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Prevalence of the Small Ruminant's Oestrosis in Benin

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Abstract: The prevalence of *Oestrus ovis* infection in Benin small ruminants was investigated from March to August 2011. A total of 480 heads of randomly selected sheep (256) and goats (224) were examined and Larvae of any instars (L1-L3) were recovered from the nasal-sinus cavities. Results indicated an overall prevalence of 27.7% and a mean larval burden of 3.8±0.2 larvae with the predominance of the two first Larval instars (L1 and L2). The infection has been diagnosed each month with almost constant rate. Three major factors (host's species, age and health) were identified to have been associated with the prevalence. The prevalence of infections was significantly ($p<0.001$) higher in sheep (35.2%) than in goats (19.2%) in adult animals (33.8%) than in young (9.8%). Both the prevalence and larval burden have been higher with animals kept in the Northern area (31.7%). On the other hand no significant difference was noted between infection rates in Southern animals comparatively to central animals. The report also showed that oestrosis and it intensity were strongly correlated with the presence of respiratory pathologies. The infection prevalence was significantly ($p<0.001$) higher in animals suffering from sneeze, catarrh and dyspnoea (59.7%) than in others (15.32%).

Key words: *Oestrus ovis*, prevalence, small ruminants, significantly, sneeze, Benin

INTRODUCTION

In tropical and subtropical areas, parasitic infections represent one of the most important causes of reduced productivity in small ruminants. They often decrease food intake and provoke lower weight gains, lower milk production. Out of helminths, *Oestrus ovis* is reported through several studies as a substantial health problem in goats, sheep and other mammals. The presence and the development of this insect in the animal's nasal cavity and adjoining sinuses can cause acute rhinitis. In some parts of Africa, epidemiological studies have confirmed its high prevalence about 86.3% by serodiagnosis in Burkina Faso (Ouattara and Dorchies, 1996), 79% by serodiagnosis in Togo (Bastiaensen *et al*., 2003) and 59.9% in Ambo and Ethiopia (Gebremedhin, 2011).

From place to place, the prevalence of small ruminant's oestrosis varies in ratio to climatic conditions and breeding system. In Benin, no investigation was undertaken in order to evaluate *O. ovis* infection. It is sure and well acknowledged that important epidemiological information lacks on sanitary prophylaxis regarding animal and human health. This study aimed at contributing to fill these gaps.

MATERIALS AND METHODS

Study area: The investigation was conducted in three agro-ecologic areas of Benin (Table 1).

Study animals: Between March and August 2011, 480 post weaning small ruminants (256 sheep and 224 goats) destined to Benin livestock's markets were selected randomly, bought and slaughtered at Cotonou abattoir. Total 80 heads of sheep or goats were examined monthly. Origin, species, breed, sex, age (estimated by teeth examination) and pathological symptoms were recorded for each animal.

Parasitological methods: The animals were slaughtered in the abattoir of Cotonou and the diagnostic based on heads autopsy. First, the heads were marked with ear tags and then cut off from the body. Afterward, skulls were longitudinally split along the forehead into two symmetric parts. A careful search inside the nasal cavities and sinuses has permitted to collect whole stages of *O. ovis* larvae in respect with the recommendations of Yilma and Dorchies (1991). The larvae were preserved in 10% formalin and then identified. The diagnosis criteria were

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Table 1: Study areas and climatic characteristics

Study areas	Seasons and covered months	Pluviometry (mm year^{-1})	Selected animals
Northern (5 departments)	A dry season (September to March)	700-1300	137 goats and 257 sheeps
Alibori-Borgou	A rainy season (April to August)		
Atacora-Donga			
Central (2 departments)	A dry season (September to March)	1000-1200	253 goats and 109 sheeps
Collines	A rainy season (April to August)		
Zou (Northern)			
Southern (7 departments)	A short rainy season (September to November)	800-1400	137 goats and 257 sheeps
Zou-Mono-Couffo	A long dry season (December to March)		
Atlantique-Littoral	A long rainy season (April to July)		
Oueme-plateau	A short dry season (August to September)		

those indicated by Mage. The infected status was conferred to subjects whom head lodged at least one larva of any stage.

Data analysis: The Prevalence (P) of *O. ovis* infections was calculated by using the following equation:

$$P(\%) = \frac{\text{Number of positive subjects}}{\text{Number of examined animals}} \times 100$$

Data were entered into a Microsoft Excel spreadsheet. Statistical analysis was performed using STATA 11 Software. Descriptive statistics was used to summarize the data. The model was fitted with suspected risk factors like species, age, sex, respiratory symptoms (catarrhal, purulent inflammations and sneeze) and origin.

RESULTS

Prevalence: During the study, 133 of 480 (27.7%) examined heads were infected by at less one of the three *O. ovis* larval stages. The infection was detected all months through with the highest rate (38.75%) in June (Fig. 1). The overall infection rate was 35.16% in sheep and 19.2% in goat. Infections rate relative to the different suspected risk factors are shown in Table 2. Northern region has presented the highest rate of infection (20.72% for goats and 40.43% for sheep) even if there was no significant difference between central and Southern areas. The oestrosis was more prevalent in Northern sheep than in other animals. The lowest prevalence was recorded with central goats. The infection rate was significantly ($p<0.001$) higher in animals suffering from respiratory symptoms (59.7%) than in other (15.32%). The host sex didn't influence infection rate but their age was strongly ($p<0.001$) associated to their statute. Older animals risked more than the younger.

Larval burden: The larval burden is shown in Table 2. On average, 3.8±0.2 larvae were counted in infected heads. All stage of larva occurred throughout study months with the predominance of the two first larval instars (Fig. 2).

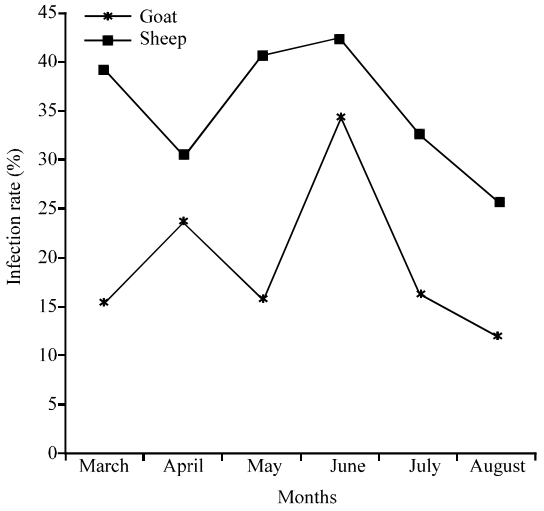

Fig. 1: Oestrosis prevalence relative to animal's species, months through

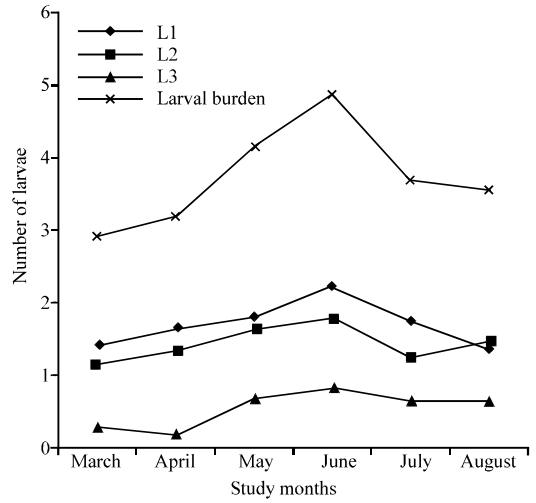

Fig. 2: Trend of larval burden months through

Statistically, no larval burden variation was noted according to origin, species or month. Nevertheless, a high intensity (6 larvae) was recorded in June with sheep from Northern and Southern. The lowest recorded intensity was of 2. The t-test (t-test under STATA 11)

Table 2: Overall prevalence of oestrosis and larval burden according to some suspected risk factors

					Larval burden			
						Percentage of the different larval instars (%)		
Variables	Category	Number examined	Number of positive cases	Prevalence rate (%)	Mean±SD	L1	L2	L3
Origin	Northern zone	252	80	31.75[a]	3.8±1.1	47.4	39.5	13.1
	Central zone	84	17	20.24[b]	3.9±0.9	46.2	35.9	17.9
	Southern zone	144	36	25.00[b]	3.7±1.1	43.3	40.5	16.2
Species	Sheep	256	90	35.16[a]	3.8±1.1	47.4	39.5	13.2
	Goats	224	43	19.20[b]	3.7±1.0	43.3	40.5	16.2
Sex	Female	291	80	27.49[a]	-	-	-	-
	Male	189	53	28.04[a]	-	-	-	-
Age	Old (≥1 year)	358	121	33.80[a]	3.6±0.8	44.4	43.5	12.1
	Young (≤1 year)	122	12	09.84[b]	3.7±0.9	47.2	40.5	12.3
Respiratory	Present	134	80	59.70[a]	4.1±1.0[a]	47.0	40.6	13.4
symptoms	Absent	346	53	15.32[b]	3.4±1.0[b]	43.3	39.4	17.3

[a,b]Values with different upper letters within a row differ significantly ($p<0.001$)

showed that the presence of respiratory symptoms was strongly correlated ($p<0.0001$) with the larval burden. Subjects with catarrhal, purulent inflammations and sneeze have presented higher burden in relation to healthy one (Table 2).

DISCUSSION

Throughout the study period, the prevalence of *O. ovis* infection in small ruminants was below 50% whatever the associated variables. The overall mean of 27.7% recorded is lower than the observations reported in literatures: 30.2% in Nigeria (Unsworth, 1949), 69.2% in Morocco (Pandey and Ouhelli, 1984) and 59.9% in Ambo, Ethiopia (Gebremedhin, 2011). But lowest infection rates were already recorded: 21.9% in Zimbabwe (Pandey, 1989). Nevertheless, the constancy of the infection throughout the study indicates that oestrosis must be considered as an endemic problem in Benin. This report is as much comprehensible that the breeding system is extensive. And in addition to the breeding system there are climatic influences. According to Yilma and Genet (2000), the flies flock's activities are permanent in tropical countries. Globally, northern sheep presented the most important infection rate. This research appears normal since, Northern areas are characterized by a sahelian climate which seems to offer a favourable ecology to several flies such as *O. ovis*. Also, sheep's gregarious instinct described by Chhabra and Ruprah (1976) is an intensifier factor for flies infectious capacity. The high prevalence of the infection (59.7%) in animals suffering from respiratory symptoms is probably due to patient's posture. In fact sick sheep and goats with respiratory symptoms are inclined to stop and to crane, exposing their nostrils and then increasing the contact with flies. But one could inversely attribute the involved symptoms to the *O. ovis* larvae's presence in respiratory routes since, larvae's activities have some inflammatory effects (Alcaide *et al*., 2005). Contrary to indications from Jagannath *et al*. (1989) the age has been an important risk factor. The infection prevalence was higher in older than younger animals. Part of this influence could be explained by the exposing duration to the flies. Otherwise, old animals are often suffering of some chronic respiratory pathology caught for a long time.

The larval burdens (3.8±0.2 on the average) were very lower comparatively with previous observations: 12.74±1.15 and 10.52±0.65 observed (in sheep and goats, respectively) in Central Ethiopia by Yilma and Genet (2000). All larval instars have occurred throughout study months and were often identified simultaneously. First and second larval instars predominated together in the larval burden notably in rainy months. These results indicate that several generations of *O. ovis* were produced (Tabouret *et al*., 2001) but the life cycles have undergone a slowing down. The low proportion of the third larval stage is in agreement with recorded data in Senegal and in Niger and respects the parasite's biology (L3 is always numeric inferiority relatively to L1). At last the larval burden was most important with animals suffering respiratory symptoms. This confirmed the high proportion of L1, major responsible of inflammation.

CONCLUSION

The present study has disclosed that Benin seems to be an endemic area of ovine and caprine oestrosis. Several generations of *O. ovis* develop, year through and maintain the infection. This, certainly contribute to the reduced productivity and economic losses. Borrowing the similar conditions elsewhere a strict plan of the parasitism control would be necessary using persistent drug every 3 months.

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REFERENCES

Alcaide, M., D. Reina, E. Frontera and I. Navarrete, 2005. Epidemiology of *Oestrus ovis* (Linneo, 1761) infestation in goats in Spain. Vet. Parasitol., 130: 277-284.

Bastiaensen, P., P. Dorny, K. Batawui, A. Boukaya, A. Napala and G. Hendrickx, 2003. Parasitisme des petits ruminants dans la zone periurbaine de Sokode, Togo. I. Ovins. Revue Elev. Med. Vet. Pays Trop., 56: 51-56.

Chhabra, N.G. and N.S. Ruprah, 1976. Observations on the incidence and biology of *Oestrus ovis*. Ind. Vet. J., 53: 180-184.

Gebremedhin, E.Z., 2011. Prevalence of ovine and caprine oestrosis in Ambo, Ethiopia. Trop. Anim. Health Prod., 43: 265-270.

Jagannath, M.S., C. Nurulia, Abdul, S. Rahman and T.G. Honnappa, 1989. Studies on the biology of *Oestrus ovis* Linnaeus, 1761 (Diptera: Oestridae). Ind. Vet. J., 66: 677-679.

Ouattara, L. and Ph. Dorchies, 1996. Prevalence serologique de l'oestrose ovine au Burkina Faso: Estimation par la technique ELISA. Revue Elev. Med. Vet. Pays Trop., 49: 219-221.

Pandey, V.S. and H. Ouhelli, 1984. Epidemiology of *Oestrus ovis* infection of sheep in Morocco. Trop. Anim. Health Prod., 16: 246-252.

Pandey, V.S., 1989. Epidemiology of *Oestrus ovis* infection of sheep in the Highveld of Zimbabwe. Vet. Parasitol., 31: 275-280.

Tabouret, G., P. Jacquiet, P. Scholl and P. Dorchies, 2001. *Oestrus ovis* in sheep: Relative third-instar populations, risks of infection and parasitic control. Vet. Res., 32: 525-531.

Unsworth, K., 1949. Observations on the seasonal incidence of *Oestrus ovis* infection among goats in Nigeria. Ann. Trop. Med. Parasitol., 43: 337-340.

Yilma J.M. and A. Genet, 2000. Epidemiology of the sheep nasal bot, *Oestrus ovis* (Diptera: Oestridae), in central Ethiopia. Rev. Med. Vet., 2: 143-150.

Yilma, J.M. and P. Dorchies, 1991. Epidemiology of *Oestrus ovis* in Southwest France. Vet. Parasitol., 40: 315-323.