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## COMPARATIVE AND PATHOLOGICAL STUDIES ON THE REPRODUCTIVE TRACT OF ALGERIAN EWES AND GOATS

(With 4 Tables and 15 Figures)

By

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دراسة مقارنة لامراض الجهاز التناسلى لإناث الاغنام والماعز فى الجزائر

فاطيمة بن شعيب ، عبد النظيف نيار

اجريت هذه الدراسة على ٦٣٩ عينة رحم لاناث الاغنام واناث الماعز من المجازر الحكومية بتيارت (الجزائر). وجمعت هذه العينات بغرض فحصها عيانيا ثم تثبيتها وفحصها عن طريق الميكروسكوب الضوئى وفحص بعضها منها عن طريق الميكروسكوب الالكترونى وبالتحديد الماسح وذلك لاستكشافات مدى التشوهات التى تحصل بداخل الجهاز التناسلى فى مختلف الامراض وتوضيح مدى خطورة ذلك فيما يخص الخصوبة عند اناث هذه الحيوانات التى تعتبر من اهم الثروات الحيوانية فى الجزائر. واطهرت النتائج ان نسبة الحالات المرضية كانت ٢٥,٩٢% عند اناث الاغنام و ٢٤,١٨% عند اناث الماعز. اما التشوهات الخلقية للرحم كانت بنسبة عالية حوالى ١٠,٥٠% عند اناث الاغنام و ٥,٨٩% عند اناث الماعز. وهذا يعتبر عائق عند التلقيح الاصطناعى عن طريق المهبل فى هذه الحيوانات مما لا يسمح بالحمل الا بنسبة ضئيلة لا تصل الى المستوى المطلوب. اما الهيبوبلزيا فى المبيض فكانت بنسبة ٣,٩١% عند اناث الاغنام و ٤,٦٠% عند الماعز والحوصلات الملتصقة بالمبيض وما حولة فكانت حوالى ٣,٥٠% و ٥,٢٢% عند اناث الاغنام والماعز لكنها لا تاتر كثيرا على الخصوبة مثل الهيبوبلزيا فى المبيض الايمن واليسر. اما الالتهابات فى الرحم كانت اكثرها عند اناث الاغنام ٢,٢٦%. التهابات الرحم تؤدى فى كثير من الحالات الى انخفاض الخصوبة مما يستوجب الفحص الدقيق لها والاسراع بعلاجه. وبناء عليه فان مثل هذه الدراسات التفصيلية تسمح بتقييم الكفاءة التناسلية عند اناث الاغنام والماعز وبوضع مخطط علمى كفيلى بزيادة انتاجية الاغنام والاهتمام بتوسيع تربية الماعز وتحسينها.

### SUMMARY

This study was planned to investigate the common pathological lesions in the ovary, the oviduct, the uterus and the cervix, (vagina was excluded) in apparently healthy adult slaughtered ewes and goats. The genital organs of six hundred thirty nine ewes and goats from Algerian

breeds at different ages from six months to three years old were collected from Tiaret abattoirs. From 486 genital tracts of ewes, there were pathological changes in 126(25.92%) cases and 50(10.30 %) cases were gravid. In the ovary: The incidence of hypoplasia was 3.91%, paraovarian cyst 3.50 %, ovarian adhesions 1.86 %, and ovarian abcess, granulosa cell tumor were respectively 0.20%; In the oviduct: cyst of oviduct 0.83%, and salpingitis 0.41%. In the uterus: endometritis 2.26%, pigmentation of the uterine mucosa and fetal mummification were respectively 0.62%. In the cervix: tortuous cervix 10.50%, hypoplasia of cervical rings was 0.20%. From 153 genital tracts of goats, there were pathological changes in 37 (24.18%) cases and 24 (15.68%) cases were gravid. In the ovary: The incidence of paraovarian cyst was 5.22%, ovarian hypoplasia 4.60 % ovarian adhesions 1.96 %, the follicular cyst, the cystic ovarian degeneration and the ovarian abcess were respectively 0.65 %. In the uterus: endometritis 0.65%, fetal mummification 0.65 %. In the cervix: tortuous cervix 5.89%, hypoplasia and hypertrophy of cervical rings were respectively 1.96%), 1.30%. Tortuous cervix, ovarian hypoplasia were the most lesions observed in the genital organs of ewes. In goats, indeed of tortuous cervix, paraovarian cyst was the most lesion observed. The narrow nature of cervix in ewes more than in goats makes vaginal insemination difficult outside of estrous period. ovarian hypoplasia was detected in ewes more than in goats, it can be a factor of infertility when it is bilateral. Inflammatory changes in the uterus were also seen in ewes more than in goats. These pathological disorders are factors of infertility and cause a big damage and irreversible alterations in the endometrium if they are not early diagnose and adequately treat.

***Key words:** Ewe, goat, ovary, oviduct, uterus, cervix, histopathological, structural changes (S. E. Microscope)*

## **INTRODUCTION**

Genital organs disorders are important factors of infertility or sterility. Many studies were performed on these disorders in many countries in all the world (Adams, 1975; Long, 1980 and Kiran and Erer, 1995). In some studies about investigations of reproductive tract disorders in ewes and goats, ovarian lesions (ovarian hypoplasia, paraovarian cyst, follicular cyst and ovarian neoplasms) have been reported by many authors (Singh and Rajya, 1977 and Karadas and Timurkaan, 1999).

Oviduct lesions and inflammatory changes in the uterus and the cervix may all so cause infertility or sterility. The most common and important lesions registered was salpingitis in the oviduct. In the uterus and in the cervix, metritis, suppurative endometritis and cervicitis have been reported by Sokkar and Kubba, (1980) and Timurkaan and Karadas, (2000).

The aim of the present study is to give more information on the pathological lesions of genitalia in ewes and in goats under Algerian conditions and learn more about functional and pathomorphological changes especially in the uterus and the cervix.

## **MATERIALS and METHODS**

The material was obtained from an abattoir study in which the genital tracts of six hundred thirty nine slaughtered ewes and goats from Algerian breeds and different ages were examined between 2003 - 2005 for detecting pathological changes in the ovaries, the oviduct, the uterus and the cervix.

**Histopathological examination:** The ovaries, the oviduct, the uterus and the cervix (vagina was not examined in this survey) were examined after slaughter procedures and lesions were recorded. Samples were brought to the laboratory and tissue of affected samples were fixed in 10 percent formalin, routinely processed and embedded in paraffin wax. Sections cut at 5 $\mu$ m thickness were stained with hematoxylin and eosin (H&E).

**Scanning electron examination:** 10 Samples of uterus and cervix of slaughtered ewes were prepared for examination on scanning electron microscope (Assiut university, Egypt) in order to show the normal structure of the endometrial and cervical mucosa and to compare it with an abnormal case, (metritis in ewe).

They were fixed by immersion in 5% glutaraldehyde for 48 hours and post fixed in 1% osmic acid for 2 hours, washing for 3 changes in buffer for 4 hours. The specimens obtained were dehydrated gradually in alcohol (ethanol 30, 50, 70, 90, 100%), drained off excess alcohol, immersion in amylacetat for 1- 2 days and drying by using liquid CO<sub>2</sub> for type tissue and cells. The final mounting consisted on sticking the sample on metallic block by using silver past or carbon past and the samples were examined later on the scanning electron microscope.

## RESULTS

The materials in this work was six hundred thirty nine samples of pregnant and non pregnant genitalia of ewes and goats from different ages bred under the local environmental condition of Algeria.

### I- IN EWES:

The genital organs of slaughtered ewes were subjected to morphopathological investigation and microscopical examination in order to detect pathological changes in the ovary, the oviduct and the different alterations in the uterus and the cervix.

The normal structure of endometrial and cervical mucosa was determined by scanning electron microscope, (Fig 1), (Fig 2) and (Fig3). The alterations of the surface epithelial mucosa in the pathological cases were studied in only one case, (metritis in ewe). The pathological cases and the gravid uteri are recorded as follows in Table 1:

**Table 1:** Percentage of gravidity and pathological cases in slaughtered ewes

State	N0/486	%
Gravid cases	50	10.30
Pathological cases	126	25.92

The different lesions observed in genitalia of slaughtered ewes were illustrated in Table 2.

#### 1. Ovary:

**-Ovarian hypoplasia:** It was found in nineteen (3.91%) cases, three cases bilaterally and sixteen unilaterally. It was seen only in non gravid samples. Grossly, the ovary was very small under one cm and was whitish. In some cases, one half of the ovary was affected. There were neither follicles no luteal scars apparently on the affected half of the ovary and the other half presented follicles which the number was very reduced comparatively to the normal ovary. This kind of ovarian hypoplasia was incomplete or partial unilateral and bilateral hypoplasia. Microscopically, the ovary was composed largely with medullary connective tissues and blood vessels. The ovarian cortex was partially absent forming a thin or incomplete investment for the medulla. The germinative stroma was deficient but a few primary follicles were found.

**-Paraovarian cysts:** were found in the mesovarium and the mesosalpinx in seventeen (3.50 %) cases, ten in the right and seven in the left side in pregnant and non pregnant cases, (Fig 4).

**Table 2:** Lesions of genitalia in slaughtered ewes

Lesions	Right Side NO.	Left Side NO.	Bilateral NO.	Total	Incidence % Total ewes(486)
Ovarian hypoplasia	07	09	03	19	3.91 %
Paraovarian cyst	10	07	-	17	3.50 %
Ovarian adhesions	04	03	02	09	1.86 %
Granulosa cell tumor	-	-	01	01	0.20 %
Ovarian abcess	01	-	-	01	0.20 %
Abcess of oviduct	02	02	-	04	0.83 %
Salpingitis	02	-	-	02	0.41 %
Endometritis	-	-	11	11	2.26 %
Pigmentation of uterine mucosa	-	-	03	03	0.62 %
Fetal mummification	-	-	03	03	0.62 %
Fetal maceration	-	-	01	01	0.20 %
Cystic hyperplasia of endometrium	-	-	02	02	0.41 %
Abcess of endometrium	-	-	01	01	0.20 %
Tortuous cervix	-	-	51	51	10.50 %
Hypoplasia of cervical rings	-	-	01	01	0.20 %
Total	26	21	79	126	25.92 %

The paraovarian cysts have a variable size, shape and number and the diameter vary from one to ten cm and more. Microscopically, the cyst was lined by a single layer of cuboidal epithelium and the wall contained smooth musculature.

**-Ovarian adhesions:** It was observed in nine (1.86%) cases, unilateral in seven cases and bilateral in two cases. Adhesions were between the ovary, periovarial tissue, mesovarium and the mesosalpinx in some cases. These lesions were accompanied in one unilateral case by purulent salpingitis. Bilateral ovarian adhesions was seen in one case of twin pregnancy.

**-Granulosa cell tumor:** It was observed in one (0.20%) case and was bilateral. The surface of the tumor was smooth and the cut surface consisted predominantly of cysts of varied size. It was a mixture of solid and cystic tissue. The solid portions of the tumor were white. Microscopically, follicular, trabecular, and diffuse patterns of growth of the neoplastic granulosa cells were present. The neoplastic cells looked like granulosa cell in growing follicle. They have spherical to oval nuclei and scant eosinophilic cytoplasm. Call-Exner bodies were present (small cavities containing follicular fluid surrounded by radially arranged granulosa cells), (Fig 5).

**-Ovarian abcess:** It was observed near the ovary in one case (0.20%). It was containing pus and was two cm in diameter.

## **2. Oviduct:**

**-Abscess of oviduct:** The incidence was (0.83%). It was observed in two cases in the right side, in the mesosalpinx and in two cases in the left side in non pregnant samples. It vary in diameter from one to five cm.

**-Salpingitis:** The incidence of this lesion was (0.41%). It was observed in two cases. Macroscopically, the oviduct was thickened and have an oedematous appearance in one case, the other case was characterised with severe thickness of oviduct and three small abscess were present in the mesosalpinx. In this case suppurative endometritis and cervicitis were also observed. Histologically, the mucosa was affected, extensive neutrophil accumulation, and desquamated epithelium cells were observed in the lumen of oviduct in purulent salpingitis.

## **3. Uterus:**

**Inflammatory changes in uterus and cervix:** were primarily lesions observed in the uterus in non pregnant cases.

**-Endometritis:** in this study, inflammatory changes of endometrium was found in eleven (2.26%) cases and were accompanied in some of them by cervicitis, (Fig 6). Endometritis was classified as purulent endometritis, catarrhal endometritis and metritis. Purulent endometritis was observed in five cases, smelly pus accumulation was seen in the uterine lumen and in the cervix. Microscopically, accumulation of desquamated epithelial cells and extensive neutrophil granulocytes were detected in the lumen of uterus and uterine glands, (Fig 7). Catarrhal endometritis was observed in three cases, macroscopically, uterine mucosa was hyperemic and oedematous, it was covered by viscous and white exudate. Microscopically, degeneration and desquamation in the epithelium, hyperemia, oedema and mononuclear cells infiltration in the lamina propria were observed. A few neutrophiles were detected in the uterine lumen, (Fig 8) Metritis was observed in three cases, the wall of the uterus was thickened with suffused blood and oedema fluid and was very friable. Microscopically, the subserosal connective tissues were oedematous and infiltrated with leukocytes and the same process surrounds the blood vessels of the myometrium. The cervix was thickened and oedematous. The uterus and the cervix were examined by scanning electron microscope, the surface epithelial changes in the endometrial and the cervical mucosa were showed in (Fig 9), (Fig 10) (Fig 11), (Fig 12).

**In addition of these lesions:**

**-Cystic hyperplasia of endometrium:** was observed in two (0.41 %) cases. It was associated to granulosa cell tumor. Microscopic examination revealed oedema glandular hyperplasia, (Fig 13).

**-Pigmentation of uterine mucosa (0.62%)** and abcess of the endometrium (0.20 %) were also seen in the uterus. In the pregnant genital tracts of ewes, fetal mummification (0.62%) was observed in three cases and fetal maceration (0.20%) was observed in only one case.

**4. Anomalies of the cervical canal and rings:**

**-Tortuous cervix** was observed in fifty one cases. The incidence of this anomaly of the cervix 10.50% was very high comparatively with the other lesions found in the genital organs of slaughtered ewes examined in this survey. Macroscopically the cervical canal was sharply curved and presented from four to six folds. The second fold was eccentric to the other concentric folds in some cases. Extreme tortuous cervical canal was the most anomaly observed in the cervix, (Fig 14).

**-Hypoplasia of cervical rings:** The incidence of this anomaly was 0.20%. It was observed in only one case. The cervical rings were small in size with the absence of one ring.

**II-IN GOATS:**

The pathological cases and the gravid uteri observed in genitalia of slaughtered goats are registered as follows in Table 03:

**Table 3:** Percentage of gravidity and genital lesions in examined slaughtered goats

State	N0/153	%
Gravid cases	24	15.68
Pathological cases	37	24.18

The different lesions observed in the genital tract of slaughtered goats were illustrated in Table 04.

**1. Ovary:**

The incidence of the ovarian lesions in genitalia of goats were:- paraovarian cyst (5.22%), ovarian hypoplasia (4.60%), ovarian adhesions (1.96%) and the ovarian abcess (0.65%). Macroscopically and microscopically, paraovarian cyst, ovarian hypoplasia, ovarian adhesions and ovarian abcess revealed the same changes that we have described in the results of slaughtered ewes above mentioned.

**-Follicular cyst:** was single, on the right ovary, more than two cm in diameter. The wall of the cyst was thicker and under more tension. Histologically, the ovum was absent, the granulosa layer was variable in thickness; often it was degenerated or becoming so.

**-Cystic ovarian degeneration:** the cysts vary in type from follicular, two to three cm in diameter, lined by normal granulosa cells, (Fig 15). The endometrium showed glandular hyperplasia and the cervix contained thick viscid, grayish white cellular mucus.

**2. Uterus:** only two lesions were observed catarrhal endometritis (0.65%) and fetal mummification (0.65 %) respectively.

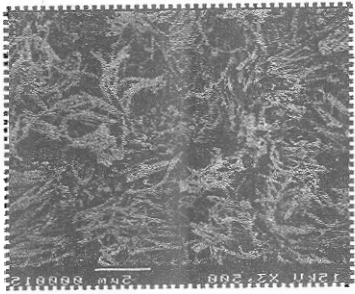
**3. Cervix:** Tortuous cervix (5.89%), hypoplasia of cervical rings (1.96%) and hypertrophy of cervical rings (1.30 %) were the most lesions observed.

**Table 4:** Lesions of genitalia in slaughtered goats

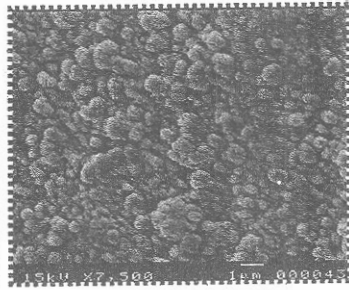
Lesions	Right side NO.	Left Side NO.	Bilateral NO.	Total	Incidence % Total goats (153)
Paraovarian cyst	05	02	01	08	5.22 %
Ovarian hypoplasia	06	01	-	07	4.60 %
Ovarian Adhesions	01	01	01	03	1.96 %
Follicular cyst	01	-	-	01	0.65 %
Cystic ovarian degeneration	-	-	01	01	0.65 %
Abcess of the ovary	01	-	-	01	0.65 %
Endometritis	-	-	01	01	0.65 %
Fetal Mummification	-	-	01	01	0.65 %
Tortuous cervix	-	-	09	09	5.89 %
Hypoplasia of cervical rings	-	-	03	03	1.96 %
Hypertrophy of cervical rings	-	-	02	02	1.30 %
Total	14	04	19	37	24.18 %



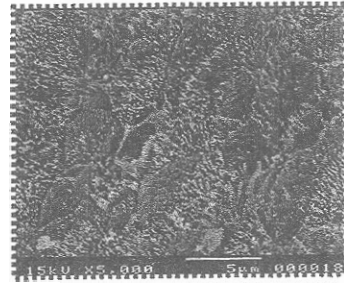
**Fig 1**



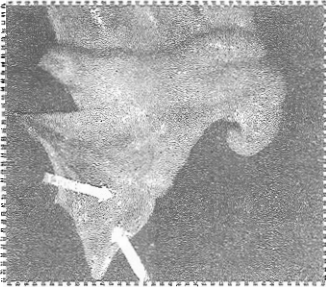
**Fig 2**



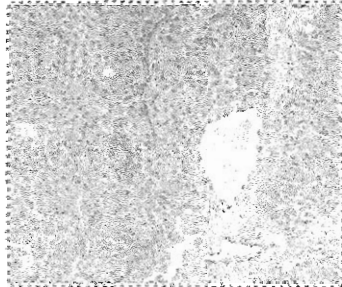
**Fig 3**



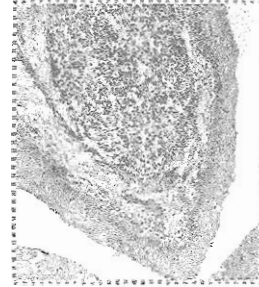
**Fig 4**



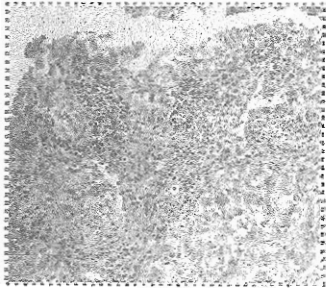
**Fig 5**



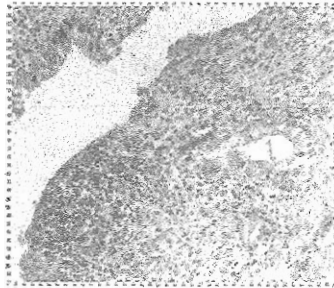
**Fig 6**



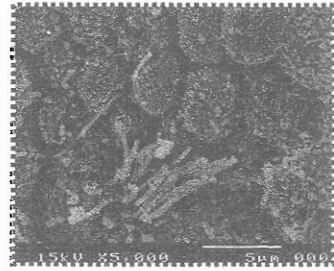
**Fig 7**

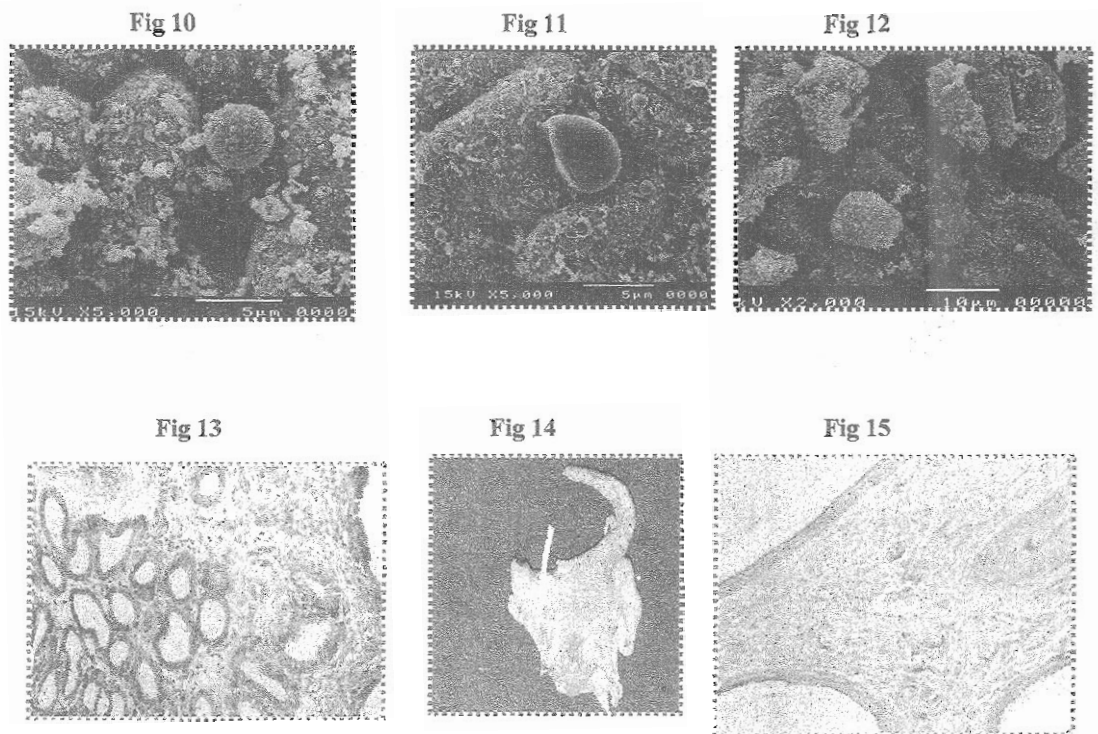


**Fig 8**



**Fig 9**





## LEGENDS

- Fig. 1:** Scanning electron microphotography showing the surface of epithelial cells (cilia and microvilli), cervical mucosa, ewe, (mag. x 3500).
- Fig. 2:** Scanning electron microphotography showing the surface of the non ciliated cell (microvilli), surface of epithelial cells, endometrial mucosa, ewe, (mag. x 7500).
- Fig. 3:** Scanning electron microphotography showing the mucocytes, surface of epithelial cells, cervical mucosa, ewe, (mag.x 5000).
- Fig. 4:** Paraovarian cyst (ewe).
- Fig. 5:** Granulosa -theca cell tumor with rosette formation around Call-Exner body, (H&E, x16).
- Fig. 6:** Chronic cervicitis, cellular infiltration in the lamina propria, (H&E, x16).

- Fig. 7:** Purulent endometritis, accumulation of desquamated cells and neutrophil granulocytes in the lumen of uterus and in the uterine glands, (H & E, x 16).
- Fig. 8:** Catarrhal endometritis, epithelial cell desquamation and cellular infiltration, (H& E, x16).
- Fig. 9:** Scanning electron microphotography showing degenerated cilia and microvilli endometrium, (metritis, ewe), (mag. x 5000).
- Fig. 10:** Scanning electron microphotography showing white exudate, microvilli and lymphocyte, (metritis, ewe), (mag.x 5000).
- Fig. 11:** Scanning electron microphotography showing mucocytes releasing the globules of mucus (cervix, ewe), (mag. x 5000).
- Fig. 12:** Scanning electron microscope microphotography showing degenerated epithelial cells and inflammatory cells in the cervix, (metritis, ewe), (mag. x 2000).
- Fig. 13 :** Glandular hyperplasia, endometrium (ewe), (H&E, x 16).
- Fig. 14:** Tortuous cervix (ewe).
- Fig. 15:** Ovarian cysts (cystic ovarian degeneration, goat), (H&E, x 6).

## DISCUSSION

Reproductive tract disorders are important factors of infertility or sterility in bovine raisings in Algeria. The same factors can cause heavy economic losses in ovine and caprine raisings which are very large in Algeria. For minimisation of these losses, it is important to learn more about the reproductive problems in ewes and goats. This study was undertaken for giving more information on genital pathology in ewes and goats bred under local environmental algerian condition. The incidence of the pathological genital changes was determined as 25.92 % in ewes and 24.18 % in goats.

**1. Ovarian affections:** 3.91% was the incidence of ovarian hypoplasia in ewes and 4.60% in goats. Lagerlöf and Boyd (1953) defined ovarian hypoplasia as "a condition of incomplete ovarian development, wherein the affected ovary or part of the ovary completely lacks follicles." ovarian hypoplasia, due to a germ cell deficiency, in domestic mammals has been studied most extensively in cattle more than ewes or goats. Karadas and Timurkaan (1999) reported an incidence of 0.21% of ovarian hypoplasia in slaughtered ewes and Timurkaan and Karadas (2000) reported an incidence of 0.10 % in slaughtered goats. The incidence of ovarian hypoplasia reported in the present study is higher

than the incidence reported by the reseachers mentioned above. Unilateral and bilateral incomplete or partial hypoplasia was seen in non pregnant cases with a relative hypoplasia of the remainder of the genital tract in nineteen cases of ewes and eight cases in goats. Hypoplasia occurs sometimes after passing from wintry alimentation to pasture and it can be a temporary factor of infertility in ovine and caprine raisings. In partial hypoplasia, the fertility is reduced according to the involved ovary and the degree of the defect, (Lindsay and Pearce, 1984).

**Paraovrian cyst** was the second anomaly observed in ewes in seventeen (3.50 %) cases and the first anomaly observed in goats in eight (5.22 %) cases. They were observed in pregnant and non pregnant samples and did not interfere with gravidity because they were found in the mesosalpinx around the ovary and the oviduct. Macroscopic and microscopic findings are in agreement with previous studies in cows (Alam, 1984) and in ewes (Long, 1980). Such cysts may originate from remnants of either mesonephric or paramesonephric tubules and ducts (Jubb, 1985).

**Ovarian adhesions** were observed in pregnant and non pregnant samples. The incidence of this anomaly in ewes and goats were respectively 1.86 % and 1.96 %. These incidences are higher than the incidence 0,50 % reported by Karadas and Timurkaan, (1999) in ewes. Bilateral ovarian adhesion was observed in twin pregnancy case in ewe, the ovaries were encapsulated in the bursa ovarica in the left and the right side and did not interfere with pregnancy. It was accompanying purulent salpingitis in the other case where the fertility was affected because the endometrium and the cervix presented severe inflammatory changes.

**Granulosa cell tumor** was found in only one (0.20 %) case in adult slaughtered ewe and it was bilateral. This lesion was not observed in slaughtered goats. Cordes and Shortridge (1971) reported three granulosa cell tumors in a series of 256 ovine neoplasms. The tumors were unilateral and occured in a newborn lamb that had bled to death following rupture of the tumor in the left ovary. Lyngset (1963) described a large granulosa cell in goat and stated that it was not possible “ to find any special mention of ovarian tumors in the goat in the litterature.” Lofstedt and Williams (1986) reported a granulosa cell tumor that occured in a 3-year –old Toggenburg goat. Granulosa cell tumor is the most common ovarian neoplasm in the cow and the mare and the incidence reported in our study is for one case observed on a total of six hundred thirty nine samples examined.

**Cystic ovarian degeneration** was observed in one (0.20 %) case in goats and was bilateral. Anovulatory ovarian cysts can apparently occur in all species, but they are important causes of reproductive failure only in cattle and swine, (Jubb, 1985). Lyngset (1968) examined the reproductive organs from 1020 slaughtered goats and reported an incidence of 2.4 % of ovarian cysts. Most of the cysts were unilateral and single with the size varying between 1.2 and 3.7 cm. This incidence is higher than the incidence reported by the present study.

**Ovarian abscess** were detected in slaughtered ewes and goats. The incidence was 0.20 % for the two species respectively. It was apparently the most uncommon lesion observed in this present survey.

### **2-Oviduct affections:**

The incidence of the cyst of oviduct was 0.83% and the incidence of salpingitis was 0.41% in slaughtered ewes. These lesions were not observed in algerian slaughtered goats but Timurkaan and Karadas (2000) reported the incidence of different lesions affecting oviduct in ordinary slaughtered goats and the incidence of salpingitis was (0.37%). Salpingitis does not appear to occur as frequently in ewes as it does in cow. Sokkar and Kubba (1980) reported an incidence of 5.4% of salpingitis and 1.8 % of suppurative salpingitis in slaughtered ewes. This incidence was higher than the incidence 0.41% reported in the present study. Suppurative salpingitis was observed in association with suppurative endometritis and cervicitis in one case only in algerian examined slaughtered ewes.

**3- Inflammatory changes in the uterus and the cervix:** In the present study the most common lesions observed in the uterus and the cervix in examined slaughtered ewes and goats was endometritis 2.26% in ewes and 0.65% in goats. Macroscopic and microscopic findings of endometritis, identical to previously reported data (Mc Entee, 1990; Kiran and Erer, 1995; Jones and Hunt, 1997; Karadas and Timurkaan, 2001;). This inflammatory changes may cause infertility, embryonic death and abortion in the pregnant ewes and goats as mentioned by some reseachers and authors, (McEntee, 1990; Jones and Hunt, 1997). In this study endometritis was accompanied with inflammatory changes of the cervix in some cases. These findings are in agreement with some reseachers opinion's (Arthur and Noakes, 1992; Mc Entee, 1990) which is infection agents in the vagina, passing to the cervix and uterine lumina may results in cervicitis and endometritis.

**Catarrhal endometritis** was observed in ewes and goats but purulent endometritis and metritis were observed in slaughtered ewes in non

pregnant cases. Many of the milder cases of endometritis recover health and fertility spontaneously. Many of the acute cases of metritis are fatal in spite of therapy. Among the residual and complicating conditions are chronic endometritis, uterine abscess, parametritis, salpingitis, pyemia and pyometra.

**Cystic hyperplasia of endometrium:** 0.41% was the incidence reported in slaughtered ewes and it was associated to granulosa cell tumor. The same lesion was observed in slaughtered goats associated to cystic ovarian degeneration. Macroscopic and microscopic findings of cystic hyperplasia of endometrium identical to previously reported data (Adams, 1975; Donaldson, 1983). Cystic hyperplastic endometritis is an inflammatory complication of cystic hyperplasia. The origin of endometrial hyperplasia can be attributed in some species to excessive and prolonged estrogenic stimulation. Cystic endometrial hyperplasia in the cow is associated with follicular cysts or granulosa cell tumors, both of which can produce prolonged hyperestrogenism (Jubb, 1985). This is in agreement with our findings in ewes and goats.

**Abscess of endometrium:** The incidence of this lesion in ewes was 0.20% and in goats 0.65%. The abscess was located in the wall of the uterus near the uterine body. It following severe metritis and dystocia, rough or improper removal of retained placenta or improper usage of pipettes and catheters resulting in trauma and introduction of infection through the endometrium. In addition of inflammatory changes in non pregnant uteri, pigmentation of uterine mucosa (0.62 %) was observed in some aged cases in slaughtered ewes. It was not a pathological problem. It was due to the great number of melanoblastes present in the propria lamina of the endometrium (Barone, 1990). The pigmentation was not observed in goats.

**Genital disorders in pregnant uterus:** The incidence of fetal mummification was 0.62% in the pregnant uteri of slaughtered ewes and 0.65 % in slaughtered goats. Fetal maceration was observed in one (0.20%) case in ewes. The incidence of fetal mummification in the two species and fetal maceration in ewes was not very important because the rate of the pregnancy reported in the present study was 10.30 % in pregnant uteri of ewes and 15.68 % in pregnant uteri of goats. In multiparous species, if most of the fetuses die at the same time, all are likely to be aborted, but it is more usual for one or several dead fetuses to be retained with the remaining viable ones and delivered at parturition. It is often apparent that the deaths have occurred at different

ages, the dead fetuses being of different sizes and degrees of mummification or maceration, (Jubb, 1985).

**4- Anomalies of the cervical canal and rings:** The incidence of tortuous cervix was 10.50 % in ewes and 5.89 % in goats. Tortuous cervix was the most lesion observed in the present study in slaughtered ewes and goats. The number of cervical folds in the ovine cervix was between four to six and six to eight in the cervix of the goat. The same description was reported by Schummer, (1979) and Barone, *et al.*, (1990). "The cervix of the goat has up to eight transverse folds, while that of the ewe in addition to two transverse folds had five to six hard prominences arranged longitudinally". In some cases the second fold was eccentric to the other concentric folds in ovine cervix. This is in agreement with the observations of Bunch and Ellsworth, (1981) in the ovine cervical canal. They reported "that the second fold is eccentric to the other concentric folds and presents a physical barrier to the passage of straight instrument, a phenomenon that has prevented the use of deep cervical or uterine artificial insemination." In the tortuous cervix, the canal was so crooked that it was impossible to pass a straight instrument. This anomaly is probably inherited since the incidence varies according to breed, (McEntee, 1990). Extreme tortuous canal may block the insertion of insemination pipette with resulting failure of conception. Hypoplasia of cervical rings was observed in one (0.20 %) case in ewes and three (1.96%) cases in goats. The cervical rings were small in size with absence of the first cervical one in ewes and goats. In case of complete absence of cervical rings, there is no cervical barrier to protect the uterus and thus chronic endometritis and sterility may accompany the defect.

**Hypertrophy of cervical rings** was observed in goats in two (1.30 %) cases in slaughtered goats. The narrow nature of the cervical canal in this anomaly makes it completely occluded. In this anomaly the uterus becomes distended with uterine secretions, (mucometra), (Mc Entee, 1990). As a conclusion, the incidence and the pathologic features of genital tract disorders were determined in ewes and goats at Tiaret, Algeria. The most common lesions were cervical anomalies, ovarian hypoplasia and paraovarian cyst detected more in ewes than in goats. The inflammatory changes in the uterus and the cervix were frequent in ewes more than in goats. The present study gives detailed information in genital tract disorders which causing infertility or sterility and economic losses in our ovine and caprine raisings. These findings may help to

establish adequate therapy for the reproductive disorders which is going to contribute in minimisation of the economic losses in our raisings.

## REFERENCES

- Adams, N.R. (1975):* A Pathological and bacteriological abattoir survey of the reproductive tracts of Merino ewes in western Australia. *Aust. Vet. J.* 51: 351-354
- Alam, M.G.S. (1984):* Abattoir studies of genital organs of cows. *Vet. Rec.:* 114, 195.
- Arthur, G.H.; Noakes, D.E and Pearson, H. (1992):* Veterinary reproduction and obstetrics, 6<sup>th</sup> Ed., 641 pages, Bailliere Tindall, London.
- Barone, R. (1990):* Anatomie comparée des mammifères domestiques, tome 4, Splanchnologie II, Vigot Ed., Paris.
- Bunch, T.D. and Ellsworth, H.S. (1981):* Gross anatomy of the ovine cervix. *Int. Goat Sheep, Res.* 1: 282-285.
- Cordes, D.O. and Shortridge, E.H. (1971):* Neoplasms of sheep: A survey of 256 cases recorded at Ruakura animal health laboratory. *N.Z. Vet. J.* 19, 55-64.
- Donaldson, L.E. (1983):* Clover disease in two Mississippi cattle herds. *J.am. Vet. Med. Assoc.* 182, 412-413.
- Jones, T.C.; Hunt, R.D. and King, N.W. (1997):* Veterinary pathology, 6<sup>th</sup> Ed. 1392. Williams and Wilkins, Philadelphia.
- Jubb, K.V.F.; Kennedy, P.C. and Palmer, N. (1985):* The female genital system in: K.V.F. Jubb, P.C.Kennedy and N.Palmer (ed.) *Pathology of domestic animals. Vol.3, 3<sup>rd</sup> Ed., Academic Press, New York, 305-377.*
- Karadas, E. and Timurkaan, N. (1999):* Pathomorphological investigations on the genital system of ewes I. Ovarium and oviduct. *Tr. J. Vet. Anim. Sci.,* 23, 557-565.
- Karadas, E. and Timurkaan, N. (2001):* Pathomorphologic investigations on the genital system of ewes II: uterus, cervix and vagina. *Tr. J. Vet. Anim. sci.,* 25, 27-37.
- Kiran, M.M.; Erer, H.; Çiftçi, M.K. and Hatipoğlu, F. (1995):* A survey of pathological conditions on the genital tract of ewes II: uterus, cervix and vagina. *Vet. Bil. Derg.,* 11, 119-129.



- Lagerlöf, N. and Boyd, H. (1953):* Ovarian hypoplasia ad other abnormalities conditions in the sexual organs of swedich highland breed. Results of posmortem examination of over 6000 cows. *CornelVet.*, 43,64-79.
- Lindsay, D.R. and Pearce, D.T. (1984):* "Reproduction in sheep." Cambridge Univ. Press, London and New York.
- Lofstedt, R.M. and Williams, R. (1986):* Granulosacell tumor in goat. *J. Am. Vet. Med. Assoc.* 189, 206-208.
- Long, S.E. (1980):* Some pathological conditions of thereproductive tracts of ewe. *Vet. Rec.*, 23, 175-177.
- Lyngset, O. (1963):* Stor ovarial tumor hos geit. (Granulosa cell tumor in goat.) *Medlmsbl. Nors.Veterinaeforen.* 15, 300-302.
- Lyngset, O. (1968):* Studies on reproduction in the goat.V. Pathologic conditions and Malformations on the genital organs of the goat. *Acta Vet. Scand.*, 9:364-375.
- Mc Entee, K. (1990):* Pathology of domestic mammals, Academic Press Inc., 401 pages. New York.
- Schummer, A.; Nickel, R. and Sack, W.O. (1979):* "The viscera of the domestic mammals" 2 nd rev. ed. Paul Parey, Berlin.
- Singh, N. and Rajya, B.S. (1977):* Pathology of female reproductive system in goats. *Indian J. Anim.Sci.* 47, 22-28.
- Sokkar, S.M. and Kuba, M.A. (1980):* Pathological studies in the fallopian tubes of ewes. *Zentralbl. Veterinaermed., Reine A* 27, 118-122.
- Timurkaan, N. and Karadas, E. (2000):* Morphologic investigations on pathological changes of the female reproductive organs in goats. II. uterus, cervix and vagina. *F.Ü.SAg. Bil. Derg.*, 14, 209-220.