

# Epidemiological Study of Fasciola Gigantica in Cattle from the Daloa Slaughterhouse (Center Western Region of Côte d'Ivoire)

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**Abstract:** *The present study aims to identify liver parasites in cattle slaughtered at the Daloa slaughterhouse. The aim is to contribute to the health monitoring of zoonotic parasitic pathologies linked to the liver of cattle. After the cattle are slaughtered, the liver is removed from the animal and then examined. All of the suspected livers were seized. Specimens of parasites collected from the livers are stored in alcohol at 70 °. Then the samples are transported to the laboratory for their characterization. Of 345 livers examined, 100 harbored the parasite Fasciola gigantica which is a large liver fluke. Young cattle (2 to 3 years old) are the most infested with a prevalence of 57.45%. The proportion of animals with low parasite intensity is 55.10%.*

**Keywords:** Hepatic parasites, pathologies, cattle, slaughterhouse

## 1. Introduction

Livestock products occupy an important place in the diet of the populations (FAO / WHO, 2004). They represent 60% of animal protein intake, for diversification and increased income for breeders [1]. In Côte d'Ivoire, the basis of the economy is agriculture. [2]

The livestock sector only partially covers national needs with 1, 400, 000 heads of ruminants in 1991 [3]. Thus, to satisfy its population with livestock, Côte d'Ivoire depends on the Sahelo - Sudanese region with Burkina - Faso, Mali and Niger as the largest suppliers of live cattle [4].

To compensate for this lack of production, the Ivorian state has made livestock breeding a national priority. In fact, between 1990 and 2009, the number of cattle increased from 2, 000, 000 head to 2, 536, 000 head [3].

Thus, the beef becomes the most popular domestic ruminant by the population because of its meat accessible to all social strata [5]. However, certain edible organs of oxen are teeming with zoonoses that are lethal to humans [6].

The general objective of this study is to contribute to the health monitoring of zoonotic parasitic pathologies linked to the liver of bovines.

More specifically, it involves identifying the hepatic pathogenic species in cattle slaughtered at the Daloa

slaughterhouse and determining the parasite load of each pathogen.

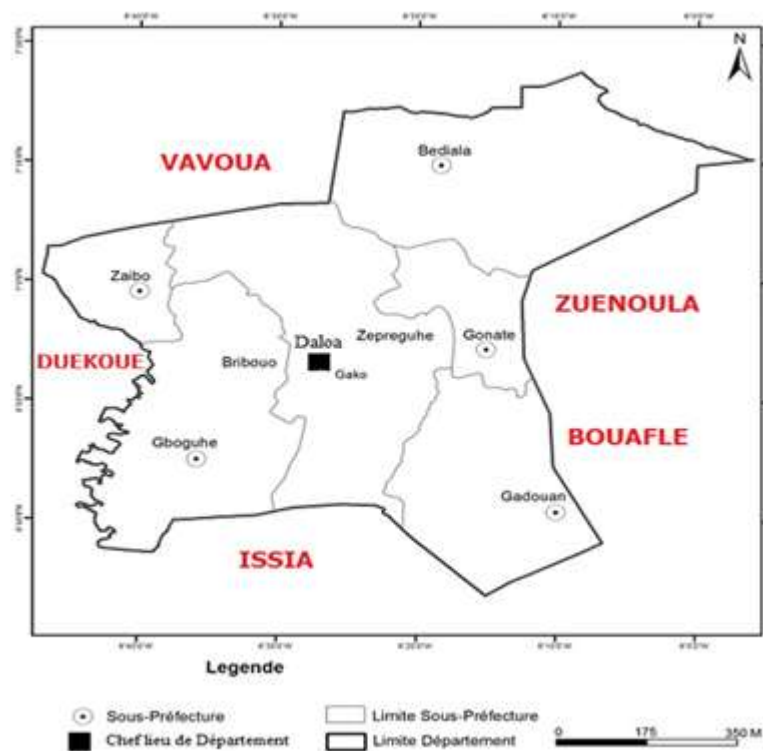
## 2. Material and Method

### 2.1 Presentation of the study site

This study was carried out at the Daloa municipal slaughterhouse. The department of Daloa is located in the center - west of the Ivory Coast, between 6 ° 53 'North altitude and 6 ° 27' West longitude. The city covers an area of 80 km<sup>2</sup>.

Daloa is 141 km from Yamoussoukro, the political capital and 386 km from Abidjan, the economic capital. Daloa is limited to the north by the department of Vavoua, to the south by the department of Issia and Sinfra, to the east by the department of Zuénoula and Bouaflé and to the west by the department of Zoukougbeu [7] (Figure 1).

The slaughterhouse of Daloa was built in 1974 [8]. It has an area of 192 square meters. The slaughter area is 16 meters long and 13 meters wide. The width of the area opposite the stalls is delimited by a low wall about 1.30 meters high covered with white earthenware tiles. This low wall serves as a demarcation between the slaughter area and a stockyard. The slaughterhouse of Daloa has among other amenities four pressurized water stations and washhouses, a coach, etc.



**Figure 1:** Location of the study area

### Material

The biological material consists of liver samples from cattle slaughtered at the Daloa slaughterhouse.

### Method

#### Inspection of livers

This study was carried out from November 20 to December 21, 2019. At the slaughterhouse, we recorded the immobilized animals.

We noted the sex, provenance and age of all animals selected for slaughter. On average, about 20 oxen are slaughtered per day.

A total of 345 oxen were inspected during this study. Two types of sampling were performed: in situ and in vitro.

For visceral control, we used the post - mortem inspection method as described by Habiba [9]. The control of the viscera of cattle slaughtered at the Daloa slaughterhouse was carried out under the responsibility of the veterinary inspector.

The veterinary inspection takes place after total evisceration. The livers are inspected by visual observation of both sides and the parenchyma after at least one knife cut of the left lobe, several cuts if necessary.

Livers may be seized for the following reasons: presence of live fluke, calcified fluke, inflammatory process, abscess,

abnormal coloring or other reason. All infested organs are partially or totally seized depending on the degree of the infestation.

The veterinary inspectors of the slaughterhouse examine the general appearance of the liver, including enlarged and thickened bile ducts, and then carry out a partial seizure or a total seizure of the liver mass due to infestations.

#### Removal and fixation of abnormal livers

About 10 livers on average are removed per day. A total of 118 livers were collected over a one month sampling period. All the seized livers are cut into small pieces then stored in bottles containing 70 ° alcohol. The whole is transported to the laboratory to carry out complementary.

#### Observation and identification of liver parasites

The parasites (fluke) are collected at the slaughterhouse and placed in bottles containing 70 ° alcohol. We carried out a first identification, based on morphological characters under the supervision of veterinary agents. The samples were then transported to the National Agricultural Development Support Laboratory (LANADA) in Bingerville for confirmation of the results.

### 3. Data analysis

#### Prevalence of hepatic pathogens

The prevalence of pathogens was determined using the following formula:

$$\text{Prevalence of pathogens in \%} = \frac{\text{No. of liver animals infested with pathogens concerned}}{\text{Total Number of liver seized}} \times 100$$

### Hepatic parasite load

The parasite load was established according to three levels based on the number of parasites counted in each of the livers seized, method used by Habiba [9]. These are among others: - Low intensity: number of parasite less than or equal to 5; - Average intensity: number of parasite greater than 5 but less than 10; - High intensity: number of parasite greater than 10; Data processing was carried out using an Excel spreadsheet.

### Prevalence of fascioliasis according to age groups

We recorded the age of all the animals slaughtered at the slaughterhouse in order to assess the manifestation of the pathologies and parasites encountered. Three age groups have been established by veterinary officers. The established age groups range from 2 to 3 years, 4 to 5 years and over 5 years.

## 4. Results

### Liver parasites found at the Daloa slaughterhouse

The examinations carried out at the National Agricultural Development Support Laboratory showed that *Fasciola gigantica* was the only parasite detected in this study (Figure 2).



Figure 2: *Fasciola gigantica*

### Prevalence of fascioliasis by age group

Three age groups have been established according to veterinary officials. The established age groups range from 2 to 3 years, from 4 to 5 years and over 5 years, (Figure 3).

### Influence of age

Figure 3 illustrates the prevalence of fascioliasis by age. It turns out that the highest prevalence in this study was in the 2 - 3 years old age group with a value of 57.5%. For the 4 - 5 years old age group, the prevalence decreases to 31.3% respectively. The over 5 - year - old class recorded the lowest prevalence, which is 11.2%.

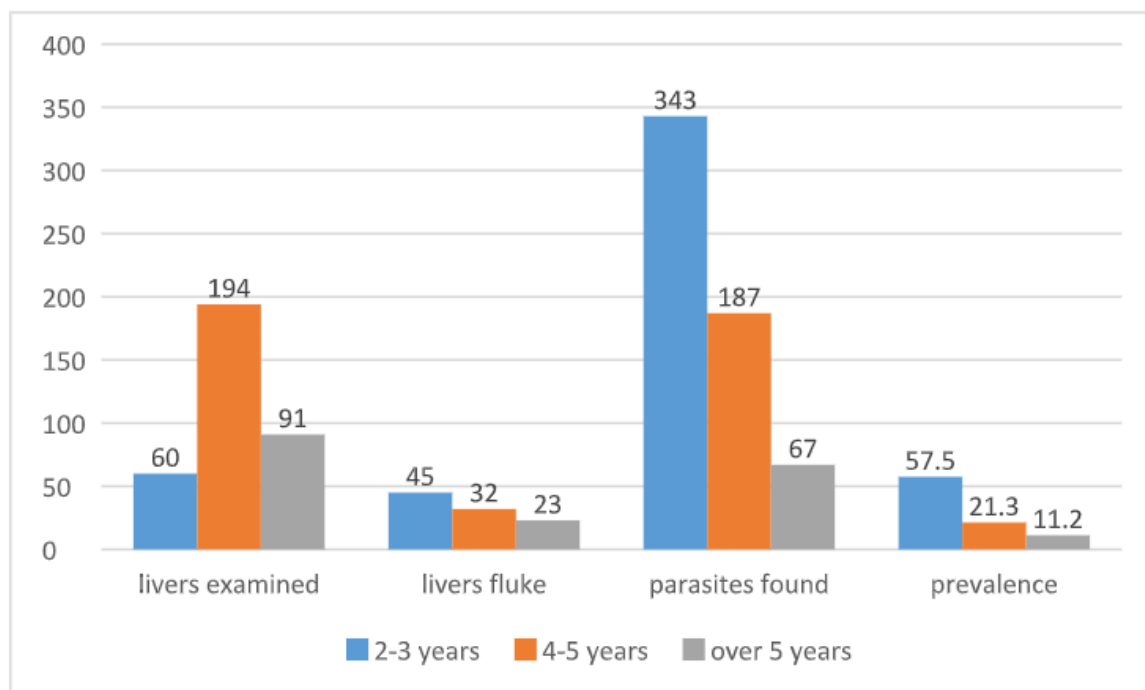
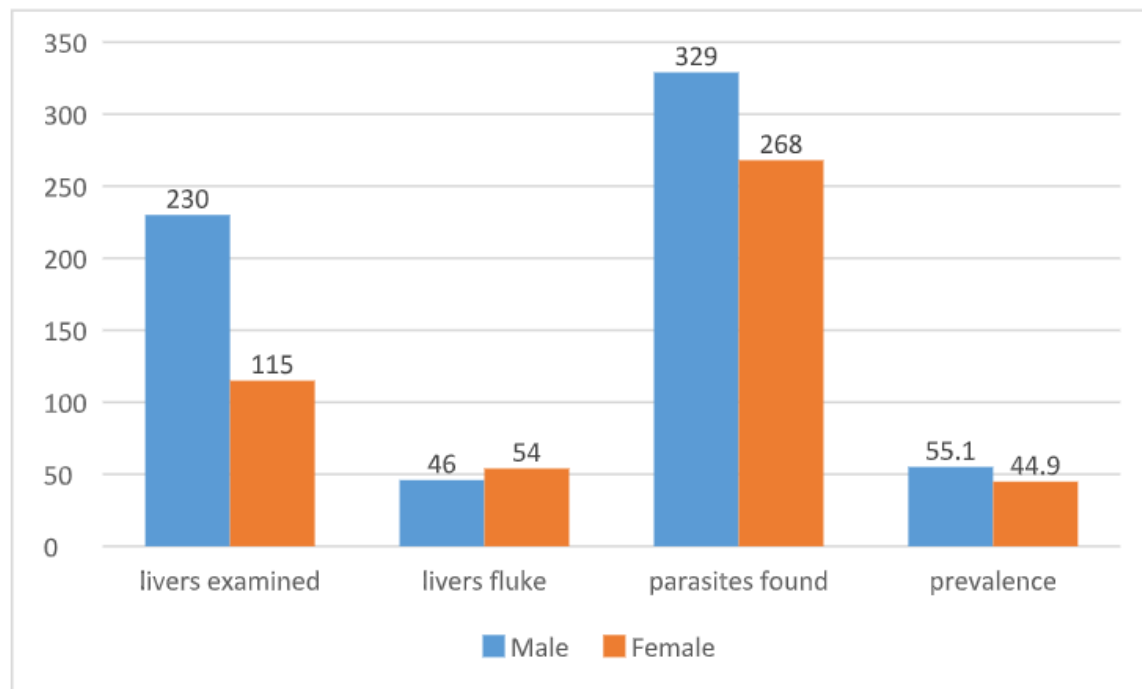


Figure 3: Prevalence of bovine fascioliasis according to age groups at the Daloa slaughterhouse from November to December 2019

### Prevalence of fascioliasis by sex

Figure 4 shows that females (54) are more infected than males (46). However, the frequency of *Fasciola gigantica*

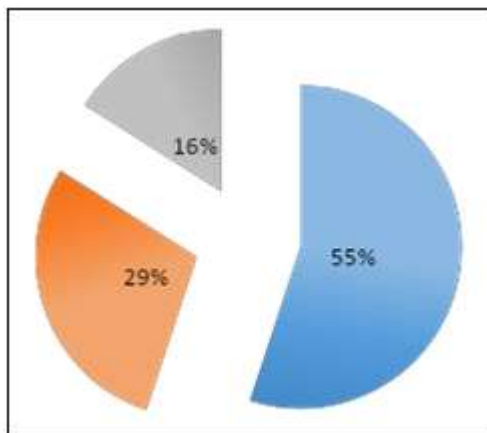
was higher in males with 55.1% than in females with 44.9% infestation (Figure 4).



**Picture 4:** Prevalence of bovine fascioliasis by sex at the Daloa slaughterhouse from November to December 2019

#### Parasitic intensity

The percentage of animals with a low parasitic intensity is in the majority 55 %, that of animals with an average parasitic load reaches 29 % and finally the percentage of animals with a high parasitic load is 16 % (Figure 5).



**Figure 5:** Parasite load in (%) of *Fasciola gigantica* found at the Daloa slaughterhouse from November to December 2019

## 5. Discussion

Out of a total of 345 bovine livers examined under the supervision of veterinary officers, 100 suspected livers were seized. This relatively large number of seizures indicates that the cattle slaughtered at the Daloa slaughterhouse have liver disease.

These results are similar to those obtained by Yeo et al. [10] in the Poro region and by Blaise & Raccart [11] in Haiti. During the work, only one type of parasite was identified. It is *Fasciola gigantica*.

To assess the importance of parasitism, the variation factors used are the sex and age of the animals. The level of

parasitism varies depending on the age group. Infestations are higher in young, adults are less receptive.

Ruminants develop resistance to the parasite with age which is probably related to repeated infestations, these infestations subsequently fade to become weak in older animals. The three age groups totaled 100 livers containing *Fasciola gigantica*.

In cattle between 2 and 3 years of age, we recorded 45 livers containing (343 *Fasciola gigantica*); or 57.5%. In cattle aged between 4 and 5 years, we counted 32 infested livers with 187 individuals, or 21.3%.

Oxen over 5 years old made it possible to count 23 parasitized livers (67 individuals) with 11.2%. Our results agree well with the results of Habiba [9] who showed that cattle whose age is between 1 and 2 years have a strong infection with *Fasciola gigantica* (57.65%), the intermediate cattle is that is to say the oxen whose age is between 3 and 4 years are less exposed than the young ones with a value of 28.82%.

The oldest are less exposed than the intermediaries with 11.76%. It is the same with the results of Mekroud et al. [12] which indicate that young cattle (<2 years) are more infested. According to Sow, [13] seizure of livers parasitized by Fascioliasis increases as cattle get older.

Older cattle are the main reservoirs of the disease. According to the results obtained, there is no significant difference in the involvement of fascioliasis by sex. In fact, 100 livers from cattle of male and female sexes were examined. In females, we identified 268 *Fasciola gigantica* in 54, for a prevalence of 44.9%.

As for male cattle, 46 were affected with 329 *Fasciola gigantica*, or 55.1%. These results are similar to those of

Bendiaf [14] who indicate that 40% of females and 53.7% of males were affected by fascioliasis.

However, other authors have shown very different results. The work of Mebanga, [6] showed that 70.7% of females are infested while only 47.8% of males are affected.

These results could be explained by the fact that the females slaughtered at the slaughterhouse during our work were generally old.

The majority of fluke infested animals fall into the lightly infested category. The heavily infested category is represented by a minority of infested animals.

Our results agree with those of Bendiaf [14] who found 71% of infested cattle in the lightly infested category, 7% in the moderately infested category and 1.9% of heavily infested livers in the Constantine region.

## 6. Conclusion

The study carried out at the Daloa slaughterhouse enabled us to identify liver parasites in autopsied cattle. *Fasciola gigantica* was the only parasite species observed in this study. Young cattle (2 to 3 years old) are the most infected. There was no significant difference in sex - related *Fasciola gigantica* infestation. It is useful to undertake surveys of the seroprevalence of parasitoses and hepatic pathologies in different regions of the country to better understand the situation at the national level.

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