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Prevalence of Bovine Fasciolosis with Fasciola Hepatica in the M'pila Slaughter Areas of Congo Brazzaville

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Abstract **Original Research Article**

Fasciolosis is a hepatobiliary dystomatosis due to the migration into the liver parenchyma of immature form of parasites called fasciola hepatica or liver fluke. It is a cosmopolitan disease which represents economic and health problems whose diagnosis is rarely made, it is usually a discovery at the slaughterhouse. It mainly affects animals and sometimes humans. It is in this context that this study was carried out at two slaughterhouses in Mpila in order to determine the prevalence of bovine fasciolosis according to breeds, age, sex, origin and slaughter sector. The liver incision technique to search for flukes was carried out on 356 cattle. The results of the analysis carried out on 356 cattle including 134 infested cattle showed a prevalence of 37.64%. Furthermore, the highest prevalence was observed among mixed race people, a rate of 53.84%. Thus, cattle aged over 4 years were the most exposed to this pathology. Our results show that fasciolosis is a reality in the slaughter areas of Brazzaville. Monitoring of this pathology must be carried out to protect the health of our animals and that of humans.

Keywords: Slaughterhouses, liver, inspection, Brazzaville.

INTRODUCTION

Fasciolosis is a water- and food-borne disease caused by two species of trematodes: the large liver flukes Fasciola hepatica and Fasciola gigantica. Fasciola hepatica has a worldwide distribution, while the transmission of F. gigantica is limited to certain regions of Africa and Asia (Dreyfuss *et al*., 2005; Chen *et al*., 2013; Mekky *et al*., 2015). There are also areas where both species of Fasciola spp coexist (Ashrafi *et al*., 2015). Fasciolosis causes serious public health problems in several regions of the world. It mainly affects people living in poverty, who do not have no access to drinking water, adequate sanitation equipment and which are in close contact with livestock. It is considered a neglected tropical disease (WHO, 2007). As with other neglected diseases, fascioliasis are generally non-fatal (at least in the short term), clinically benign and unreported, but they are disabling diseases that maintain or increase poverty (Fürst *et al*., 2012).

Indeed, it is also considered a major animal health problem since it is responsible for significant losses in the production capacity of livestock (meat and milk) (Torgerson *et al*., 1999). It causes annual economic losses of more than US$3 billion in agriculture because it affects millions of ruminants worldwide. These costs are largely unquantified at the national or regional level, while at the farm level, fluke has been reported to affect milk yield, carcass composition and prolong the time needed to reach weight slaughter (Howell *et al*., 2015). Fasioliasis is currently on the rise in some European countries, likely due to climate change, changing agricultural practices, animal movements and land use, and the emergence of resistance to treatments, in particular to the most used molecule, Triclabendazole (Cwiklinski *et al*., 2015).

For the specific case of Congo, no study has been carried out on bovine fasciolosis over the last 20 years. And yet the country has enormous breeding potential and ideal climatic conditions for the

development of the intermediate host of bovine fasciolosis. It is in this context that this study takes place.

The main objective of this study is to determine the prevalence of bovine fasciola hepatica fasciolosis in the M'pila slaughter areas.

MATERIAL AND METHODS

Presentation of the study area

This study was carried out in the two slaughter areas of Mpila located in district 6 Talangai. It is located south of the equator, between 4°15'5" south latitude and 15°17'56" east longitude of the Greenwich meridian.

This study took place in the period from July 1 to September 30, 2023.

Materials Used

Animal Equipment

The inspection was carried out mainly on cattle. In total, a sample of 356 cattle was slaughtered, including 352 males and 4 females. The cattle were divided into two (02) age classes:

- Class 1 [2-4 years]
- Class 2 {+4 years]

Inspection equipment

The inspection materials that we used during the study consisted of:

Knife; Boots; Blouses; Gloves; A survey sheet.

Methods

The study mainly concerned animals intended to be slaughtered during the period of our study. Indeed, the animals in our study were transported using livestock trucks to the slaughterhouse, once arriving, they can no longer leave: the animals are necessarily slaughtered, except by mistake at the place of slaughter. They are unloaded in the bouveries. Upon delivery, careful control focuses on the state of health of the animals, traceability and identification. The animals are installed in bouveries equipped with water troughs to facilitate their rest. A water diet is observed to prevent them from being destroyed during digestion and to ensure that the viscera are as empty as possible. An ante-mortem inspection is carried out by veterinary inspectors to reassure themselves of the state of health of the animals before slaughter. Before killing (bleeding), the animals are restrained using ropes (Figure 1).

Figure 1: Delivery and restraint

After restraint, an operator carries out bleeding without stunning, which consists of slitting the animal's throat, it is placed on the ground and a transverse section of the throat is carried out using a sharp knife. This operation allows the animal to be drained of blood, which is essential to ensure the health quality of the meat. Once the animal dies, the leather is separated from the carcass (Figure 2), recovered and processed to be marketed.

Figure 2: Counting

Evisceration begins with the removal of the animal's thoracic and abdominal viscera except for the minor parts. The evisceration technique includes two stages.

- Abdominal evisceration, after incision of the belly with a knife, the operator detaches the abdominal mass (Figure 3) and transports it to the recovery trough where the viscera are treated, the liver and spleen are separated to be examined carefully.
- Thoracic evisceration, begins with the slitting of the sternum, detachment of the sternum, removal of the heart and lungs which are joined to the liver, their examination separately.

Figure 3: Evisceration

The post-mortem inspection begins after dressing, during which the following operations are carried out:

- Assessment of the general appearance of the carcass (consistency, color and amount of fat);
- Search for the presence of lesions such as tuberculosis by exploration of the lymph nodes (pre-scapular).

The examination of the spleen is done by visual observation then by palpation and incision of this organ. The incision allows the color and consistency of the splenic tissue to be assessed. In case of anthrax, the spleen becomes friable and leaks blackish mud from the incision.

After extracting the kidneys from the fat surrounding them, they are palpated and then visually examined for cysticerci. After the visual examination, the lung was palpated to look for cysts, abscesses, tuberculosis lesions and bovine pleuropneumonia. The examination of the heart is done by visual observation of the pericardium, followed by incisions allowing the liquid to be drained and the heart exposed, which allows the inspector to examine the surface and interior of the heart in order to look for cysticerci lesions or hemorrhagic lesions.

The inspection of the livers which constituted our study was carried out by visual observation of both sides and the parenchyma after at least one long and superficial incision at the level of the blade followed by several cuts if necessary in the case of flukes (Figure 4). Livers may be seized (totally or partially) for the following reasons: presence of live fluke, calcified fluke, inflammatory process, abscess, abnormal coloring or other reason.

Figure 4: Liver examination

Statistical Analyzes

Data analysis was carried out using the Statistical Package for the Social Science (SPSS) software, comparing the means between the different parameters (age, sex, breed, origin, place of breeding) and the place of slaughter of cattle) was carried out by the Chi-square comparison test at the 0.05 significance level. Prevalence was determined using the following formula:

$$\text{Prevalence (\%)} = \frac{\text{Number of infested animals}}{\text{Number of animals slaughtered}} \times 100$$

RESULTS

Structure of animals slaughtered according to breeds

Figure 5 gives the structure of the livestock slaughtered at the Mpila slaughter areas. It appears from this figure that the animals slaughtered during this study consisted of 5 Ndama breed cattle, 223 Mbororo breed cattle, 102 Goudali breed cattle and 26 Metis cattle from the cross (Mbororo X Goudali).

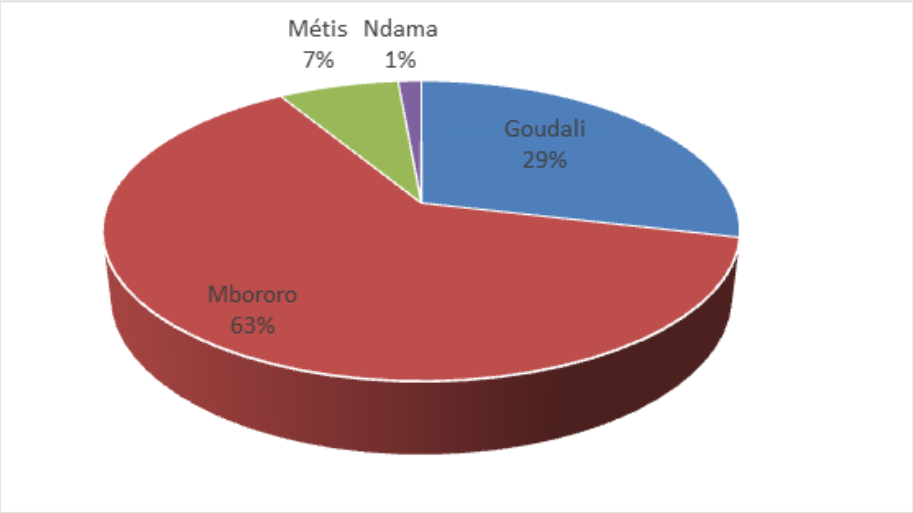

Figure 5: Statistics of slaughtered animals

Prevalence by Race

Figure 6 shows the prevalence of fasciolosis according to cattle breeds. From this figure, it appears that of the 356 cattle inspected, 134 cattle were infested, a rate of 37.64%. Analysis of these results indicates that the Métis have a highest infestation rate of 53.85%, followed by the Goudalis and the Mbororos with prevalences depending on the respective race of 38.24% and 35.85%. On the other hand, the low prevalence is that of the Ndama, 20%. Statistical analysis revealed no significant difference between breed and infested liver (P>0.05).

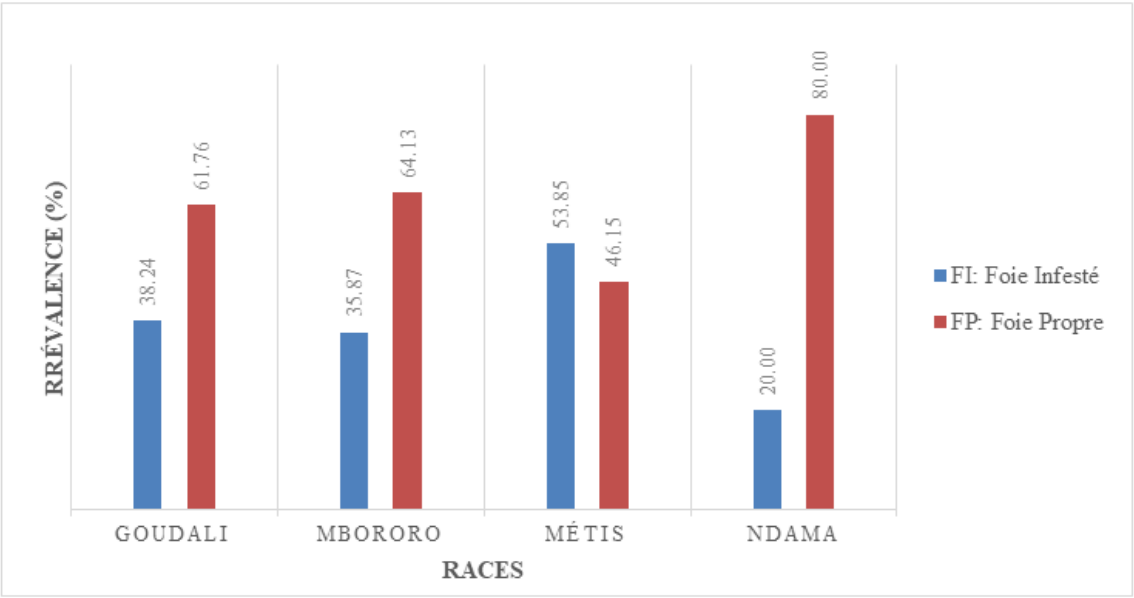

Figure 6: Prevalence by Race

Prevalence by Sex

Figure 7 shows the prevalence of fasciolosis according to the sex of cattle. From this figure, it appears that out of a sample of 352 males, 133 cases were positive, representing a prevalence of 37.78%. On the other hand, out of a population of 4 females, 1 case was positive, a prevalence of 25%. Statistically speaking, there is no significant difference between sexes and parasitized livers (P>0.05).

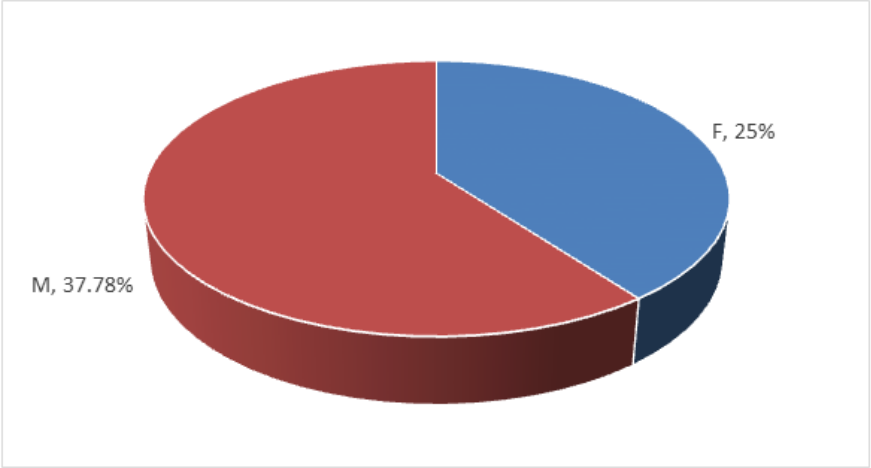

Figure 7: Prevalence by Sex

Prevalence according to Age

Figure 8 shows that, of the 356 cattle examined, there were 89 cattle aged 2 to 4 years and 267 cattle aged over 4 years. Of cattle aged 2 to 4 years, 32 infested, a prevalence of 35.95%, and of those over 4 years old, 102 cattle infested, a prevalence of 38.20%. There is no significant difference (P>0.05) in the fasciola hepatica infestation rate depending on age.

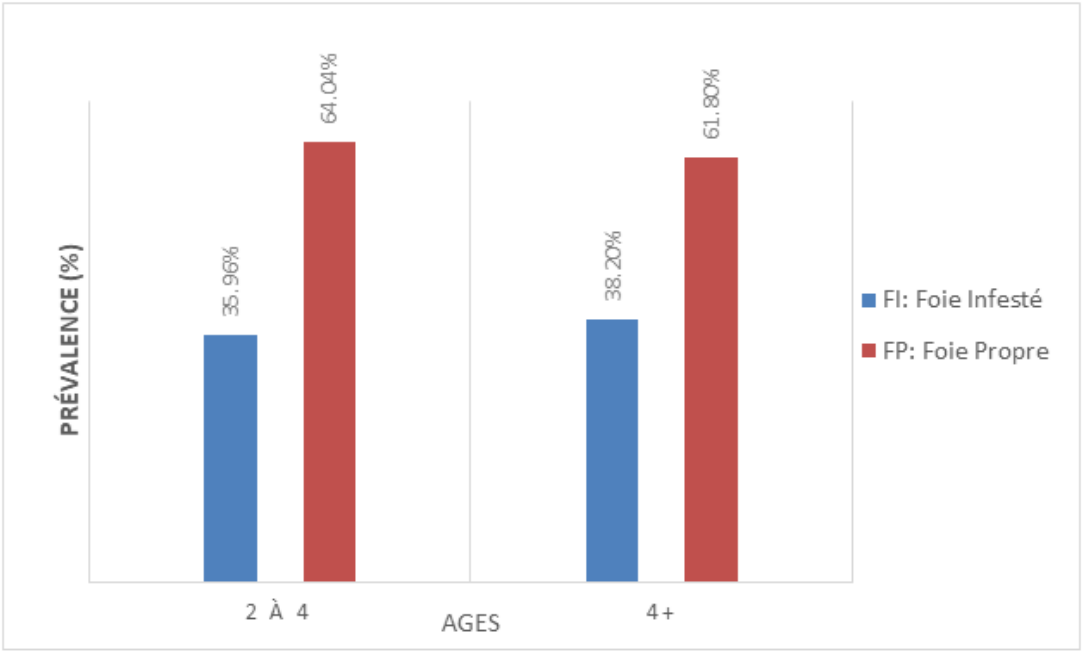

Figure 8: Prevalence according to Age

Prevalence depending on the origin of the animals

The prevalence of fasciolosis depending on the origin of the cattle is illustrated in Figure 9. From this figure, it appears that the highest infestation rate was recorded in animals coming from the CAR with a rate of prevalence of 44.62%; followed by Chad 37.75%, Cameroon 27.03% and Congo 20%. Statistical analysis showed no significant difference depending on the origin of the animals (P>0.05).

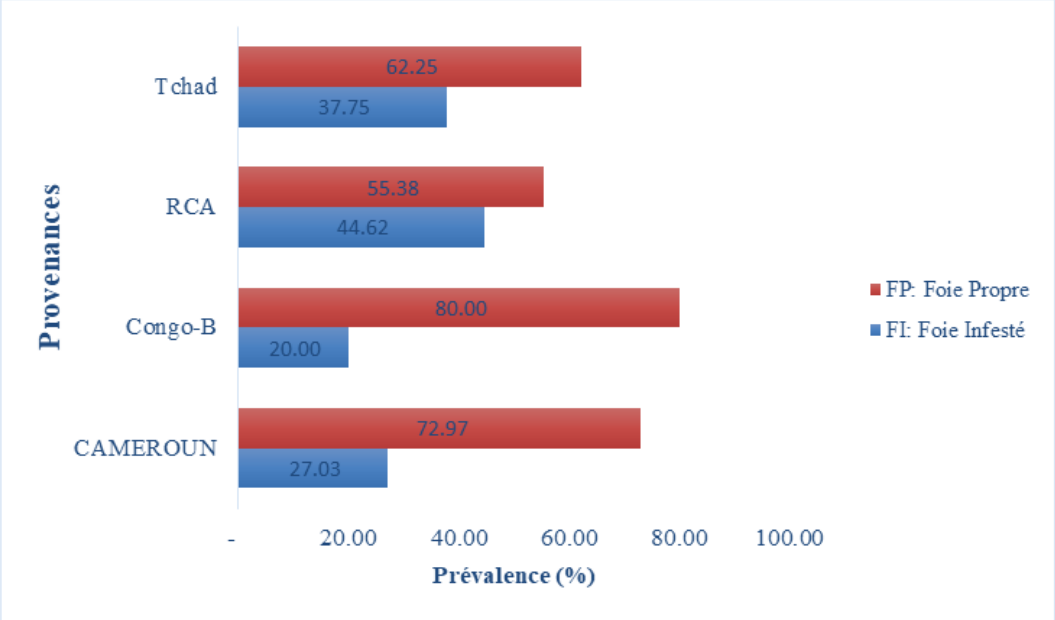

Figure 9: Prevalence according to Origin

Prevalence in relation to place of housing

Figure 10 shows the prevalence of fascioliasis depending on the location of cattle stabling. It appears that the highest infestation rates were recorded in Nkouo, Inoni, Mbé, Imbimi and Ignié, i.e. respective prevalences of 46.15%; 45.45%; 43.56%; 42.86% and 23.60%%. On the other hand, those recorded in Ouenze and Talangai are zero. There is a significant difference (P<0.05) between the location of the animals and the infestation.

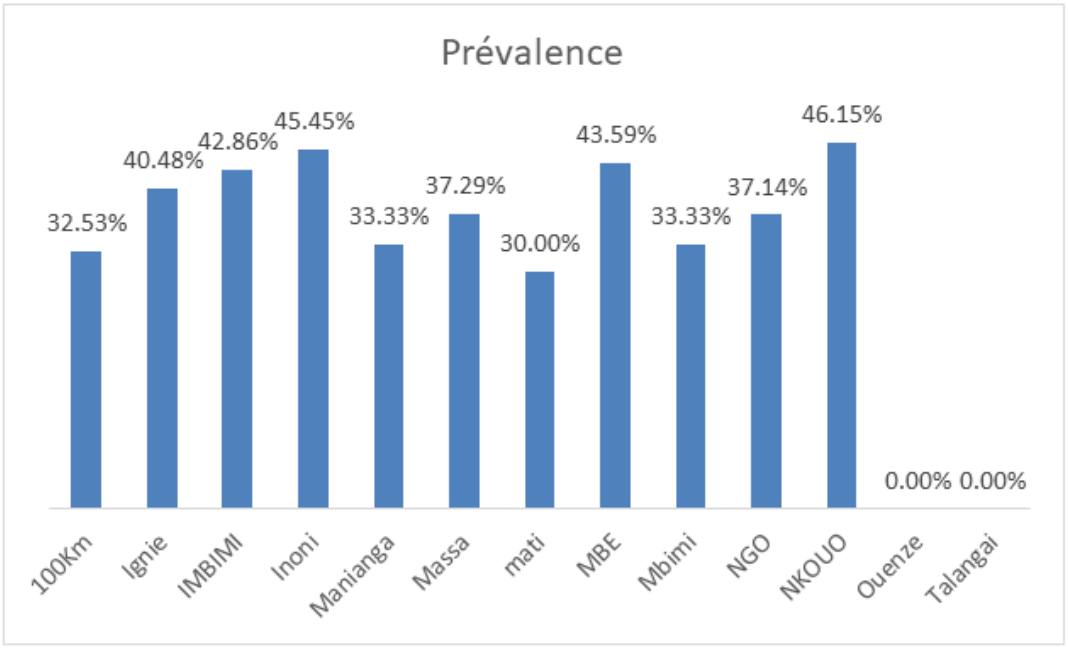

Figure 10: Prevalence according to location

Prevalence in relation to the place of slaughter

Figure 11 illustrates the prevalence of fasciolosis depending on the location of cattle slaughter. The highest infestation rate was encountered in the private slaughterhouse with a prevalence of 38.30% compared to the public slaughterhouse which recorded a prevalence of 37.21%. However, there is no significant statistical difference (P>0.05%) between the slaughter sectors and the presence of parasitosis.

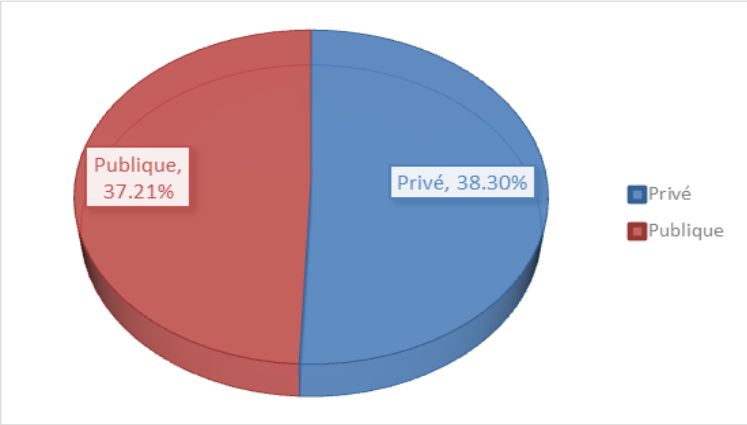

Figure 11: Prevalence in relation to the place of slaughter

DISCUSSION

The results obtained in this study were discussed and compared to other authors. Indeed, during the present study, Fasciola hepatica fascioliasis showed an overall prevalence of 37.64%, our results are close to that carried out in Ethiopia by Telila *et al*., (2013) who obtained a prevalence of 36. 5%. But lower than that carried out by Squire *et al*., (2013) and Abaliou (2014) who respectively obtained prevalences of 51.1% and 87.00% in Ghana and Cameroon in the city of Ngaoundéré. On the other hand, at the Djelfa slaughterhouse in Algeria, the prevalence is 8.23% according to Mebarka et Megrane (2018), and 4% at Abdou *et al*., (2022) observed at the Dosso slaughterhouse in Niger.

These results show that the rate of infestation of cattle by Fasciola hepatica according to breed is not statistically significant, the infestation among mongrels is very high (53.85%) compared to other breeds. These results were very far from those obtained in Madagascar by Rakotondrainiarivelo (2012) with a prevalence of 70%. This result can be explained by uncontrolled crossbreeding of cattle, which can lead to a reduction in the immune system and make them vulnerable to diseases and breeding conditions.

The results of our study show that males are more infested by fasciolosis 37.78% compared to 25% for females. This observation could be explained by the fact that males are more slaughtered and that females are intended for reproduction and especially for sale or export. Our results are contrary to those of Ferhati *et al*., (2014), who point out that the prevalence in cattle by sex does not appear to be different between males and females. However, our results corroborate with those of Abdou *et al*., (2022) where males are more slaughtered than females. These results are different from those of Deya-yang (2014) in Cameroon, females are more infested (47.72%) and according to Siama *et al*., (2018), slaughter concerns females much more than males with a infestation rate of 29.56%.

This study showed a high prevalence in cattle aged over 4 years (38.20%) compared to 35.95% in cattle aged 2 to 4 years. Our results corroborate those of Siama *et al*., (2018), where the prevalence of old animals (34.32%) is higher than that of young animals (32.46%). These results are lower than those observed by Mebarka et Megrane (2018), where the highest infestation is observed in cattle aged over 5 years, i.e. a prevalence of 57.14%. But different from those observed in Ethiopia by Birhan *et al*., (2019).

The origins of the animals slaughtered in the slaughterhouses of the city of Brazzaville are mostly Chad with a prevalence of (69.94%), CAR with a prevalence of (18.26%), Cameroon with a prevalence of (10.39%) and Congo with a prevalence of (1.40%). These results are similar to those of Dimi *et al*., (2023) with a rate of 67.78%, 17.22%, 13.33% and 1.67% observed in Chad, CAR, Cameroon and Congo.

Indeed, the highest animal infestation rate depending on origin is that observed in CAR (44.62%) and the lowest are those of Congo and Cameroon with an infestation rate of 20% and 27 .03% respectively. It is difficult to know exactly the place where these animals become infested for the first time; repeated and sometimes clandestine transhumance does not make it possible to precisely determine the rate of infestation in livestock throughout the national territory.

During this study, it was found that the highest infestation is that observed in animals in the village of Nkouo, Inoni and Mbe with a prevalence of 46.15%; 45.45% and 43.59% respectively. This high prevalence may be due to the favorable climate, abundance of aquatic sources and rainfall, which make it a good habitat for the intermediate host of F. hepatica. In addition, these animals are mostly raised free-roaming, which exposes them to better access to intermediate hosts.

The results of our study show that the prevalence of fasciolosis was 37.21% observed at the public slaughterhouse level and 38.30% observed at the private slaughterhouse level. Our results are superior to

those of Mebarka et Megrane (2018), where the prevalence is 8.23% found at the municipal slaughterhouse in the wilaya of Djalfa in Algeria. On the other hand, they corroborate with that of Siama *et al*., (2018), encountered in the main slaughterhouses in the far north of Cameroon, with prevalences of 38.89% at the Mora slaughterhouse and 39.12% at the Mora slaughterhouse. Bogo slaughterhouse. Clandestine transhumance, the significant commercial circulation of livestock between Cameroon, Chad, the CAR and the breeding method can explain the infestation rate of slaughtered animals.

CONCLUSION

Fasciolosis or hepatic distomatosis is a parasitic disease caused by a trematode fasciola hepatica, which affects both animals (ruminants) and humans.

This pathology remains a disease responsible for significant economic losses in cattle breeding due to its negative effect on meat and milk production. This study showed that the prevalence of fasciolosis is higher among mixed race people (53.84%) than among the Goudalis and Mbororos. Older animals are exposed to the disease (38.20%) than young ones. Animals from the CAR are more infested with an infestation rate of 44.62%. Concerning the place of stabling, the highest infestation was noted in the village of Nkouo (46.15%). Regarding the place of slaughter, this parasitosis is encountered in both slaughter areas. This study shows that bovine fasciolosis is present in Congo Brazzaville and that it will be desirable to put in place control measures to counter this parasitosis.

In perspective, a study on the seroprevalence of bovine fasciola hepatica fasciolosis should be carried out.

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