was recorded in 9 (0.94%) genitalia. Graaffian follicles larger than 1 cm. in diameter were considered cystic. The right and left ovaries were affected in 55.5 and 44.5 per cent respectively. All the cysts were single except bilateral multiple cysts in a single genitalia (Fig. 3).

Macroscopic Pathology:

The cysts were large, soft and fluctuating. The size ranged from 1 to 2 cm. The tense cyst wall was translucent and the cystic cavity was found to contain clear cystic fluid of varying quantities. The cyst wall was lined on the inside with a thin, loose and greyish white fibrinous membrane. Thin patches of luteal tissue was invariably

present in the cyst wall in almost all cases.

Microscopic pathology:

The granulosa layer was thinner than that of normal follicles and the cells showed degenerative changes. Cystic fluid in the cavity took a light eosinophilic stain (Fig. 4). The cyst wall was lined with luteal cells of varying thickness. The luteal cells were considerably atrophied or even absent in some areas of the cyst wall. The outer thecal wall contained concentrically arranged dense band of fibrous tissue with an abundance of collagenous bundles.

CYSTIC CORPUS LUTEUM:

Incidence:

The incidence of this condition was 0.421 per cent (4 cases). The right ovary was involved in 66.6 per cent cases as against 33.3 per cent in the left. In one genitalia cystic corpus luteum was observed in both the ovaries.

Macroscopic pathology:

The affected corpora lutea had a central cavity of 4 mm or more (Fig. 5a,b). The cysts contained small quantities of straw coloured fluid. The cut surface of fresh specimen showed only slight extravasation of blood. A

well developed fibrous capsule was found to separate the corpus luteum from the surrounding stroma.

Microscopic pathology:

Considerable amount of fibrous connective tissue breaking up the luteal tissue into irregular cell masses was observed(Fig. 6). The vascularisation was found to be considerably less resulting in mild regressive changes of luteal cells.

CHRONIC OOPHORITIS:

Incidence:

This condition was seen in two (0.211%) genitalia, one gravid and the other non-gravid. The left ovaries were affected in both the cases.

Macroscopic Pathology:

The condition was characterised by nodular elevations on the surface of the ovary in the gravid genitalia (Fig. 7a,b). The incised surface of the ovary revealed greenish yellow pin head sized area (Fig.8). The abscess seen in the left ovary of the non-gravid genitalia, revealed total ovario-bursal adhesion with complete encapsulation. The ovary was round, hard, smooth and devoid of follicles and corpora lutea (Fig. 9). When incised, yellowish, calcified material was seen to fill more than half of the ovarian tissue (Fig. 10).

Microscopic pathology:

A large abscess containing calcified necrotic tissue was found occupying an extensive area in the ovarian medulla and part of the cortex, in the ovary of the non-gravid genitalia. The abscess wall was ruptured at many places and there was diffuse infiltration into the surrounding cortical tissue with mononuclears (Fig. 11). There was total destruction of the germinal elements in the cortex. Extensive areas of calcification was seen within the abscess cavity (Fig. 12). A similar picture was seen in the case of the ovary which showed nodular elevations.

MULTIPLE FOLLICULAR ATRESIA:

Incidence:

The incidence of this condition was 0.105 per cent (one case) found in the right ovary of one genitalia, in association with macerated foetus.

Macroscopic pathology:

The ovary was rough to feel. Aggregates of pin head sized cavities were seen over the entire cut surface of the ovary (Fig. 13). There was no ovario-bursal adhesion. Neither developing follicles nor functional or degenerating corpora lutea were seen.

Microscopic pathology:

Atretic follicles were seen closely arranged in groups in the ovarian cortex (Fig. 14). The follicular wall was composed of fibrous connective tissue with single layer of flat epithelium. There was no evidence of any degenerating oocyte in any of the follicles. The atretic follicles appeared more like retention cysts. Secondary follicles were not traceable in the ovarian cortex. Few degenerated corpora lutea were seen.

PAR OVARIAN CYST:

Incidence:

This condition was observed in 13 (1.368%) genitalia examined. All the cysts were unilateral.

Macroscopic pathology:

The cysts were seen close to the left ovary in two cases (Fig. 15). However, the ovaries were of normal size and showed evidence of being functional. The other cysts were seen in the mesovarium free of any connections with the ovaries and oviducts.

Microscopic pathology:

The cyst wall, made up of fibrinous connective tissue and unstriated muscle fibers, was lined with a single layer of cuboidal or low columnar epithelium (Fig. 16).

BURSITIS:

Incidence:

The condition was seen in 8 (0.842%) genitalia examined. Unilateral bursitis was observed in six genitalia and bilateral in two genitalia. All these except one was partial. The total ovario-bursal adhesion wa seen in the ovary affected with oophoritis resulting in encapsulation of the ovary.

SALPINGITIS:

Incidence:

An incidence of 0.105 per cent (one case) mild salpingitis was observed. The condition was bilateral and was seen in association with bilateral cystic ovarian degeneration.

Macroscopic pathology:

The salpinx were slightly enlarged and thickened (Fig. 3). No change in colour or consistency was noticed.

Microscopic pathology:

The lining epithelium of the villi was found to show moderate degree of degenerative changes (Fig. 17). There was neither pus cells nor necrotic debri seen in the lumen.

Pathological changes of the uterus were seen in 20 (2.105%) genitalia examined.

MACERATED FOETUS:

Incidence:

This was the most common condition encountered during the present study. Sixteen (1.68%) genitalia revealed the presence of macerated foetus. In 13 cases, there were two or more macerated foetus in both the horns. The incidence of maceration was more in multiple (75%) than in single pregnancy.

Macroscopic pathology:

The affected horns were enlarged and pale in appearance. Brownish chocolate coloured material was found smearing the endometrial surface. The maternal caruncles were enlarged (Fig. 18). In no case foetal bones could be seen in the uterus.

ENDOMETRITIS:

Incidence:

Endometritis was observed in two (0.21%) genitalia.

Macroscopic pathology:

The condition occured in association with macerated foetus. No gross lesions were evident. External appearance of the uterus was generally normal. The endometrium was smeared with chocolate coloured material. Neither muscular layer nor the serosa showed any marked changes.

Microscopic pathology:

Variable degrees of desqumation of the epithelium with diffuse infiltration of mucosa with lymphocytes, and neutrophils were observed (Fig. 19). Diffuse congestion of the mucosa was also observed. The capillaries and large vessels were greatly distended and packed with red blood cells.

CYSTIC GLANDULAR HYPERPLASIA:

Incidence:

This condition was seen in one case (0.10%) in association with bilateral cystic ovarian degeneration.

Macroscopic pathology:

The uterus was small in size (Fig. 3). Uterine wall appeared slightly thickened and the mucous membrane appeared pale.

Microscopic pathology:

There was proliferation of the endometrial glands and they were arranged irregularly. Wide variation in the size and shape of the glands were also noted. Some of the glands, especially, the superficial ones, showed cystic enlargement (Fig. 20). The cystic glands were lined by a single layer of flat epithelium and the cavity contained necrotic debri and few neutrophils.

ENDOMETRIAL CYST:

Incidence:

This condition was seen in one (0.105%) of the genitalia examined, in association with cystic ovary.

Macroscopic pathology:

The endometrium revealed small translucent cysts of about 4 mm in diameter diffusely scattered in the entire surface.

Microscopic pathology:

The cyst wall was lined by a layer of epitholium. There was break in continuity of the cyst wall at many places. Sub-epithelial haemorrhage was evident in the cyst wall (Fig. 21).

No lesions were observed in the cervix, vagina and vulva of any genitalia examined.

TABLES

Table - I

Overall incidence of pathological lesions in the genitalia of female goats.

Total genitalia examined	Number of genitalia with pathological lesions	Overall per cent of pathological lesions
950	48	5.053

Table - II

Incidence of pathological conditions of ovaries

Description of the condition	Number of cases			percentage of incidence.	percentage of the reproductive disorder.
	Unilateral	Bilateral	Total		
Ovarian hypoplasia	3	-	3	0.316	4.921
Cystic ovarian degeneration	8	1	9	0.947	11.748
Cystic corpus luteum	3	1	4	0.421	6.557
Chronic oophoritis	2	-	2	0.211	3.286
Multifollicular atresia	1	-	1	0.105	1.635
Par ovarian cyst	13	-	13	1.368	21.305
Total	30	2	32	3.368	49.452

Table - III

Incidence of pathological conditions of bursa and salpinx.

Description of the condition	Number of cases			percentage of incidence	percentage of the reproductive disorder.
	Unilateral	Bilateral	Total		
Bursitis	6	2	8	0.842	16.131
Salpingitis	-	1	1	0.105	1.635
Total	6	3	9	0.947	17.766

Table - IV

Incidence of pathological conditions of the uterus.

Description of the condition	Number of cases			percentage of incidence	percentage of the reproductive disorder.
	Unila-teral	Bilateral	Total		
Macerated foetus	3	13	16	1.684	26.226
Endometritis	-	2	2	0.211	3.286
Cystic glandular hyperplasia	-	1	1	0.105	1.635
Cysts in the endometrium with sub-epithelial haemorrhage	-	1	1	0.105	1.635
Total	3	17	20	2.105	32.782

PLATES

Fig-1.

Fig-2.

Fig. 3.

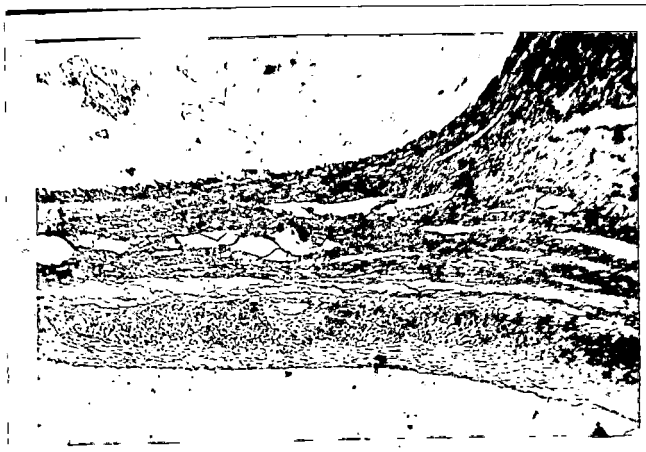


Fig. 4.

Fig. 5a.

Fig. 5b.

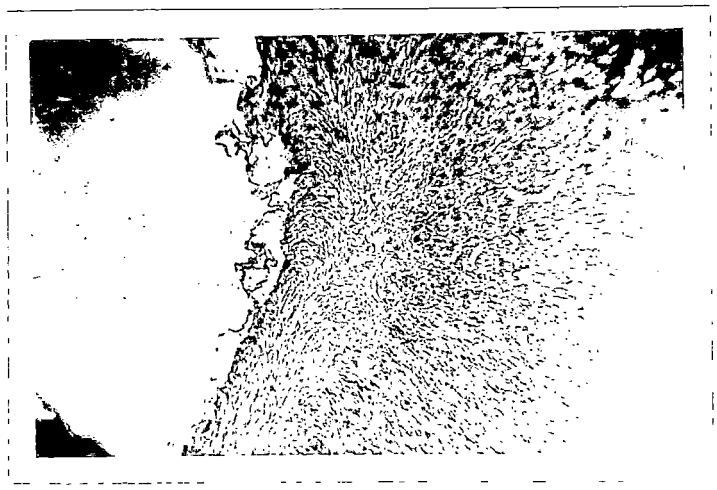


Fig. 6.

Fig- 7a.

Fig. 7b.

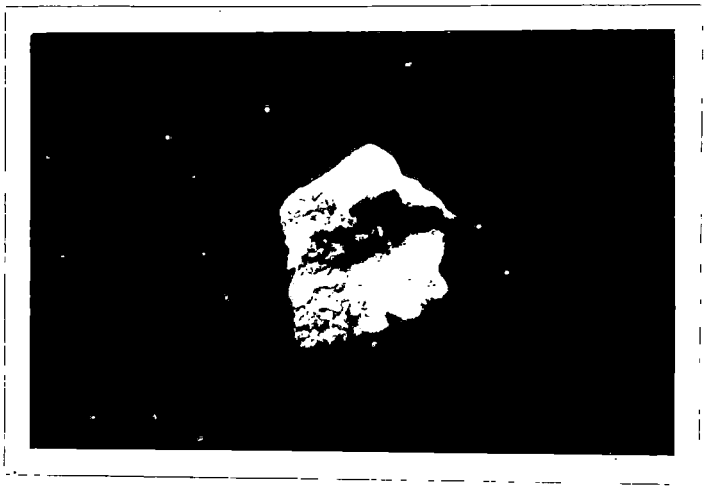
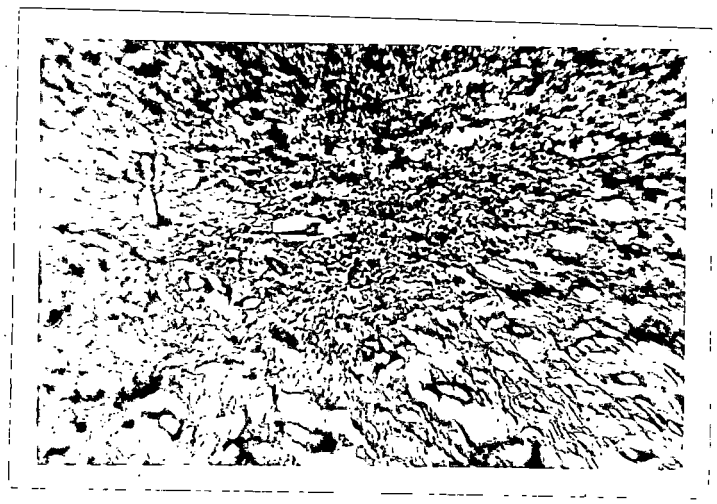


Fig. 8.

Fig. 9.

Fig. 10.



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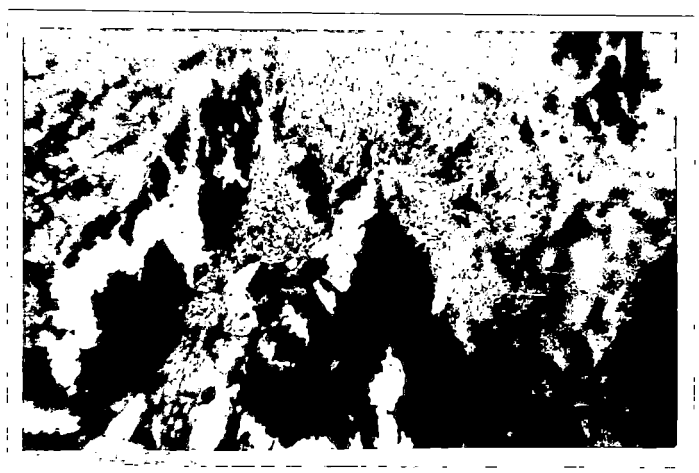

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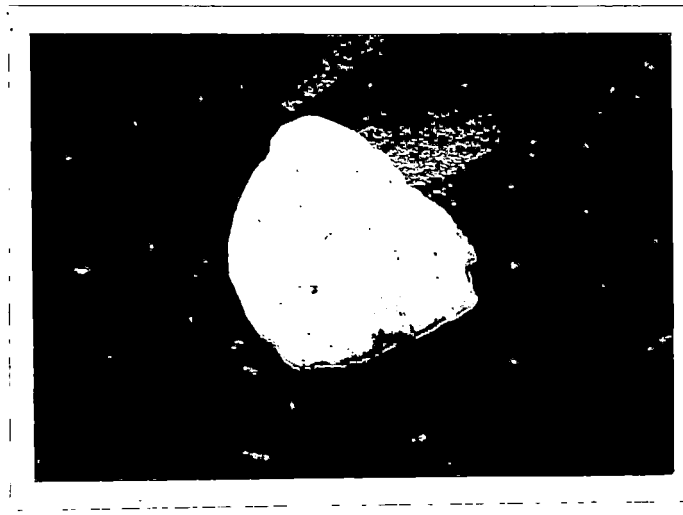

Fig. 13.

Fig. 14.

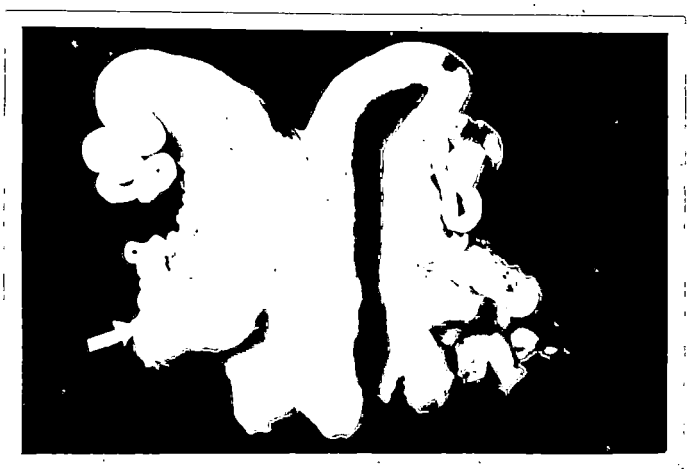

Fig. 15.

Fig. 16.

Fig. 17.

Fig. 18.

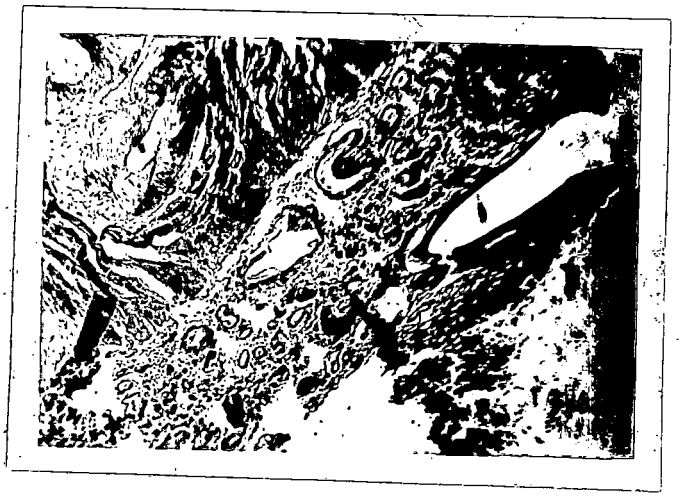

Fig. 19.

Fig. 20.

Fig. 21.

DISCUSSION

DISCUSSION

The overall incidence of various pathological conditions in the genitalia of female goats was found to be 5.053 per cent. This incidence is lower than the overall incidence reported in goats by Lyngset (1968), Singh and Rajya (1977), Abeyratne et al. (1978) and Das et al.(1979) but is higher than that reported by Nair and Raja (1972). The lower incidence presently obtained might be on the account of the fact that the goats slaughtered were of different age groups and were not exclusively barren discards.

Three cases (0.316%) of unilateral partial hypoplasia of the ovaries have been recorded. This incidence is more than that recorded by Lyngset (1968) but lower than that recorded by Bhaskaran and Sivadas (1969) and Abeyratne et al (1978). Settergren (1964) reported that the number of primordial follicles in both the ovaries of a heifer with one ovary partially or totally hypoplastic averaged 19,000 to 23,000 only. If both the ovaries were totally hypoplasti the total number of follicles were only 500. Jubb and Kennedy (1970) stated that the primary morphological defect in the hypoplastic ovaries in cattle is a deficiency in the number of follicles. Lack of organisation of the germinal cells into secondary follicles and the presence of ovigerous cords and primary graafian follicles and the

preponderance of atretic follicles confirmed the condition as partial ovarian hypoplasia.

Cystic ovarian degeneration was one of the most common gonadal affections presently encountered. A total of nine (0.94%) genitalia showed evidence of cystic ovarian degeneration. However, this incidence is less than that reported by Lyngset (1968), Bhaskaran and Sivadas (1969), Singh and Rajya (1977), Abeyratne et al. (1978) and Das et al. (1979), but higher than that reported by Nair and Raja (1972). The condition arises from the failure of mature follicles to ovulate, but instead become cystic. The pathogenisis is not clear, but there is good evidence of functional dearrangement of the pituitary gland. The affected follicles are larger than the normal ones with appreciably thicker walls and are under more tension. Histologically, the ovum is absent and most of the granulosa is either degenerate and lost or becoming so (Jubb and Kennedy, 1970). In the present work, the right ovary was found to be more frequently affected (55.5%) than the left. This is in confirmation with the observation of Lyngset (1968), Roberts (1971) and Nair and Raja (1972). Only in one genitalia, both the ovaries showed multiple cysts. Lyngset (1968) had also reported the presence of multiple cysts in goats. Since varying degrees of luteinisation of the cyst wall were seen in all the cysts, and the breeding history of

the slaughtered animals were not known, it was impossible to distinguish between the follicular and luteal cysts. In confirmation with the findings of Ajello (1947) and Garm (1949) cystic glandular hyperplasia of the uterus was observed in association with cystic ovaries only in one case.

Cystic corpus luteum was recorded in 0.421 per cent (4 cases) genitalia. The condition occurs following ovulation with the formation of a cystic cavity in the centre of the mass of developing luteal tissue. The pathogenesis of the cystic corpus luteum has not been established. Asdell (1948) observed in cattle that a good proportion of normal corpus luteum remain demonstrably hollow until 8 days from oestrum, and opined that the more presence of a central cavity should not be taken as an indication of pathological cysts. However, Dawson (1949) considered that in cattle any corpus luteum with a central cavity of more than 8 mm diameter as pathological. No such demarcation seems to have been described for cystic corpus luteum in the case of sheep and goats. In the present study, however, cavity of 4 mm or more was considered pathological. Since the breeding history of the slaughtered animals were not known the pathological significance of this condition could not be ascertained with certainity.

Chronic oophoritis was observed in two (0.21%) genitalia examined. This incidence is more than that reported by Lyngset (1968), Nair and Naja (1972) and Singh and Najya (1977). Suppurative process takes the form of an abscess, generally the result of haematogenous metastatic infection but sometimes as ascending infection by way of the fallopian tube in purulent endometritis (Nieberle and Cohrs, 1966). The fact that there was total ovario-bursal adhesion and encapsulation of the ovary in one case points to a possible ascending infection.

There was a single case of (0.10%) unilateral multiple follicular atresia. The condition was characterised by the presence of multiple atretic follicles in the ovary. The absence of the degenerating oocyte and cumulus cells and the presence of only a single layer or two of flat epithelial cells lining an outer fibrous tissue capsule points out that the atretic follicles instead of undergoing resorption had remained as retention cysts. Follicular atresia is a normal phenomenon and the destiny of any follicle which does not attain maturity. On the other hand, follicular atresia is pathological when unnatural influences inhibit the final maturation (Jubb and Kennedy, 1970). The form of atresia depends on the stage of development of the follicle when degeneration begins. It is always preceded by degeneration of the ovum and its zona pellucida. The affected follicles may cease to

develop at any stage between development of antrum and formation of the ripe follicle. It is not known how long they may persist before degenerating. The final process in the atresia is infiltration by connective tissues which, when mature, form a collagenous core. An alternate form of immature follicles results in the formation of cysts which, after degeneration of the ovum and granulosa epithelium, are lined by a single layer of epithelium. They may be very persistent and are common and multiple in pregnancy, much less frequent and solitary in debility (Jubb and Kennedy, 1970). The multiple follicular atresia presently recorded is similar to the one described in pregnancy by the earlier workers. There is no other report except that of Singh and Rajya (1977) and the multifolliculoids described by Singh and Rajya (1977) might be same condition.

Par ovarian cyst is used rather loosely in reference to a variety of cystic structures located adjacent to the ovary. These cysts are caused by cystic enlargement of the vestiges of wolffian or mesonephric ducts and mullerian or paramesonephric ducts. In the present study 1.368 per cent (13 cases) of the genitalia revealed this condition. This incidence was found to be higher than that recorded by Lyngset (1968), Nair and Raja (1972), Singh and Rajya (1977) and Das et al.(1979) but less than that reported by Bhaskaran and Sivadas (1969) and Abeyratne et al.(1970). The cysts being small and situated not too close to the

ovary and oviducts would not have interfered with the functions of the organs.

Bursitis was observed in eight (0.84%) genitalia of which 7 were partial and seen in association with macerated foetus. Complete ovario-bursal adhesion with encapsulation of the ovary was seen in association with oophoritis in one non-gravid genitalia. This incidence is much more than that recorded by Nair and Raja (1972) and Abeyratne et al.(1978), but less than that reported by Das et al. (1979). Wright (1945) frequently found unilateral adhesions in animals which did not conceive for longer periods and remarked that bursitis was an important cause for infertility in cattle. Inflammation of the ovarian bursa generally occurs due to trauma. A wide variety of lesions such as few fibrinous threads between the bursa and the ovary, partial adhesion of the edge of the ovary, roughness of the internal wall of the bursa, narrow or closed bursa and cysts of the bursa have been observed in chronic bursitis in cows (Roberts, 1971). Although ovary was functional in most cases of bursitis, the adhesion would have caused mechanical obstruction for the passage of the ovum, as stated by Wright (1945).

Mild salpingitis was observed in one of the genitalia examined. This incidence (0.10%) is found to be higher than that reported by Nair and Raja (1972). The condition was bilateral and seen in association with bilateral cystic

ovarian degeneration. Garm (1949) reported that the appearance of the oviduct was normal in most cases of cystic ovarian degeneration. Sometimes it was thickened and sometimes some yellow fluid could be squeezed out, and microscopically this was composed of epitholial cells and debris. The present condition might be similar to that described by Garm (1949).

Pathological changes of the uterus were recorded in 2.105 per cent cases studied, the major condition being macerated foetus (1.684%). Macerated foetus is relatively frequent in the case of goats. This incidence (1.684%) is found to be higher than that recorded by Lyngset (1968), Bhaskaran and Sivadas (1969), Nair and Raja (1972), Singh and Rajya (1977) and Abeyratne et al. (1978). In multipara early maceration and resorption of the foetus are believed to be not usually associated with infection. According to Roberts (1971) maceration of early embryos and foetuses ends up in their being resorbed, while the other foetus in the uterus may develop normally. In the present study, all the foetuses had undergone extensive maceration. Apparently normal foetuses were not found since the study was limited to non-gravid genitalia. The incidence of maceration was more in multiple than in single pregnancy and occurred in the first two months of pregnancy.

Acute non-suppurative endometritis was seen in two

(0.21%) genitalia examined. This incidence is much lower than that reported by Bhaskaran and Sivadas (1969) and Singh and Rajya (1977). Since this condition was associated with macerated foetus, mild infection might have been the cause. Circulatory disturbances was the most prominent microscopic change. Capillaries and larger vessels were greatly distended and were packed with red blood cells. There was diffuse infiltration of the mucosa with lymphocytes and neutrophils.

Cystic glandular hyperplasia of the endometrium was observed in one (0.10%) genitalia. This was seen in association with bilateral cystic ovarian degeneration. In the present study, the main histological picture was cystic dilatation of the endometrial glands. Pasture legumes as sources of oestrogenic activity have claimed much attention as a cause of a spectacular syndrome of infertility in sheep and cows (Roberts, 1971). Several workers have linked up this condition with hyper oestrogenism of the animals due to follicular cysts (Ajello,1947; Garm, 1949). In the present study, cystic glandular hyperplasia was seen in association with bilateral cystic ovarian degeneration. This finding, therefore, is in accordance with the reports of Ajello (1947) and Garm(1949)

In another genitalia, the uterine horns revealed small transluscent cysts of about 4 mm in diameter scattered

throughout the endometrium in the inter cotyledonary space. The histological picture revealed endometrial cysts with sub-epithelial haemorrhage. Persual of available literature does not reveal any earlier report about this condition. Since this was seen in association with unilateral cystic ovarian degeneration, hormonal disturbance might be attributed as the causation factor for this condition.

The cervix, vagina and vulva did not reveal any pathological lesions in any of the genitalia examined.

SUMMARY

SUMMARY

With the object of assessing the incidence and nature of pathological conditions in the genitalia of female goats, a study was undertaken using nine hundred and fifty genitalia, inclusive of forty two gravid ones, collected at random, from the slaughter house, Corporation of Cochin, Ernakulam. Neither the age nor the breeding history of the slaughtered animals were known. The genital organs were first examined for gross pathological lesions. The tissues from the grossly affected organs and from those which were suspected to be affected were subjected to detailed histopathological studies.

Various pathological lesions were observed in 48 (5.053%) genitalia, out of the 950 examined, Thirty two (3.368%) genitalia revealed various pathological changes in the ovaries. Ovarian hypoplasia was observed in three (0.316%) genitalia. The ovaries were small, flat and firm. Lack of organisation of the germinal cells into secondary follicles, presence of few ovigerous cords, primary graafian follicles and the preponderance of atrotic follicles confirmed the condition.

Cystic ovarian degeneration was seen in nine (0.947%) genitalia. Graafian follicles larger than 1 cm. in diameter were considered cystic. The right and left ovaries were affected in 55.5 per cent and 44.5 per cent respectivel

All the cysts were single except bilateral multiple cysts in a single genitalia. Cystic corpus luteum was encountered in four (0.421%) genitalia. Cavities of 4 mm. diameter or more were considered pathological in the present investigation. The right ovary was involved in 66.6 per cent cases as against 33.3 per cent in the left.

Chronic oophoritis was observed in two cases (0.211%), one in a gravid and the other in a non-gravid genitalia. The condition seen in the left ovary of the gravid genitalia was characterised by nodular elevation on the surface of the ovary. In the non-gravid genitalia, an abscess was seen in the left ovary. Multiple follicular atresia was recorded in 0.105 per cent of the genitalia examined. Pin head sized cavities were seen over the entire cut surface of the ovary. Histologically, atretic follicles were seen closely arranged in groups in the ovarian cortex. Par ovarian cysts were seen in 13 (1.368%) genitalia examined. All the cysts were unilateral. Bursitis was noticed in eight (0.842%) genitalia, of which 7 were partial and seen in association with maceration of foetus. Complete ovario-bursal adhesion was seen in oophoritis. Salpingitis was observed in a single (0.105%) genitalia. The condition was bilateral and was seen in association with bilateral cystic ovarian degeneration.

Pathological changes of the uterus were recorded in 20 (2.105%) genitalia, the major condition being foetal

maceration (1.684%). In 13 cases, there were two or more macerated foetus in both horns. The incidence of maceration was more in multiple than in single pregnancy. In all the cases maceration had occurred during the first two months of gestation and no foetal bones could be seen in the uterus.

Endometritis was evident in two (0.211%) genitalia. This was seen in association with foetal maceration. No gross lesions were evident. Cystic glandular hyperplasia was observed in a single (0.105%) genitalia, in association with bilateral cystic ovarian degeneration. The endometrium of one genitalia (0.105%) revealed small translucent cysts of about 4 mm. in diameter diffusely scattered on the entire surface.

No lesions were observed in the cervix, vagina and vulva in any of the genitalia examined.

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INVESTIGATION ON THE PATHOLOGICAL CONDITIONS IN THE GENITALIA OF FEMALE GOATS

By

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ABSTRACT OF A THESIS

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ABSTRACT

A study was undertaken to assess the incidence and nature of pathological conditions affecting the genitalia of female goats.

The material for the present study comprised of 950 genitalia, inclusive of 42 gravid ones, collected at random, from the slaughter house, Corporation of Cochin, Ernakulam. The organs which revealed gross lesions and those which were suspected to be affected were subjected to detailed histopathological studies.

Pathological lesions of genital organs were observed in 48 (5.053%) genitalia. Thirty two (3.368%) genitalia revealed various pathological changes of the ovaries and pathological changes of the uterus were recorded in 20 (2.105%) genitalia. The cervix, vagina and vulva did not reveal any pathological changes in any of the genitalia examined.

The following pathological conditions were observed during the course of the present study:

Ovarian hypoplasia (0.316%); cystic ovarian degeneration (0.947%); cystic corpus luteum (0.421%); chronic oophoritis (0.211%); multifollicular atresia (0.105%); par ovarian cyst (1.368%); Bursitis (0.842%); salpingitis (0.105%); macerated foetus (1.684%); endometritis (0.211%); cystic glandular hyperplasia (0.105%) and cyst in the