Vet.Med.J.,Giza. Vol.53, No.1. (2005):107-125.

INCIDENCE AND BIOGRAM OF ISOLATES FROM MASTITIC SMALL RUMINANTS IN HALIAB, SHALATEEN AND ABU-RAMAD.

AZZA S.A. GODA*, T.R. ABOU-EL-NAGA * and T. A. ABDU **

*Animal Health Dep.-Desert Research Center

**Faculty of Veterinary Medicine- Cairo University

Received: 24. 10. 2004

Accepted: 30. 11. 2004

SUMMARY

A total of 600 milk samples were collected from the udder halves of 300 native dairy sheep and nannies at Haliab, Shalateen and Abu-Ramad. California mastitis test (CMT), qualitative chloride percentage and somatic cell count (SCC) were carried out to detect subclinical mastitic cases; the percentage was 43.3% and 47.4% for ewes and nannies respectively. Mastitic cases represented 41.3% and 48.7% of examined ewes and nannies respectively. The isolated organisms were *Staph. aureus, Staph. epidermidis, Strept. dysagalactiae, Strept. agalactiae. Strept. uberis, Past. haemolytica, Actinomycies ovis, A. pyogens, E. coli* and Fungi. Antibiotic sensitivity tests showed variable potency between highly, moderately effective and resistant. In conclusion, this most probably is the first microbiological study for mastitis in small ruminants in this Nomadic area (Haliab, Shalateen and Abu-Ramad). Mastitis is a serious problem in the study area and mastitis control programme is a must to protect Bedouin income and health.

Key words: Mastitis- Ewes- Antibiotic sensitivity- treatment- Nomadic areas.

INTRODUCTION

In nomadic areas milk of small ruminants is a very important source for animal protein, most of this milk consumed raw, thus the condition of the udder is important to public health. In these areas the available feed is poor and mainly comprises weeds and shrubs. Dairy sheep and goats with their efficient digestive system, small body size and low feed intake are cheaper and more economical to keep (Kinuthia, 1997).

Dairy goat milk, inspite of its small quantity, pro-

vides a source of animal protein all the year around (Semenye and Hutcheroft, 1992). Nevertheless, mastitis could be an important factor limiting milk production in these goats (Saratsis et al. 1999). Several causative agents and predisposing factors have been implicated in dairy goat's mastitis (East et al., 1986 &Egwu et al., 1994). Moreover, the prevalence of udder abnormalities appeared to have a positive association with ewes which have lost their lambs (Kiry et al., 1980). Beside this 8.4% of ewe's deaths and up to 34.3% of lamb deaths in Scotland were attributed to mastitis (Watson, 1982).

This study was undertaken to determine the prevalence of subclinical, clinical mastitis in Shalateen, Haliab and Abu-Ramad, isolation, identification of causative agents and their sensitivity to different antibiotics as well as treatment of some mastitic cases.

MATERIALS AND METHODS

1-Animals and clinical examination:-

This study was carried out at the period from March 2002 up to June 2003 on a total of 300 primiparous and pluriparous native lactating animals and housed in hand made barns under poor hygienic measures, out of them 150 were ewes and the rest were nannies. These animals belonged to Bedouin flocks which were fed naturally by grazing in Shalateen, Haliab and Abu- Ramad localities.(Table ,1)

The investigated animals were subjected to thorough clinical examination with special reference to udder after Kelly (1984). According to the clinical signs, the examined animals were classified into two main groups. The first group included the apparently healthy animals (88 ewes and 77 nannies) and the second group included clinically mastitic animals (62 ewes and 73 nannies).

2- Samples:-

Six hundred individual milk samples were collected from the investigated animals. Each sample represented by 20 ml of milk, was collected from each udder half in sterile, and screw capped bottle. All samples were stored immediately at 4°C until used.

3- Clinical rapid field test:-

Special screening tests were performed to the samples which were collected from the apparently healthy animals to detect the subclinical mastitic cases.

These tests included California Mastitis Test "CMT", Qualitative Chloride percentage and Somatic Cell Count (SCC). The previously mentioned tests were carried out according to Schalm et al (1971), Atherton and Newlander (1977) and American Public Health Association (A.P.H.A) (1993), respectively.

4- Microbial examination:-

The collected milk samples were centrifuged at

3000 rpm/15 minutes and then the first loop full from the sediment of each sample was streaked onto Eosin Methylene blue agar (EMB), Baird Parker agar, blood agar and Edwards's media. All the inoculated plates were incubated at 37°C for 48 hours. The bacterial isolates were examined microscopically and identified biochemically according to Stander procedures given by Baily and Scott (1994).

The second loop full from milk sediment of each sample was inoculated onto Sabouraud dextrose agar for yeast isolation and incubated at 25∫C for 7 days. Isolation and identification of yeast was carried out according to Lodder (1970).

5- Antibiotic Sensitivity Test:-

Disc diffusion technique was applied according to Hirsh and Zee (1999). The isolates were tested for sensitivity to eight antibiotics. Discs were manufactured by Pasture Lab., Egypt.

6-Intramammary infusions:-

Because of convenience and efficiency, udder infusions are the preferred method of treatment. Strictly hygiene is necessary during treatment to avoid the introduction of bacteria, yeast and fungi into the treated udder.

1- Tetra-Delta (Upjohn Animal Health).

Each 10 ml contains:-

Novobiocin 100 mg.
Neomycin sulphate 150 mg.
Procain penicillin G. 100.00 I.U.

The dose was one syringe into each affected half.

II-Gentamam (Schering-Plough Animal Health).

Each syringe contains-

Gentaamicin sulphate 50 mg.
Cloxacillin 200 mg.

The dose was three syringe into each affected half with 12 hours apart.

III- Terrexine (Intervet).

Each 10 ml contains:-

Cephalexin 200 mg
Kanamycin sulphate 100.00 I.U.

The dose was one syringe per each half every 12 hours for 2 days.

RESULTS AND DISCUSSION

In this study, 300 animals out of which 150 lactating ewes and 150 lactating nannies were subjected to general inspection, temperature, pulse, respiration rate, visual inspection and palpation of the udder (Tab,2). According to this examination, animals were divided into two groups; the first one constituted apparently healthy animals (88 ewes and 77 nannies) with no visual abnormal changes in either milk or udder while animals of the second group (62 ewes and 73 nannies) were suf-

fered from mastitis with visual abnormalities in both milk and udder the infected halves often become swollen, some times painful to touch, and the milk is visibly altered by the presence of clots, flaks or discolored. Some cases (acute cases) the animals show signs of generalized reaction: fever, rapid pulse, decreased appetite with sharp decrease in milk yield.

From the first group 330 milk samples were collected and subjected to different field tests for detection of mastitis (Table 3). These tests were California Mastitis Test (CMT) and chloride test, CMT could be very useful for monitoring the sanitary status of mammary gland at the farm or when costly lab equipment was not available Perrin et al (1996).

Incidence of (CMT) positive samples was 43.2 % and 47.4 % for ewes and does respectively with peak in Haliab region 50 % (ewes) and 53.5 % (nannies).

In chloride test, the percentage of subclinical mastitis was decreased to reach in ewes and nannies 24.4 %, and 44.8 % respectively. The same results were recorded by Mervat (1992).

The (CMT) positive samples were examined for Somatic Cell Count (SCC) Which was used as an acceptable routine method for monitoring of presence or absence of subclinical or clinical mastitis in sheep and goats milk (DeCrémoux et al.1994) (Table 4). Most of milk samples of ewes and does had somatic cell count (SCC)< 4X105 (60 milk samples) while 47 milk samples have SCC ranges between 5X105 and < 10^6 and finally 43 milk samples had SCC >10^6. In conclusion, bacterial infection of the mammary gland is associated with an elevated somatic cell count. SCC was sensitive, specific test to give sharp discrimination between infected and uninfected udders in the subclinical form of mastitis, (McDougall et al. 2002& Attia et al. 2003 c).

The prevalence of bacterial isolates from clinically normal and mastitic nannies and ewe's milk was affected by many factors such as the contamination of milker's hands, breed difference, management practice, age and parity of the animal, and type of milking (East et al., 1986 and Boscos et al., 1996).

Regarding the main pathogens isolated from the examined California Mastitis Test (CMT) positive samples of subclinically and mastitic ewes, (Table 5&6) revealed that, from 76 (CMT) positive milk samples there were 66 (86.8%) bacteriologically positive samples. Strept. dysagalactiae was the main isolated pathogen (18.4%). These results disagreed with those given by Attia et al. (2003 a) who reported lower percentage 4%. The percentage of Stpah. aureus was (17.1%). This goes in hand with Attia et al. (2003 a and b) who reported little higher percentage (18.3%).

In the present study, Stpah. epidermids was the cause of subclinical mastitis in dairy sheep representing (13.2%); on the other hand, Cruz et al. (1994) obtained a very high percentage reached 66.8%, which may be due to bad hygienic measures. As regard to E. coli, it was isolated in an incidence of (11.8%) from milk samples, the foregoing results disagreed with that of Attia et al. (2003 a and b) who obtained an incidence of (9.2%) and (8.7%) respectively besides Macro-Melero, (1994) who reported that E. coli detected was very low in sheep milk.

On the other hand, 124 milk samples of mastitic ewes were 100% bacteriologically positive. The predominant pathogen was Staph. aureus, Strept. agalactiae, Past. haemolytica, Strept. dysagalactiae and E. coli, the percentages were 23.4%, 17.7%, 14.5% and 12.1% respectively. Staph. aureus was the major etiological agent of mastitis, which was the cause of economical loses of dairy in dairy industry (Wilson et al., 1994) and was found in large numbers on the skin surface of the milker's hand, teats and teat canal Deutz et al. (1990). This agreed with Bergonier et al. (1996) who stated that the main isolated bacteria from mastitic ewes was Staph. aureus (16.7% up to 57.5% of clinical mastitis). Past. haemolytica was very important cause of peracute and clinical mastitis of sheep (17.7%).The above-mentioned results agreed with that of Billon and DeCrémoux (1998) and Christmas (2003) who isolated the same pathogens from mastitic sheep and goats.

Concerning the main pathogens isolated from the examined California Mastitis Test (CMT) positive samples of subclinically and mastitic nannies.

Tables 7 and 8 showed that from 73 (CMT) positive samples, 68 (93.2%) milk samples were bacteriologically positive.

The isolated microorganisms in descending order were Strept. dysagalactiae, Actinomycies pyogenes, Staph. aureus and Staph. epidermidis, 17.8%, 16.4%, 15.1% and 15.1% respectively. Martin et al. (1993), Mallikeswaran and Padmanaban (1990) and McDougall et al. (2002) reported nearly similar results from dairy nannies. It is worth mentioning that Yeasts fail to be detected in the examined ewe's milk.

The milk samples of mastitic nannies were infected with Staph. aureus, Strept. agalactiae, Past. haemolytica, and Strept. dysagalactia, the percentage were 28.8%, 27.4%, 21.9% and 15.8% respectively. E. coli and fungi were isolated from 13.1% and 4.1% of milk samples respectively. These agree with (Sheashe et al. 1996 and Boscos et al. 1996). While Shawakat and Nabil (1999) reported, an incidence reached 22.7% of mastitic milk samples.

In the present study, *Strept. dysagalactia* isolated from clinical and subclinical mastitic dairy nannies with an incidence of 17.8% and 15.8% respectively, lower percentages were reported by Vihan (1989) and Sheashe et al. (1996).

The results presented in Table (8) revealed that *Strept. agalactiae* represent 5.5% in apparently healthy nannies, a lower and higher incidences were reported by (Sheashe et al.,1996) 3% and (Mona et al., 2003) 17.5%. Most of organisms associated with mastitis of dairy animals were found freely in the environment, of particular importance are streptococci species, which were found in large number on human, sheep and goats skins, consequently were the most important pathogens in small ruminant's mastitis (Deutz et al. 1990, Ryan et al. 1990 and Shin et al. 1998).

In the present study, Staph. aureus represented 15.1% and 28.8% of infection in apparently healthy and mastitic nanies respectively. EL-yas and Nashed (1988) stated nearly similar percentage (26% - 67%), while Nag et al., (1975), Shawakat and Nabil (1999) and Mona et al., (2003) reported a higher incidences 33.3%, 31.3% and 31.2% respectively. On the other hand, Vihan (1989) gave lower percentage reached 20%.

As regarded to Staph. epidermidis, it was detected as 15.1% and this coincides with the results obtained by Mishra et al., (1996), Contreras et al., (1997) and Mona et al., (2003).

The results revealed that Strept. ubris was detected in 4.1%, the same result was recorded by Sheashe et al., (1996). In contrary, Mishra et al., (1996) and Contreras et al., (1997) detected higher incidence 32% and 33.5% respectively.

E. coli isolated in an incidence of 5.5%, the same incidence was achieved by Sheashe et al., (1996) 5%, while Guha et al., (1989), Sudar et al., (1996) and Mona et al., (2003) reported lower and higher infection rate 3.1% , 12% and 8.3% respectively. Klebsiella species was detected in 8.2% of milk samples, this was some what close to the results recorded by Mishra et al. (1996) 6.8%. While Mona et al. (2003) recorded lower infection rate 2.5%.

In this study, Actinomycies pyogenes was found to be from the main pathogens that cause clinical and subclinical mastitis in goats, Ndegwai et al. (2001) isolated the same organism from nanny's milk.

Fungi represented 4.1% of infected samples and it consider to be of economical importance as there presence in milk even in small numbers results in undesirable changes that renders the milk of inferior quality as well as constituting a public health

hazards to the consumers (Mossel., 1982).

Results of the in-vitro sensitivity of the isolated strains against eight antibiotics were represented in (Table 9). It is evident that *Staph. aureus, Strept. agalactiae and Actinomycies pyogenes* were sensitive to Gentamycin, Neomycin and Kanamycin.

This result is similar to that recorded by Mallikeswaran and Padmanban (1990),Guha et al. (1989), and Shawakat and Nabil (1999) who stated *staphylococci, streptococci and E. coli* are more sensitive to Gentamycin 89.5% followed by Neomycin 72.9% Erythromycin 68.7% and tetracycline 45%. Also (Sheashe et al. 1996 and Mishra et al.1996) reported the sensitivity of these microorganism to Tetracycline, Chloramphinicol, and Gentamycin.Whereas 81.2%, 88.7% and 88.9% of Past. haemolytica strains were sensitive to Gentamycin, Penicillin and Neomycin respectively. Past. multocida strains were resistant to Kanamycin and Oxytetracyclin but the same strains were sensitive to Penicillin and Neomycin. On the other hand, Shawakat and Nabil (1999) reported that penicillin was the least effective antibiotic (in vitro) against bacteria in ewes.

In this study, trails were done for field treatment of a total 104 cases. In Subclinical mastitis of ewes and nannies, 37 animals (18 nannies and 19 ewes) were treated with Tetra-Delta and Terrexine intramammary infusions (Table 10). Two nannies infected with *E. coli* and Klebsiella and two ewes infected with Strept. agalactiae and *Actinomycies pyogenes* did not cured using Tetra-Delta (22.3%), while only one ewe infected with Strept. agalactiae did not cured by using Terrexine (5.3%).

Regarding to 67 (31 ewes and 36 nannies) mastitic animals, from these 25 treated by using Tetra-Delta, 17 cases treated by using Terrexine and the remained 25 cases treated by using Gentamam. The results of this work illustrated in Table (11). From 31 ewes, 26 (83.8%) cases responded to treatment and five cases did not cured, while the 36 nannies, 31 (86.1%) were cured and five cases still uncured. Generally, the ordinary used broad spectrum antibiotics were fairly efficient in treatment of Strept. agalactiae and Staph. aureus.

Conclusion

Our final conclusion view that this may be is the first microbiological study for mastitis in small ruminants in this Nomadic areas (Haliab, Shalateen and Abu-Ramad) according to the available literature. Our study screening the microorganisms causing mastitis in this area and so that we can establish mastitis control programme and predicting the zoontic effect of these organisms, hence, increasing milk production that in turn will reflect on Bedouin income and health.

Table (1): Animal Distrubition

Animal species	Districts	Number of examined animals	Apparently healthy animals		Mastitic animals	
			No.	%	No	%
Ewes	Shalateen	50	31	62%	19	38%
	Halaib	50	23	46%	27	54%
	Abu-Ramad	50	34	68%	16	32%
Total		150	88	58.7%	62	41.3%
Nannies	Shalateen	50	22	44%	28	56%
	Halaib	50	29	58%	21	42%
	Abu-Ramad	50	26	52%	24	48%
total		150	77	51.3%	73	48.7%

Table (1): Animal Distrubition

Items	Apparently bealthy animals	Diseases animals
Mucous membrane	Rosy	Congested
Pluse	Mean 75	Mean 90
Respiratory rate/min.	Mean 25	Mean 37
Temerature	Mean 38-39°C	Mean 39-39.5f°C
Udder examination		
Hotness	-	Vriable
Enlargment	-	+
Pain	-	+
Supramammary L. N	-	Enlarged
Visual milk change	-	+Ve

L.N= Lymph node.

Table (3): Results of different field tests of milk samples of apparently healthy ewes and nannies.

Animal species	Districts	No. animals	No. of milk samples		CMT +ve samles		Intensity of the reaction						Chloride ≥0.14
							1+ve		2+ve		3+ve		
	Shalateen	31	62	29	46.8	12	41.4	9	31.1	8	27.6	18	29.1
Ewes	Halaib	23	46	23	50	10	43.5	6	26.1	7	30.4	11	23.9
	Abu-Ramad	34	68	24	35.3	9	37.5	7	29.2	8	33.3	14	20.6
Total		88	176	76	43.2	31	40.8	22	28.9	23	30.3	43	24.4
Nannies	Shalateen	22	44	20	55	8	40	7	35	5	25	18	40.9
	Halaib	29	58	31	53.5	12	38.7	8	25.8	11	35.5	32	55.2
	Abu-Ramad	26	52	22	42.4	9	40.9	5	22.7	8	36.4	19	36.5
Total		77	154	73	47.4	29	39.7	20	27.4	24	32.9	69	44.8

CMT= Califomia Mastitis test.
% = Percentage of animals to CMT+ve milk samples.
No. = number.
+ve = Positive.

Table (4): Somatic Cell Count (SCC) in mastitic milk samples of subclinical cases of ewes and nannies.

Animals	Districts	CMT+ve samples	SCC/ml.milk		
			$<4 \times 10^5$	$5 \times 10^5 - <10^6$	$<4 \times 10^5$
Ewes	Shalateen	29	12	9	8
	Halaib	23	10	6	7
	Abu-Ramad	24	9	7	8
Total		76	31	22	23
Nannies	Shalateen	20	8	7	5
	Halaib	31	12	8	11
	Abu-Ramad	22	9	5	8
total		73	29	20	24

Table (5): Microorganisms species isolated from milk samples of apparently healthy

Districts	CMT +ve Sample	Strept. dysgaluctiae		Steph aureus		Steph epidermidis		E.coli		Actinomycies pyogenes		Strept. dysgaluctiae		Strept. dysgaluctiae		Strept. uberis	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Shalateen	29	6	20.7	5	17.3	3	10.3	4	13.8	3	10.3	2	6.9	2	6.9	2	6.9
Halaib	23	4	17.4	3	13.1	4	17.4	2	8.7	2	8.7	2	8.7	1	4.4	-	-
Abu-Ramad	24	4	16.7	5	20.8	3	12.51	3	12.51	3	12.51	2	8.4	1	4.2	-	-
Total	76	14	18.4	13	17.1	10	3.2	9	1.8	8	0.5	6	7.9	4	5.3	2	2.6

Table (6): Microorganisms species isolated from milk samples of mastitic

Districts	No. of milk Sample	Staph aureus		Steph agalactiae		Pasteurella. haemoytica		Strept. dysgalactiae		E.coli		Staph epidermidis		Actinomyc ies. pyogenes		Actinomy cies. pyogenes		Fungi	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Shalateen	38	9	23.7	7	18.5	7	18.4	6	15.8	4	10.5	4	10.5	5	13.2	3	7.9	3	7.9
Halaib	54	11	20.4	10	18.5	8	14.8	5	9.3	6	11.1	6	11.1	4	7.4	3	5.6	2	3.7
Abu-Ramad	32	9	28.1	10	31.3	7	21.9	7	21.9	5	15.6	3	9.4	4	12.5	5	15.6	1	3.1
Total	124	29	23.4	27	21.8	22	17.7	18	14.5	15	12.1	13	10.5	13	10.5	11	8.9	6	4.8

Table (7): Microorganisms species isolated from milk samples of apparently healthy nannies

Districts	CMT +ve Samples	Staph aureus		Staph epidermidis		Strept agalactiae		Strept. dysgalactiae		Strept. uberis		Actinomycies. pyogenes		Actinomycies ovis		E. coli		Kiebsiella	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Shalateen	20	3	15	3	15	1	5	4	20	2	10	3	15	1	5	1	5	1	5
Halaib	31	4	15.4	5	16.1	2	7.7	5	16.1	-	-	6	19.4	1	3.8	2	7.7	3	11.5
Abu-Ramad	22	4	13.8	3	13.6	1	3.5	4	13.8	1	3.5	3	13.6	2	6.9	1	3.5	2	6.9
Total	73	11	15.1	11	15.1	4	5.5	13	17.8	3	4.1	12	16.4	4	5.5	4	5.5	6	8.2

Table (8): Microorganisms species isolated from milk samples of mastitic nannies

Districts	CMT +ve Samples	Staph aureus		Staph epidermidis		Strept agalactiae		Strept. dysgalactiae		Strept. uberis		Actinomycies pyogenes		Actinomycies ovis		E. coli		Kiebsiella	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Shalateen	56	16	28.6	13	23.2	9	16.1	12	21.4	8	14.3	5	8.9	7	12.5	2	3.6	3	5.4
Halaib	42	12	28.6	10	23.8	8	19.1	11	26.2	6	14.3	4	9.4	6	14.3	3	7.2	4	9.5
Abu-Ramad	48	1	29.2	17	35.4	6	12.5	9	18.8	4	8.3	6	12.5	6	12.5	1	2.1	3	6.3
Total	146	42	28.8	40	27.4	23	15.8	32	21.9	18	12.3	15	10.3	19	13.1	6	4.1	10	6.8

Table (9): Sensitivity of isolated strains from mastitic milk samples to 8 antibiotics.

Culture	Antibacterial agents								
	Animal species	Gentamycin (10µg)	Penicillin (10.I.U.)	Cloxacillin (5µg)	Streptomycin (10 µg)	Oxytetracyclin (30 µg)	Kanamycin (10 I.U.)	Neomycin (30 µg)	Lincomycin (15 µg)
Staph. aureus	Ewes Nannies	78% 100%	25% 40.5%	44% 46%	15.2% 43.2%	64.4% 93.8%	96% 98.9%	100% 100%	80% 80%
Str. agglactiae	Ewes Nannles	90% 100%	80% 65.2%	92% 95.5%	60% 50%	50% 65.6%	90.1% 76.5%	44.4% 55%	40% 40%
A. pyogenes	Ewes Nannies	100% 100%	83.3% 77.2%	75% 80%	33.3% 50%	20% 33.3%	82.2% 78.8%	60% 72%	R R
E. coli	Ewes Nannies	100% 85.5%	R R	15% 20%	R R	60% 75%	77.4% 75.3%	60% 40%	25% 20%
Past. haemolitica	Ewes Nannies	81.2% 64.6%	88.7% 88.9%	R R	66.6% 77.2%	57.1% 55.6%	R R	88.9% 83.3%	55% 50%
Str. dysgalatae	Ewes Nannies	75.2% 81.5%	79.2% 66.2%	84% 79.2%	12.5% 14.5%	166.4% 42.8%	97.5% 97.2%	75.5% 71.4%	44.4% 40%
Klebsiella	Nannies	100%	R	R	R	85%	100%	R	15%
Past. maltucida	Nannies	73.3%	100%	25%	73.2%	R	R	100%	50%

Table (10): Results of Treatment of subclinical mastitic cases by using two patent drugs

Culture	A ntibacterial agents								
	Species	No. of treated	No.of cured animals	No. of uncured animals	Causative organisms	Species	Kanamycin (10 I.U.)	Neomycin (30 µg)	Lincomycin (15 µg)
Staph. aureus	Ewes	3	3	-	Staph. aureus	Ewes Nannies	2 1	2 1	
Staph. epidermidis	Nannies	3	3	-	Staph. epidermidis	Ewes	2	2	
Strept. agalactiae	Ewes Nannies	4 2	3 2	1	Strept. agalactiae	Nannies Ewes	2 1	2	1
Actinomycies. pyogenes	Ewes	2	1	1	Aetinomycies. ovis	Ewes	2	2	2
E. coli	Nannies	3	2	1	E. coli	Nannles	2	2	
Klebsiella	Nannies	1	-	1	Klebsilla	Ewes Nannies	1 1	1 1	
					Strept. Dysgalactiae	Ewes	2	2	
					Strept. uberis	Ewes	3	3	
Total		18	14	4	Total		19	18	1
%			77.7	22.3	%			94.7	5.3

Table (11): Sensitivity of isolated strains from mastitic milk samples to 8 antibiotics.

Culture	Species	Antibacterial agents: No. of treated	No.of cured animals	No. of uncured animals	Causative organisms	Terrexine: Species	No. of treated	No.of cured animals	No. of uncured animals	Causative organisms	Gentamam: Species	No. of treated	No.of cured animals	No. of uncured animals
Staph. Aureus	Ewes	3	3		Strept. dysgalactia	Nannies	2	2		Strept. multocida	Nannies	5	4	1
	Nannies	5	4	1										
Strept. epidermidis	Nannies	3	3	-	Past. haemolytica	Nannies	4	3	1	Staph. aureus	Ewes	5	4	1
	Ewes	1	1	-							Nannies	4	4	-
Strept. agalactiae	Nannies	1	-	1	Strept. agalactiae	Ewes	5	5		Past. haemolytica	Ewes	4	3	1
	Ewes	2	2											
Strept. dysgalactiae	Ewes	2	2	-	Actinomycies pyogenes	Nannies	3	2	1	Actinomycies pyogenes	Ewes	2	2	
E.coli	Ewes	3	3	-	Klebsilla	Nannies	2	2		E. coli	Nannies	2	2	
Past. haemolytica	Nannies	2	-	2	Actinomycies ovis	Ews	1	-	1	Klebsilla	Nannies	3	3	
	Ewes	3	1	2										
Total		25	19	6	Total		17	14	3	Total		25	22	3
%			76	24	%		82.4		17.6	%		88		12

REFERENCES

American Public Health Association "A.P.H.A" (1993): Standard methods for the examination of dairy products. 16th Ed. A.P.H.A. Washington.

Atherton, H.V. and Newlander, J. A. (1977): Chemistry and testing of dairy products 4th Ed. The AVI Publishing co., INC. Westport Connecticut.

Attia, E.R.H.; Amal, A. and Metias, K. N. (2003 c): Coparative study between electric conductivity, calfornia mastitis test and somatic cell count for papid diagnosis of subclinical mastitis in lactating cows. 7th Sci. Cong. Egyptian Society for cattle Diseases Assiut, Egypt. Pp. 25-30.

Attia, E.R.H.; Hanaa, A. A. and Osman, R. H. (2003 a): Endometritis and subclinical mastitic syndromes in ewes. 7th Sci. Cong. Egyptian Society for cattle Diseases Assiut, Egypt. Pp. 6-10.

Attia, E.R.H.; Raghib, R.W.; Hanaa, A. A. and Gomaa, A.M. (2003 b): Effect of mastitis pathogens on milk parameters in subclinical mastitic ewes. 7th Sci. Cong. Pp. 11-25.

Baily, W.R. and Scott, E. C. (1994): Diagnostic Microbiology 9th Ed.

Bergonier, D.; Lengo, F.; Lagriffoul, G.; Consalvi, P. J.; Van de Wiele, A. and Berthelot, X. (1996): Somatic cell count and milk of small ruminants. Wageningen Pers, Pays Bas, 53-59.

Billon, P. and DeCrËmoux, R. (1998): Mastitis of dairy ewes: Etiology, detection and control. Proc. 4th great Lakes Dairy Sheep Symp. Wisconsin. Pp. 44-50.

Boscos, C.; Stefanakis, A.; Alexopoulos, C.; and Somartzi, F. (1996): Prevalence of subclinical mastitis and influence of breed, parity, stage of lactation and mammary gland bacteriological status on coulter counts and California mastitis test in the milk of Saanen and autochronous Greek goats. Small Rum. Res. 21: 139-147.

Christmas, P. (2003): Change in the etiology of mastitis in goats and sheep. Personal communication.

Contreras, A.; Coralles, J. C.; Sanchez, A. and Sierra, D. (1997): Persistence of subclinical intramammary pathogens in goats through lactation. Dairy Sci., 80 (11): 2815- 2819.

Cruz, M.; Serrano, E.; Montoro, V.; and Marco, J. (1994): Etiology and prevalence of subclinical mastitis in the Manchega sheep at mid-late lactation. Small Rum. Res., 14 (2): 175-180.

De Crémoux, R.; Poutrel, B.; Pillet. R.; Perrin, G.; Ducellier, M. and Heuchel, V. (1994): Use of somatic cell counts for diagnosing mammary infections of bacterial origin in goats. International symposium on Somatic Cell and Milk of Small Ruminants. Bella. Italy. Pp 22-24.

Deutz, A; Perthaner, A; Schlerca, G. and Baumgartner, W. (1990): Cell count of milk from sheep and goats and the ocurrance of bacterial mastitis in lower Australia. Wiener Tierartlche Monatsschrift, 77 (3): 70-77.

East, N. E.; Birnie, E. F. and Farver, T. B. (1986): Risk factors associated with mastitis in dairy goats. Am. J. Vet. Res. 67: 63-67.

Egwu, G. O.; Zaria, L. T.; Onyeyili, P. A.; Ambali, A. G.; Adamu, S.S. and Birding, M.(1994): studies on the mi-

crobiological flora of caprine mastitis and antibiotic inhibitory concentration in Nigeria. Small Rum. Res.14: 233-239.

Egyptian Society for cattle Diseases Assiut, Egypt. Pp. 11-16.

EL-yas, A. H. and Nashed, S. M. (1988): Bacteriological studies on mastitis in ewe's and she goats. Assiut Vet. Med. J., 20 (40): 38-42.

Guha, C; Pramanik, A. K.; Misra, S. K. and Banerjee, A. K. (1989): Studies on the incidence and diagnosis of subclinical mastitis in goats, in vitro sensitivity of the isolates pathogens. Indian Vet. J., (7): 601-604.

Hirsh, D. C. and Zee, Y. C. (1999): Veterinary Microbiology. Blackwell Science, Inc.

Kelly, W. R. (1984): Texetbook of Vet.clinical diagnosis. 3 rd Ed.

Kinuthia, M. N. (1997): The productive performance of dairy goat cross on small holdings in central Kenya. M.S.C. Thesis, University of Nairobi, Pp. 43-48.

Kiry, J. H.; Huffman, E.M. and Anderson, B.C. (1980): mastitis and udder abnormalities as related to neonatal lamb mortalities in shed-lambed range ewes. J. of Animal Science 50 (4) 610-616.

Lodder, J. (1970): The yeast; A taxonomic study. North. Holland Publishing Company, Amsterdam, London.

Mallikeswaran, K and Padmanaban, V. P. (1990): Antibiotic sensitivity pattern of microorganisms involved in clinical mastitis in goats. Indian Vet. J. 67: 2, 142-148.

Marco Melero J. C. (1994): Thesis Doct. Med. Vet., Zaragoza, Espagne.

Martin, W.B; Aitken, I. D. and Stobo. J. (1993): Diseases of sheep. Second ed. Blackwell Scientific publications. London, Edinburgh Boston. pp. 75-78.

McDougall, S.; PanKey, W.; Delaney, C.; Barlow, J.; Murdonglt, P. A. and Scruton, D. (2002): Prevalence and incidence of subclinical mastitis in goats and dairy ewes in Vermont. USA. Small Rum. Res., 46 (2/3): 115-121.

Mishra, P. R.; Sidhartha, H.; Pal, A. and Hazari, S. (1996): Subclinical mastitis in goats with special reference to funugus. Indian J. dairy Sci., 49 (3): 209-210.

Mervat, A. Z. (1992): Some studies on mastitis in sheep and goats. M.V.Sc. thesis Fac. of Vet. Med. Cairo Univ.

Mona, A. Mahmoud; Wafaa, A. Osman; Ahmed, L. El-Nagger and Mohamed, A. Balata (2003): Studies on subclinical mastitis in she goats in Siwa. Beni-Suef Vet. Med. J.,Vol. XIII. No. (1): 169-179.

Mossel, D. A. (1982): Microbiology of foods 3rd ed. The Univ. Utrecht. Netherlands. Nag, N. C. (1975): Staphylococcal mastitis in cows buffaloes and goats and their antibiotic sensitivity. Indian J. Anim. Hlth., 14 (2): 169-173.

Ndegwai, E. N.; Mulei, C. M. and MUNYUA, S.G.M. (2001): Risk factors associated with subclinical mastitis in Kenyan dairy goats. Isr. Vet. Med. Assoc, vol. 56 (1) 6-16.

Ryan. D. P. and Green Wood, P. C. (1990): Prevalence of udder bacteria in milk sample from four dairy goats herds. Austr. Vet. J. 67: 326-336.

Saratsis, Ph.; Alexopoulus, C., Tzora, A. and Fthenakis. G. C. (1999): The effect of expermintly induced subclinical mastitis on the milk yield of dairy ewes. Small Rum. Res., 32: 205-209.

Schalm, O. W.; Carrol, E. J. and Jain, N. C. (1971): Bovine mastitis. Physical and chemical tests for detection of mastitis. Lea and Febiger, Philadelphia. pp. 128-157.

Semeny, P.P. and Hutcheroft, T. (1992): On the farm research and technology for dual-purpose goats. Lea and Febiger, Philadelphia. Pp.68-69.

Sheashe, T. H.; Afifi, E. A. and Nada, S. M. (1996): Some studies on clinical and subclinical mastitic cases in dairy she goats in relation to causative pathogenic isolates and their sensitivity pattern. Assiut Vet. Med. J. 36 (71): 244- 254.

Shin, I.; Mikhaillova, G.; Tyankov, S.; Kafedzhiev, V and Kafedjiev, V. (1998): Microbial examination of goat milk originating from environments of different environmental cleanness. Zhivotnov. Dni- Nauki, 2: 57-60.

Shawkat, Q. L. and Nabil, Q. H. (1999): Incidence and antibiotic sensitivity of bacteria causing bovine and ovine clinical mastitis in Jordan. J. Egypt. Vet. Med. Assoc. 59 2&3. 419-4360.

Sudar, S. M.; Ananda. Kumar, A.; Sreemannarayana, O.; Kao, M. and Kumar, A. (1996): Subclinical mastitic ewes. Indian Vet. J., 73 (11) 1189-1190.

Vihan, V.S. (1989): Determination of N.A: Case activity in milk for diagnosis of subclinical caprine mastitis. Small Rum. Res. 2 (4) 359-360.

Watson, D. J. (1982): Sheep mastitis. Annual Procedings of the sheep Vet. Society 6, 88-92.

Wilson, D. J., Gonzaled, R. N. and Sears, P. M. (1994): Bulk tank and individual cow milk cultures for detection of contagious mastitis pathogens before adding purchased animal to dairy herds. Page 3 in Proc. Am. Assoc. Vet. Lab. Diag., Grand rapids. MI.