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Prevalence of caprine contagious agalactia in and around Jabalpur

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Abstract

The present work was aimed to study the prevalence of contagious agalactia in goats. For this study, total 705 female lactating goats belonging to organized and unorganized sectors of in and around areas of Jabalpur were screened over a period of 12 months i.e. from April 2014 to March 2015. Out of 705 lactating females, 282 females suspected for contagious agalactia were selected for further study. The presence of causative agent of caprine contagious agalactia i.e. *Mycoplasma agalactiae* was confirmed by polymerase chain reaction. Results revealed an overall prevalence of contagious agalactia as 4.39 % in lactating goats and 14.42% in mastitic goats. The prevalence of contagious agalactia in organized goatry was significantly higher as compared to unorganized goatry. The age wise prevalence does not differ significantly. Non-descript goats showed lesser prevalence as compared to defined breed of goats under study.

Keywords: Prevalence, contagious agalactia, molecular detection, Age wise prevalence

1. Introduction

Contagious agalactia of goats has been known for about two centuries. The clinical disease was first described by Metaxa in Italy in 1816 and was given the name contagious agalactia in 1871 by Brusasco ^[1]. It was the first of the mycoplasmoses of small ruminants for which clinical descriptions and microbiological findings suggested a mycoplasmal origin.

Goats seem to be more susceptible to the natural disease than sheep ^[2]. Clinical disease can be inapparent, mild, acute or chronic. In the female, acute clinical signs are first noticed at the beginning of lactation. Usually, general malaise, fever, mastitis, decreased milk yield, agalactia and Keratoconjunctivitis is seen. Large number of the organisms can be shed in the milk whereas, in blood the organism remains for a short time. Often, the organism settles in the joints, causing arthritis involving one or several joints (polyarthritis). Therefore, classically the disease is characterized by the triad of mammary, joint and eye symptoms in lactating females, although other symptoms may also appear. These symptoms do not simultaneously appear in a single animal, although all three may be detected in the bulk of an affected herd.

Clinical mycoplasmoses often lacks pathognomonic characteristics and symptoms can be shared by other clinically significant infections. Therefore, definitive diagnosis requires molecular tests like polymerase chain reaction. Samples of preference include milk, nasal, ear swabs and joint fluid. Although the significance of mycoplasmosis is well known but a meagre work regarding establishment of the prevalence of mycoplasmosis in goats in Madhya Pradesh has been carried out. So in view of the above facts, this study was aimed with the objectives to know the prevalence of contagious agalactia in goats in and around Jabalpur.

2. Materials and Methods

2.1 Selection of Goats

A total of 705 lactating goats belonging to organized and unorganized sectors of in and around areas of Jabalpur were included in the study and screened over a period of 12 months i.e. from April 2014 to March 2015. Out of 705 lactating goats, a total of 282 goats showing signs of clinical mastitis or suspected for mastitis were selected for further study (Table 01). Presence of clinical mastitis was done on the basis of typical clinical symptoms like swelling of udder, abnormal secretion, enlargement of Supramammary lymph nodes and/or raised clinical

parameters. The confirmation of mastitis in suspected cases was done by California Mastitis test (CMT). The presence of *Mycoplasma agalactiae* was confirmed by polymerase chain reaction.

Table 1: Details of milk samples collected

S. No.	Health status of goats	Goats selected for study	Milk samples collected
1	Clinical Mastitis	137	137
2	Suspected for mastitis	145	145
Total		282	282

About 5 ml of pooled milk from both the udder halves was collected from the suspected cases in sterile tubes for performing CMT as per the standard procedures and molecular diagnosis.

2.2 Polymerase chain reaction

Polymerase chain reaction (PCR) was performed to identify the *Mycoplasma agalactiae* and thus for confirmatory diagnosis of contagious agalactia. The DNA required for PCR was extracted from the milk samples of suspected animals.

DNA extraction was performed by chelex based extraction of DNA [3] using Insta Gene Matrix (Bio-Rad laboratories, India Pvt. Ltd.). The specific primers were used in the study to identify *Mycoplasma agalactiae* [2].

ma-mp 1 5'-AGCAGCACAAAACCTCGAGA-3' (forward)

ma-mp 1 5'-AACACCTGGATTGTTTGAGT-3' (reverse)

The amplification of specific PCR product was checked by electrophoresis of the PCR product in 1.5% agarose gel and viewed in UV transilluminator system.

2.3 Data analysis

Overall prevalence of contagious agalactia was calculated by dividing the number of positive samples by the total number of samples. Age wise and breed wise prevalence were calculated by category wise dividing the number of positive samples by the total number of samples [4]. Analysis of data of prevalence studies was done by using Chi square test.

3. Results

The study on the prevalence of contagious agalactia in goats in and around Jabalpur was based on screening the lactating goats for the presence of clinical signs pertaining to contagious agalactia and molecular identification of *Mycoplasma agalactiae* in the suspected animals. On the basis of clinical symptoms of contagious agalactia like mastitis, history of abortion, respiratory, ocular and mixed signs, 282 lactating goats were suspected for the disease. When milk samples collected from lactating goats suspected of contagious agalactia were subjected to PCR test, a specific 176 bp bands obtained from the DNA amplification of *Mycoplasma agalactiae* using primers ma-mp 1F and ma-mp 1R were observed.

3.1 Clinical picture of goats suspected for contagious agalactia

Out of 282 lactating goats, 48.58% were positive for clinical mastitis, 18.44% showed respiratory, 11.70% showed ocular signs, 3.19% revealed history of abortion and 18.08% showed mixed signs of mastitis, respiratory signs, ocular signs and/or history of abortion (Table 02).

Table 2: Details of clinical picture in the goats suspected for contagious agalactia

S. No.	Clinical picture	No. of goats showing signs (n=137 + 145 = 282)	Per cent (%)
1	Mastitis	137	48.58
2	Respiratory signs	52	18.44
3	Ocular signs	33	11.7
4	Abortion	09	3.19
5	Mixed signs	51	18.08

3.2 Prevalence of contagious agalactia in lactating goats

The overall prevalence of contagious agalactia was 4.39% in lactating goats. However, the prevalence among the goats suffering from mastitis was 14.42% (Table 03).

Table 3: Prevalence of contagious agalactia in lactating goats

Goats	Number screened	Number positive	Prevalence (%)
Total Screened	705	31	4.39
Mastitic goats	215	31	14.42

3.3 Prevalence of contagious agalactia in organised and unorganised goatry

Prevalence of contagious agalactia in organised goat farms was higher i.e. 10.92% than the unorganised sector of goatry i.e. 1.26%. Significant variation was noticed in the prevalence with respect to rearing pattern of goatry (Table 04).

Table 4: Prevalence of contagious agalactia in organized and unorganized goatry

S. No.	Sector/ Rearing Pattern	Number screened	Number positive	Prevalence (%)
1	Organized goatry	229	25	10.92
2	Unorganized goatry	476	6	1.26
$\chi^2=30.4771$ df = 1 p=0				

3.4 Age wise prevalence of contagious agalactia

The age wise prevalence of contagious agalactia in lactating goats revealed a non-significant variation among various age groups. However, highest prevalence i.e. 6.87% was seen in above 4 years age group followed by 4.49% in goats of 3 to 4 years of age group and lowest prevalence i.e. 2.73% (Table 05).

Table 5: Age wise prevalence of contagious agalactia in lactating goats

S. No.	Age group	Number screened	Number positive	Prevalence (%)
1	2-3 years	256	07	2.73
2	3-4 years	289	13	4.49
3	Above 4 years	160	11	6.87
$\chi^2 = 3.6636$ df = 2 p = 0.160124				

3.5 Breed wise prevalence of contagious agalactia

The breed wise prevalence study of contagious agalactia in lactating goats revealed a highest prevalence of 12.24% in Barbari breed followed by 11.19% in Sirohi breed, 7.14% Black Bengal breed, 3.41% in Jamunapari breed and lowest prevalence of 1.01% in non-descript breed of goats. The breed wise prevalence of contagious agalactia showed significant variation ($p < 0.05$) among various breeds of goats (Table 06).

Table 6: Breed wise prevalence of contagious agalactia in lactating goats

S. No.	Breed	Number screened	Number positive	Prevalence (%)
1	Barbari	49	06	12.24
2	Black Bengal	28	02	07.14
3	Jamunapari	88	03	03.41
4	Sirohi	143	16	11.19
5	Non-descript	397	04	01.01

$\chi^2 = 30.5124$ df = 4 $p < 0.00001$

4. Discussion

The clinical symptoms observed during the disease correlates well with the previous studies [5, 6]. In the present study, the overall prevalence of contagious agalactia was reported as 4.39% in lactating goats. However, the prevalence among the goats suffering from mastitis was 14.42%. A prevalence of 5.5% of *Mycoplasma agalactiae* was reported in sheep and goat milk samples in Kordestan province, Iran [7].

The results of the present study can be supported by the previous studies conducted throughout the world, although prior to this investigation no such study was conducted in lactating goats in Madhya Pradesh. The possible reason is that the isolation and identification of mycoplasma is difficult and culture of mycoplasmas is not routinely carried out in most of the diagnostic laboratories. As PCR has recently been accepted as a valuable diagnostic method for mycoplasma infections, therefore in the present work, PCR was used for confirmatory diagnosis of contagious agalactia. Thus, the present study indicated the prevalence of contagious agalactia in and around areas of Jabalpur.

In the present study, significant variation was noticed in the prevalence with respect to rearing pattern of goats. The prevalence of contagious agalactia in organised goat farms was reported to be significantly higher (10.92%) than the unorganised sector of goatry (1.26%). It might be due to the reason that contagious agalactia is a highly contagious disease which spreads by ingestion of feed, water or milk contaminated with infected milk, urine, faeces, nasal, ocular and genital discharges. So, when animals are reared under intensive system, they come in close contact with each other resulting in the development of clinical form of infection while, traditional extensive system of rearing resulted only in sporadic cases of the disease [8].

The age wise prevalence of contagious agalactia revealed a non-significant variation among various age groups with the highest prevalence of 6.87 per cent in goats of above 4 years age group followed by 4.49 per cent in goats of 3 to 4 years of age group and lowest prevalence i.e. 2.73 per cent in goats of 2 to 3 years of age group.

Direct association of age with the prevalence of contagious agalactia in the present study might be attributed to the fact that female goats in the age group of 2 to 3 years are not routinely exposed to the causal agent, since most of them are in their first lactation [9]. Lactation may facilitate multiplication of mycoplasmas and their clinical manifestation in the udder.

The breed wise prevalence study of contagious agalactia in lactating goats revealed a highest prevalence in Barbari breed followed by Sirohi breed, Black Bengal breed, Jamunapari breed and lowest in non-descript breed of goats. The variability in breed wise prevalence might be due to the variability in the number of samples examined in each category. However, comparatively lower prevalence was

observed in the breeds of goats i.e. Jamunapari and non-descript breeds which were reared in the unorganized sector.

5. Conclusion

In the present study, the overall prevalence of contagious agalactia was reported as 4.39% in lactating goats. However, the prevalence among the goats suffering from mastitis was 14.42%. The prevalence of contagious agalactia in organised goat farms was reported to be significantly higher (10.92%) than the unorganised sector of goatry (1.26%). The age wise prevalence of contagious agalactia revealed a non-significant variation among various age groups and the breed wise prevalence study of contagious agalactia in lactating goats revealed a highest prevalence in Barbari breed followed by Sirohi breed, Black Bengal breed, Jamunapari breed and lowest in non-descript breed of goats.

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