

Parasites in Cattle in the Ecuadorian Amazon

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ABSTRACT--- *The aim of the present study was to evaluate the association between protozoa and nematodes with age, race and sex in cattle which graze freely in Canton Arosemena Tola, Napo Province - Ecuador. 147 cattle feces were sampled during March 2011 and November 2012. The collection of feces was made during the first morning hours and the samples were obtained directly from the rectum of the animal. Coproparasitologic analyses were performed at the Veterinary Laboratory of Diagnostic Parasitology in Chaco, Ecuador. The total of sampled animals were divided into two groups: \leq twelve months of age (31) and \geq twelve months of age (116). With the protozoa *Coccidia* and *Balantidium* there were significant differences ($P < 0.0001$) between the ages and race, but not so with sex ($p \geq 0.05$). In *Bunostomum*, *Neoscaris*, *Trichostrongylus* spp, *Cooperia*, *Oesophagostomum*, *Strongylus* and *Ostertagia* there are significant differences ($P < 0.0001$) between age and race, but not so with sex ($p \geq 0.05$). In conclusion, there are associations between the presence of both protozoa and nematodes with age and race, but not with the sex of the cattle.*

Keywords--- Protozoa, Nematodes, cattle, age, race, sex, Amazon

1. INTRODUCTION

The need for food production from animal protein for human consumption makes livestock a fundamental tool for that purpose. Agricultural activity is a feasible alternative in the Amazon [8]. For this to happen it is essential that in its application, technologies that generate social, environmental and economic benefits, without changing the ecology and sustainability of the system are used. Cattle farming is one of the largest income producers in the Amazon. Dairy farming and raising beef cattle are affected by a number of constraints that influence production: among these include diseases of infectious, parasitic and nutritional origin. 68% of farms are managed as extensive exploitation farms, which together with the bioclimatic characteristics of the area, poor pastureland management and marketing of animals within the region, contribute as predisposing factors to the presence of various parasites [12].

The success of a productive operation depends on factors such as proper sanitary management and control. Therefore, it is essential to create and implement a plan of vaccination and deworming, in conjunction with proper nutrition, that contributes to the health of cattle, taking into account that the parasite load and permanence, both in the host and the environment (pasturelands), is closely linked to such controls. Parasitic diseases, in particular, sometimes go unnoticed, because there is not always a laboratory analysis to determine their etiology. Instead cattle farmers opt for a symptomatic treatment based on a presumptive diagnosis. Therefore, the correct results are not obtained and the root problem is not eliminated. Consequently, parasites develop resistance to pharmaceutical drugs and there is a predisposition for the host to suffer from other diseases, making recovery difficult. This chronic problem leads to gastrointestinal disturbances, and thus to deficiencies in absorption and utilization of nutrients. In the Amazon region, there are different studies of distribution, geographical presence and incidence of distinct species of parasites affecting cattle, many of which bring with them related problems of daily weight gain and even death.

Therefore, the objective of this work was to see the associations between nematodes and protozoa with regards to age, race and sex of cattle that graze freely in the Ecuadorian Amazon.

2. MATERIALS AND METHODS

147 cattle of various ages were used, which were sampled during March 2011 and November 2012, in the area of Arosemena Tola, Napo province, (Ecuador). The animals were grouped according to the these factors: 1) Age: 0-12 months, over 12 months. 2) Race and fitness: a) Beef: Brahman and native cattle, b) Dairy: Holstein and Brown Swiss, Jersey, Normande 3) Sex: female and male. The climate is tropical with rainfall of 4000 mm / year, an average relative humidity of 80% and temperatures ranging between 15 and 25 ° C. Its topography is characterized by slightly undulating relief without steep slopes distributed across natural plateaus over a large area. The altitude varies between 580 and 990 meters above sea level. While soils are of a very heterogeneous composition, most originate from river sediments of the Andean region. The feeding pattern of the cattle in the this study was free range grazing with pasturelands based on *Brachiaria decumbens*, *Brachiaria brizantha*, *Arachis pintoi*, *Desmodium ovalifolium* and *Stylosanthes guianensis*. The sampling consisted of collecting feces in individual samples. It was always performed in the early hours of the morning and was obtained directly from the rectum of each animal study, through the introduction of the gloved index finger making defecation stimuli on the rectal mucosa. The samples were refrigerated and sent to the laboratory within 12 hours of collection. Coproparasitologic analyses were performed, identifying the presence or absence of parasites using the McMaster technique in the Veterinary Laboratory of Diagnostic Parasitology in Chaco, Ecuador. The results on prevalence were expressed as a percentage and the relationship between Protozoa and Nematodes with age, race and sex of the cattle were evaluated with a test of homogeneity based on statistical Chi-square (χ^2) ($P < 0.05$) and test hypotheses for continuous variables, according to Student's t-test ($P < 0.05$).

3. RESULTS

The total of the sampled animals for the study were divided into two groups:

- \leq twelve months of age (31)
- \geq to twelve months of age (116).

As for protozoa (Table 1), those identified in the fecal samples were *Coccidia* and *Balantidium*. With both types of parasites there were significant differences (χ^2 , $P < 0.0001$) between the younger ages, less than twelve months, and the older ages, greater than twelve months.

Table 1: Absolute values and percentages of Protozoa according to age category

	0-12 months	0-12 months (%)	12 months or more	12 months or more (%)	Total	Total (%)
No presence	6	19.4	1	0.9	7	4.8
Only Coccidia	18	58.1	31	26.7	49	33.3
Only Balantidium	1	3.1	2	1.8	3	2.0
Both	6	19.4	82	70.6	88	59.9
Total	31	100.0	116	100.0	147	100.0

With regards to the nematodes, the parasites found in samples taken were *Bunostomun*, *Neoscaris*, *Trichostrongylus spp*, *Cooperia*, *Oesophagostomun*, *Stronyloides* and *Ostertagia*. (Table 2) and there were also significant differences (χ^2 , $P < 0.0001$) between the younger ages, less than twelve months and the older ages, greater than twelve months.

Table 2: Absolute values and Percentages of Nemátodes based on age

	0-12 months	0-12 months (%)	12 months or more	12 months or more (%)	Total	Total (%)
No presence	9	29.1	93	80.0	102	69.4
Only Bunostomun	0	0.0	2	1.8	2	1.4
Only Neoscaris	1	3.2	0	0.0	1	0.7
Only Trichostrongylus Spp	0	0.0	5	4.2	5	3.4
Only Cooperia	0	0.0	0	0.0	0	0.0
Only Oesophagostomun	2	6.4	5	4.2	7	4.8
Only Stronyiloides	7	22.6	3	2.6	10	6.7
Only Ostertagia	0	0.0	2	1.8	2	1.4
Combination (2 or more species)	12	38.7	6	5.4	18	12.2
Total	31	100.0	116	100.0	147	100.0

The Brahman and Criollo breeds presented 89% of Protozoa and 42% of Nematodes. Breeds Brown Swiss, Jersey, Holstein and Normando presented 89% of Protozoa and 30% of Nematodes.

Figure 1: Percentage of protozoa by sex within meat producing breeds

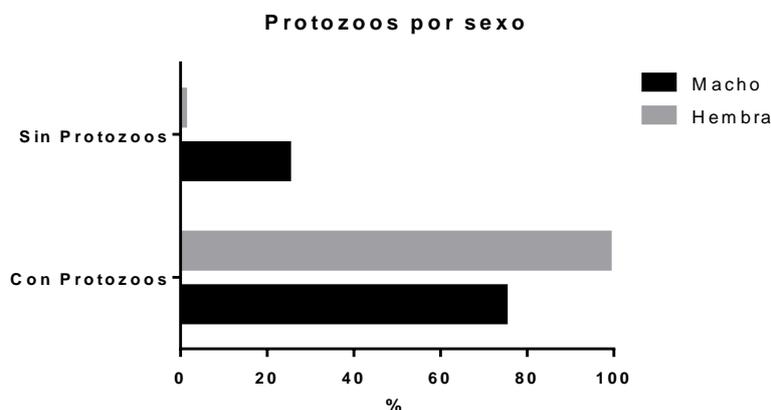


Figure 2: Percentage of Nemátodes by sex within meat producing breeds

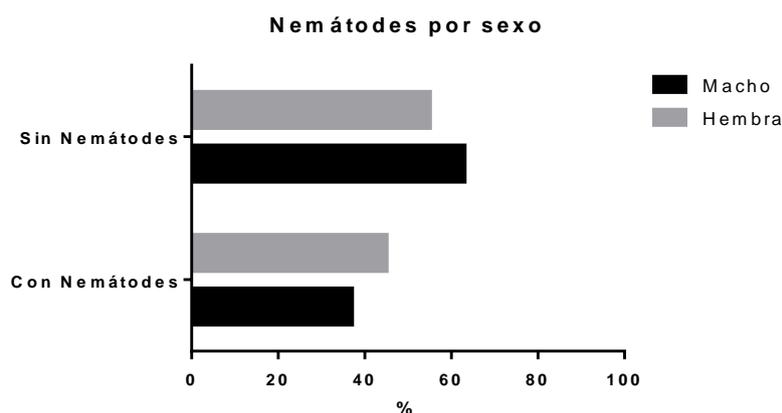


Figure 1 and 2 show that there are no significant differences ($p \geq 0.05$) for protozoal and nematodes by sex within meat-producing breeds.

Figure 3: Percentage of protozoa by sex within dairy breeds

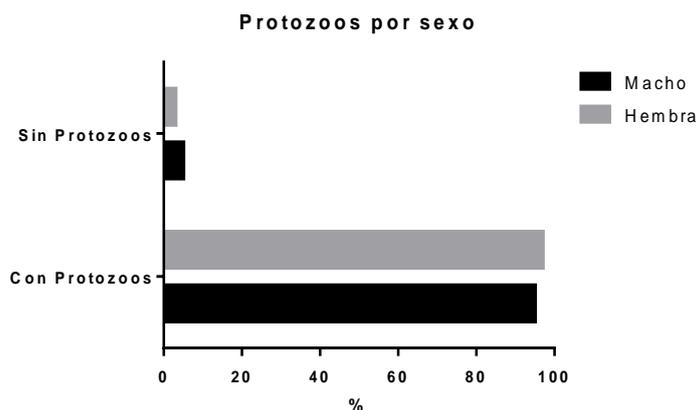


Figure 4: Percentage of nematode by sex within dairy breeds

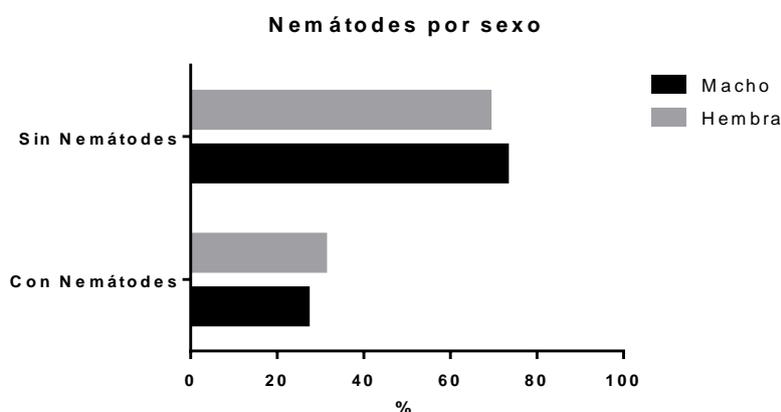


Figure 3 and 4 show that there are no significant differences ($p \geq 0.05$) for protozoal and nematodes and sex for dairy breeds.

4. DISCUSSION

The epidemiology of parasites is linked to the environmental conditions of each region, influenced by the development of eggs and the infective larval stages; periods of higher humidity tend to increase the number of larvae [2]. Regarding protozoa, there are significant differences between animals that are less than 1 year old and those older than one year, especially coccidia, where their presence is most dangerous during the animals first year of life. Coinciding with work of [1] where they found an overall prevalence of *Eimeria* gastrointestinal parasitism, 84.9% of cattle showed significant difference between age and race factors. It is reasonable that 20% of cattle under one year of age do not have the presence of coccidia. At the same time, this is an interesting result to take into account with the particular environmental conditions of the Amazon. Of course, it is not a good result to have a 58% presence of coccidia in cattle analyzed. However, these results are also consistent with the work of [4]; [6] and [3], where they found a high percentage of coccidial infection with percentages of 26.7%, 83.7% and 100%. [5], reported a study where coccidia had a prevalence of 63 to 65% in animals under 12, and animals between 12 and 24 months, respectively, and a lower prevalence in animals older than 24 months, which could be explained by the increasing immunity which develops when as cattle reach one year of age. In relation to the aptitude of breeds, protozoa have a high prevalence in both groups. In this case, these results coincide with those reported by [1]. As for nematodes, this is where the biggest difference is seen, since meat-producing breeds have parasitosis, while dairy breeds have less presence. One might think this is because they are controlled by a better anti-parasitic management or that they have greater genetic resistance. The nematodosis affects cattle both acutely and chronically, primarily harming young animals and causing serious economic losses in livestock systems. The nematodes effect metabolism and productive animal behavior such as altering appetite and skeletal growth, changes in hematopoiesis, mineral and protein metabolism and may also confuse or exaggerate the effects of various nutritional deficiencies [9]. As might be expected, it has been found that nematode parasitism is related to age. There is a very low presence of parasites in animals older than a year, since 80% do not show a presence of parasites. By contrast, only 29.1% of younger animals do not have parasites, therefore almost 70% of animals' stage of

development and growth has been affected which certainly impacts the daily weight gain (DWG). Similar results were found by [11]., in cattle of Venezuela, and those presented by [10], which corresponded to all young animals less than three years old. [7], found that the prevalence of nematodes in nursing calves was 78.3% and that the parasitic genera in nursing calves in the tropical region of the Tierra Caliente region of Guerrero, Mexico during the rainy season increased in the following order of importance according to prevalence in each species, *Haemonchus spp.*, *Cooperia spp.*, *Oesophagostomum spp.* and *Trichostrongylus spp.* As far as differences between males and females, no statistical evidence was found between different breeds for both protozoa to nematodes.

5. CONCLUSION

In conclusion, the presence of both protozoa and nematodes are associated with the age and the breed of cattle, but not by the sex of the animal.

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