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Prevalence of small ruminants digestive parasitosis in the Communes of Bohicon, Djidja and Zogbodomey, center of Benin

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ABSTRACT

An epidemiological study of parasitism has been undertaken in the Communes of Bohicon, Djidja and Zogbodomey on 300 small ruminants. The coproscopic technics of flotation and sedimentation realized on Djallonke and Oudah sheeps and on guinean dwarf goats have shown parasites like *Dicrocoeluim* sp, *Monieza expanza* sp, *Cappillaria* sp, *Strongyloide* sp likewise strongylides eggs and *Trichostrongylide* commonly called ''strongles eggs'' and some oocysts coccidiosis like *Eimeria* sp. This study has revealed that the animal global infestation rate to helminth and oocysts like *Eimeria* sp was from 82.47% in goats versus 80.77% in sheeps. The helminthic was more raised in sheeps (69.87%) than goats (36.25%) ($P < 0.05$). The strongles were the most helminths met with the rates of 89.65% in goats and 83.62% in sheeps. The coccidiosis prevalence was 87.5% in goats versus 83.13% in sheeps. By considering the Communes, the rate of coccidian oocysts were 61.84%, 91.01%, and 98.76% respectively in Djidja, Bohicon and Zogbodomey. According to coprology methods used, the flotation was shown to be more sensible with 73.95% of positive samples in comparison to the sedimentation (63.57%). The predominance of nematodes and

trematodes's eggs can explain this difference in the sensitivities. A close collaboration between the Veterinary laboratory of Bohicon, the agents of the rural development in the field and the breeders by strategical intervention based on the association ''diagnosis-deworming'' at the end of dry season and the rainy season must be considered. However, the development of this type of farming , accelerated by the expectation of products more "natural" by consumers, increases the risk parasite.

1. Introduction

In the Republic of Benin, livestock farming takes an important place in the production plan of agricultural sector. It takes the second position after plant production in terms of natural resources potentially acceptable and turning into currency (Direction de l'Elevage, 2012). Small ruminants have an economic importance related to their fertility, fecundity, prolificacy, precious maturity and their adaptability to humid environment (Adenosuma, 1988). However, the development of this type of farming accelerated by the expectation of products more ''naturals'' by consumers, increases the parasitic risks (Larsen, 2001). Parasitism is considered as an essential part of ruminants herd management (Cabaret, 2004). In fact, the internal parasitism widely known in cattle involves many parasites causing endemic diseases, sources of losses due to the delay of development, the drop in meat production, milk, wool and by the mortality (Mcled, 1995; Coop et Holmes, 1996). Often the parasites spread unhindered by causing epizootic diseases that can be deadly (especially for young animals) and reduce the productivity by their pathogenic effects (Fakae et al., 2000; Ngambia et al., 2000).

In the tropics, the helminthosis constitute one of the major factors that limit animals production (Fabiyi, 1987). In addition to these sanitary problems, it is noted that coccidiosis is one of the diseases which constituted an obstacle to the development of intense production of goats and sheeps (Opoku-Pare et Chinene, 1979). The control of this parasitism is often necessary in animal breeding so as to allow animal's production performances which do not have any disadvantage and even affect their health (Okombe et al., 2013). The aim of this study is to contribute to the knowledge of internal parasitism in center of Benin by the evaluation of the prevalence of parasitosis digestive prevalence in small ruminants.

2. Materials and methods

2.1. Material

The material used was composed of transparent plastic sachets serving to faeces samples, stamper for the samples identification, freezer compartment in which the samples were putting down even the sampling files in order to identify the herd and animals. Dealing with the laboratory materials, it was composed of a saturated solution of sodium chloride, a balance to weight the faeces quantity, a mortar to knead and to homogenize the faeces, a sieve to filter stools, some test tubes of 10 ml necessary to contain the filtrate, a centrifugal for a good sedimentation, a support which contains the test tubes, some Pasteur pipette for the sampling of the filtrate, some blade and gill to observe eggs, a photon microscope, a methylene blue solution at 1% to improve the sedimentation sensibility.

2.2. Period and area study

The study has been realized from March to December 2015. The samples have been performed in the Communes of Bohicon, Djidja and Zogbodomey. For the laboratory analysis, they have been made at the Veterinary laboratory of Bohicon. The description of the three research areas is stated as followed (Akomagni, 2006). Bohicon is situated in the south-west in the department of Zou, at 130 km from Cotonou and is located between 6*55' and 7*08' at latitude north, 1*58' and 2*24' at longitude east. It has a surface area of 139 km^2. The

northern side of Bohicon is bordered by the district of Djidja; in the south by the Commune of Zogbodomey; in the east by the Commune of Za-kpota and by Abomey in the west.

Djidja is located between 7*19'60'' at latitude north and 1*55'60'' at longitude east, with a surface area of 2184 km^2. It is bordered by Dassa and Savalou in the north, by Abomey and Bohicon in the south, by Aplahoue and the Republic of Togo in the west and by Za-kpota in the east. About Zogbodomey, it is situated between 7*05'00' north and 2*06'00'' east and it covers 600 km^2. Bordered by Bohicon, Toffo, Agbangnizoun and by Za-kpota and Cove respectively in the north, south, west and east.

2.3. Climatology of the research areas

The three Communes are situated in a transition area between a sub-equatorial coast climate of the south Benin and a humid tropical climate of Sudan-Guinean type of north Benin. The annual rainfall average varies between 900 and 1200 mm of water. However, the bimodal evidence of the precipitations, either two rain seasons or two dry seasons, become progressively blurred from the south to north.

2.4. Methods

2.4.1. Animal choice

The examined animals came from breeding, which have benefited or not from a regular sanitary control. The sheeps which have been identified come from Djallonke and Oudah race in goats, whereas the Guinean dwarf goats are the ones of sheeps. In total 100 animals, irrespective species have been chosen per Commune. The table 1 shows the number of samples realized by animal specie and per Commune.

Table 1
Samples per animal specie and per Commune.

Area	Goats	Sheeps
Bohicon	50	50
Djidja	75	25
Zogbodomey	78	22
Total	203	97

2.4.2. Parasitological methods

The sampling had been realized on the animals rectum composed of transparent plastic sachets. Then, the latter was turn upside down, tied and identified with a corresponding number in a cardinal order. The sampling was put into a freezer compartment containing cold preservative. The transportation is realized in cold toward the veterinary laboratory of Bohicon where they are immediately put into the icebox for analysis.

To maintain the parasitic constituents to their emission stage, the preserving of faeces is aiming to avoid the transformation of their morphology and all external contamination. When an immediate analysis is not possible, it consists of freezing. The analyses were made according to two techniques of qualitative coproscopy: The flotation technique and the sedimentation technique.

Flotation

The principle of this technique is to dilute the sampling in solution with a high density in order to make come back up to the surface of the fluid the parasitic constituents while the fragment flow at the bottom. For that, 5g of faeces was taken and knead in the mortar. Then they have been diluted and homogenized in stemmed glass with 70 ml of saturated solution of sodium chloride of 1,2 density. The mixture after sifting, has been poured into a test tube till to obtain a meniscus convex. A gill has been put down delicately on each tube and left at rest during 20 to 30 minutes. The gill has been saved and delicately put down on a slide blade. The eggs observation has been made at photon microscope with 10 and 40 objectives.

Sedimentation

Here the principle is to dilute the sampling in aqueous solution with a density inferior to the parasitic constituents one to mass them at the bottom of the tube while some fragments are filled. It consisted of taking 5g

of faeces and delit them into 10 volume of water between pestle and mortar. The mixture has been sifted and centrifuged two times during 3 minutes at 3000 tr/mn. After rejecting the surnageant, a drop of methylene blue at 1% has been added. Some drop of the sediment so colored are examined to photon microscope between blade and gill to 10 and 40 of magnifying.

2.4.3. Eggs identification

The egg identification is made by following the morphological characteristics described by Beugnet et al. (2004).

2.4.4. Determination of the animal infestation rate

The infestation rate (IR) of the small ruminants has been worked out by doing the ratio between the infested animal and the examined ones multiplied by 100.

$$IR = \frac{\text{Number of infested animals}}{\text{Number of examined animals}} \times 100$$

2.4.5. Statistical data analysis

The process *Proc freq* of the Statistical Analysis System (SAS) software has been used for the determination of the infestation rate of small ruminants. The comparison of the infestation rate between sheeps and goats in the three Communes have been done by the Z bilateral test.

3. Results and discussion

The eggs met were from *Dicrocoelium* sp, *Cappillaria* sp, *Moniezia expanza*, *Strongyloides* and *Trichostrongyloides*. The egg of the last two families of parasites are commonly known as ''Eggs of strongles''. In additon to that eggs, some coccidian oocysts as Eimeria sp and strongylides larva sp have been identified (Fig 1 to 6). On the 300 faeces analyzed, 145 (48.33%) contained helminths versus 208 (69.33%) for the oocysts of Eimeria sp. Taking into account the parasatism rate of helminth-Eimeria sp, 246 animals (82%) have been positive.

The tables 2 to 9 show the rate of infestation of the small ruminants per Commune per animal specie and according to the parasitological method used.

Table 2
Global animals infestation rate per Commune.

Commune	Number of examined animals	Number of parasitized animals	Infestation rates (%)
Bohicon	100	89	89a
Djidja	100	76	76a
Zogbodomey	100	81	81a

a: The infestation rates followed by the same letter do not vary significantly at the level of 5%.

Table 3
Global infestation rate according to animal species.

Animal species	Number of examined animals	Number of parasitized animals	Infestation rates (%)
Sheeps	97	80	82,47a
Goats	203	166	81,77a

a: The infestation rates followed by the same letter do not vary significantly at the level of 5%.

Table 4
Global infestation rate of the small ruminants according to the parasitological method of analysis.

Method used	Number of examined animals	Number of parasitized animals	Infestation rates (%)
Flotation	300	215	71,66a
Sedimentation	300	151	50,33b

a,b: The infestation rates followed at least by a different letter, significantly vary at the level of 5%.

Table 5
Parasitosis prevalence according to investigated Commune.

Commune	Number of examined animals	Infestation rate to helminthes (%)	Infestation rates to oocystes (%)
Bohicon	100	51,68aA	91,01bA
Djidja	100	64,47aA	61,84aB
Zogbodomey	100	61,72aA	98,76bA

a, b: The prevalences of the same line followed at least by a different letter significantly vary at the level of 5%. A, B: The prevalence of the same column followed at least by a different letter significantly vary at the level of 5%.

Table 6
Parasitosis infestation rate according to animal species.

Animal species	Number of examined animals	Infestation rate to helminthes (%)	Infestation rate to oocystes (%)
Sheeps	80	36,25aA	87,5aB
Goats	166	69,87b	83,13aB

a, b: The infestation rates of the same line followed at least by a different letter, significantly vary at the level of 5%. A, B: The infestation rate of the same column followed at least by a different letter, significantly vary at the level of 5%.

Table 7
Infestation rates of the different helminths according to the Communes.

Commune	Number of helminths	Observed parasites (%)			
		Strongles	*Moniezia expenza*	*Dicrocoelium sp*	*Capillaria sp*
Bohicon	46	45 (97,82aA)	8 (17,39bA)	5 (10,86bcA)	1 (2,17cAB)
Djidja	49	38 (77,55aB)	5 (10,20bA)	9 (18,36bA)	5 (10,20bA)
Zogbodomey	50	40 (80aAB)	8 (16bA)	7 (14bA)	0 (0cB)

a, b, c: The prevalence of the same line followed at least by a different letter significantly vary at the level of 5%. A, B: the prevalence of the same column followed at least by a different letter significantly vary at the level of 5%.

Table 8
Infestation rates of the different helminths according to the animal species.

Animal species	Number of helminthes	Observed parasites (%)			
		Strongles	*Moniezia expenza*	*Dicrocoelium sp*	*Capillaria sp*
Sheeps	29	26 (89,65aA)	0 (0bB)	1 (3,44bB)	3 (10,34bB)
Goats	116	97 (83,62aA)	21 (18,10bB)	20 (17,24bB)	3 (2,58cC)

a, b, c: The prevalences of the same line followed at least by a different letter significantly vary at the level of 5%. A, B, C: The prevalences of the same column followed at least by a different letter significantly varies at the level of 5%.

Table 9

Prevalence of the he different helminths according to the Method used.

Method used	Number of helminths	Observed parasites (%)			
		Strongles	*Moniezia expenza*	*Dicrocoelium sp*	*Capillaria sp*
Flotation	125	113 (90,4aA)	14 (11,2bA)	3(2,4cB)	6 (4,8cA)
Sedimentation	78	59 (75,64aB)	10 (12,8bcA)	18 (23,07bB)	4 (5,12cA)

a, b: The infestation rates of the same line followed at least by a different letter, significantly vary at the level of 5%.
A, B: The infestation rates of the same column followed at least by a different letter, significantly vary at the level of 5%.

Fig. 1. Egg of *Dicrocoelium* sp. (x10).

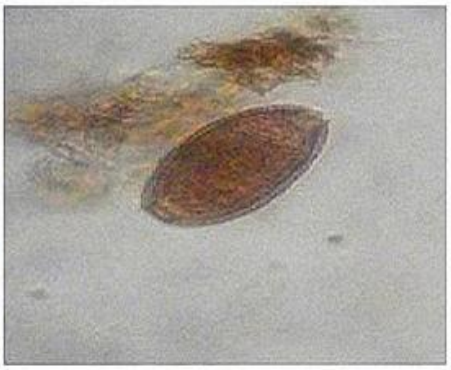

Fig. 2. Egg of *Cappillaria* sp (x40).

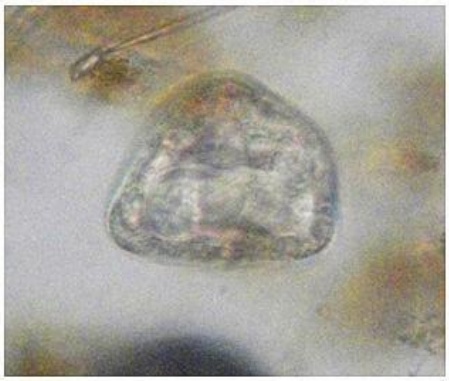

Fig. 3. Egg of *Moniezia expanza* (x40).

Fig. 4. Egg of strongle (x40).

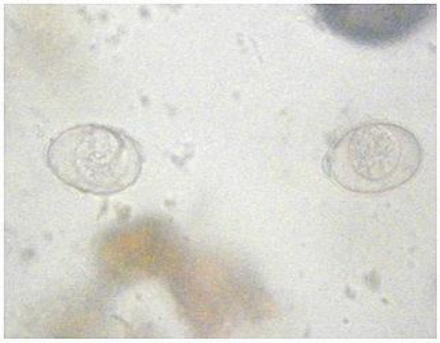

Fig. 5. Oocyst of *Eimeria* (x40).

Fig. 6. Larva 1 of *Strongyloides* sp (x40).

After analyzing those tables it comes out that the parasitosis prevalences were increased in the following districts: Bohicon (89%); Djidja (76%) and Zogbodomey (81%), however any significant differences (P > 0.05) have not been observed between those three districts. The infestation rate registered in caprines and ovines have been respectively 82.47% and 87.77%. The parastic charges obtained with flotation (71.66%) were higher than those found with sedimentation (50.88%) (P > 0.05).

At Bohicon the helminthes infestation rate (51.68) were inferior to those caused by the coccidiens oocystes 91.01%) (P < 0.05). As far as Zogbodomey is concerned, those rate were 98.76% for the coccidian and (61.72%) for the helminthes (P>0.05). At Djidja, the coccidiens oocysts infestation rate (61.48%) didn't show and significant difference with those caused by helminths (64.44%) (P<0.05). The analysis oriented on the caprines and ovines show a clear difference between the parasitic caused by the helminth and the ones caused by oocystes of Eimeria sp. In fact, in ovines, the prevalences were (69.78%) for helminth and (83.13%) for Eimeria sp whereas (36.25%) of the caprines were infested by helminth and (87.5%) by Eimeria sp. An absence of Cappillaria sp at Zogbodomey was noticed as far as *Monieza expanza* is concerned sheeps. An helminth coccidia co-infection was noticed.

In the Community of Bohicon, Djidja and Zogbodomey, the small ruminants are parasitized during all the investigation period. This observation sustains the one done by Attekpami (2007) in Zou which demonstrate that the small ruminants are parasitized during the period from November to May. It also joins the ones of Salifou (1996) in Ouéme, Mono and Altantique which showed that animals are infested during all the year. The ubiquity of digestive parasites in small ruminants was also reported by Pedreira et al. (2006) in Spain and Driss et al. (2012) in Morocco. Goats and sheeps global infestation rate by helminth are lower compare to those of 92.68% and 90.56% respectively found by Attekpami (2007) in Zou, then Tossoulegue (2000) in Couffo. The rate obtained in this study can be explained by the fact that some breeders eliminate interference in animals ones in the year.

The helminthic parasitism is higher in ovines than in caprines. The high prevalences of helminth in ovines compare to caprines are probably due to the fact that the latter exploit the ligneous pasture while ovines prefer grassland (Ndao et al., 1995). The nematode presence (strongyloide sp, Trichostrongylides, Cappillaria sp) as well as in ovines than in caprines in this three districts is close to the observation made by Salifou (1996) which indicated that the infestation of the small ruminants with nematodes exist in all the regions of the south Benin. The sheep and the goats show resemblance at the level of their infestation by nematode parasite of alimentary canal because they accommodate the same species of worm with the pathology associated to those parsites. Moreover, the polyparasitism was in order. In fact, apart from the coccidiens oocystes permanent presence, the associatin monieza expanza-cappillaria sp-strongle are observed. It is recognized that the association of cestode and of the gastric-intestinal nematode can lead to the decrease of the growth and an increase of the young animals death rate (Gretillat, 1981). The strongles are the most encountered. The registered prevalence rate are close to those of 85% and 89% found by Bastiensen et al. (2003) respectively in goats and sheeps.

The coccidi and monieza expanza sp presence is in accordance with the results of Bonfoh (1993) which reported coccidi infestation frequency from 98% to 100% in ovines and caprines and an *Monieza* sp infestation rate of 10% in sheeps and of 17% in ovines. The coccidi infestation rate is higher in small ruminants in the concerned districts. In fact, the cocccid have a direct cycle and their oocysts are very resistant in the environment after sporulation in favor to a temperature and a higher rate of humidity (Chartier et al., 2000). Mammals intestinal coccidian caused to their host the perforation, the lysis and the peeling of the intestinal mucosa together with ulceration which in cases of high infestation could cause their death (Chartier, 2002; Shah et Joshi, 1963). Till now the conception of medical prophylactics plants in these Communes do not include the use of anticoccidiens.

The economic importance of coccidiosis is due to the occasional lose in young ruminants during clinic coccidiose, but also during sub clinic coccidiose giving birth to stunt (Chartier, 2002). The best method of Oocystes implementation is the one of flotation, the coccidiens oocystes having a lower density. These observations are in accordance with the ones done by Chartier et al. (2000).

4. Conclusion

The current study helped to confirm that permanent parasitism in the Communes of Bohicon, Djidja and Zogbodomey. The polyparasitism was also permanent. This study showed out that the breeding of small ruminants in those three districts is faced to a real problem of helminthosis. Helminth infestation rate are higher. Ovines are

more parasitized than caprines. The parasites met are Dicrocoelium sp, of Cappillaria sp, of *Moniezia expanza*, strongyloides and trichostrongyloides. To that is added an important presence of Eimeria sp oocysts.

Apart from the high infestation rate, the parasites observed in the three area study and the small ruminants reveal by this study, it comes to stress on this permanence of parasites and the usefulness of anti- parasitic treatment based on large spectrum action products. Otherwise, one must unsaturated a collaboration between Bohicon veterinary lab, the framing agents of CARDER and the different breeders for sensitization of animals sanitary in general and particularly parasitic by strategic intervention based on the association ''diagnostic-deparasitage'' at the end of rainy season and dry season.

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