

Glenda Elizabeth Sghirla-Herrería; Fabián Segundo Guamán-Quinche; Raúl Lorenzo González-Marcillo;
Carlos Mestanza-Ramón

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Prevalencia de hemoparásitos en bovinos de doble propósito en el Cantón Pallatanga, Ecuador

Prevalence of hemoparasites in dual-purpose cattle in Pallatanga Cantón, Ecuador

Glenda Elizabeth Sghirla-Herrería

glenda.sghirla@esPOCH.edu.ec

Escuela Superior Politécnica de Chimborazo, Sede Orellana
Ecuador.

<https://orcid.org/0000-0002-0823-3138>

Fabián Segundo Guamán-Quinche

fabian.guaman@esPOCH.edu.ec

Escuela Superior Politécnica de Chimborazo, Sede Orellana
Ecuador.

<https://orcid.org/0000-0002-9228-2126>

Raúl Lorenzo González-Marcillo

raul.gonzalesmarcillo@esPOCH.edu.ec

Escuela Superior Politécnica de Chimborazo, Sede Orellana
Ecuador.

<https://orcid.org/0000-0002-4653-6076>

Carlos Mestanza-Ramón

cmestanza@ug.uchile.cl

Universidad de Cádiz, Cádiz
España

<https://orcid.org/0000-0003-2401-4151>

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Glenda Elizabeth Sghirla-Herrería; Fabián Segundo Guamán-Quinche; Raúl Lorenzo González-Marcillo;
Carlos Mestanza-Ramón

ABSTRACT

The objective of the research was focused on analyzing the prevalence of haemoparasites in dual-purpose cattle in Pallatanga canton, Chimborazo Province, Ecuador. Based on the laboratory analysis, the Capata farm had the highest incidence of hemoparasites (38.46%). The Lugmapata farm had the lowest parasitic incidence with 14.29%, defining that the highest hemoparasitic incidence corresponds to animals older than 2 years of age and the lowest from 6 to 12 months. Animals under 2 years of age and those under 1 to 2 years were the most affected, while Brahman and crossbred cattle were not affected. Of all the farms investigated, only one keeps records and the respective identification in the animals, making data collection difficult.

Descriptors: Epidemiology; parasitology; livestock; animal diseases. (Words taken from the UNESCO Thesaurus).

INTRODUCTION

Parasitic diseases are a limitation for the genetic improvement of livestock with the incorporation of *Bos taurus* breeds, due to their greater susceptibility to them. The production of bovines in the Pallatanga area, Chimborazo Province- Ecuador is frequently affected by the incidence of these conditions, having a negative impact on the economy of the region; furthermore, many animals die or experience prolonged convalescence, with a decrease in the production of both meat and milk. The effectiveness of the measures to be applied to prevent and control these diseases are related to epidemiological knowledge and management, however, parasitosis has become a serious threat to both animal and human health due to small producers do not have specialized veterinary assistance and precise medications for the case.

Based on such reality, it is necessary to identify the haemoparasites from the scientific diagnosis, in order to apply the respective clinical treatment to try to minimize the risk of death in animals and economic losses for achieving an existing dairy meat's productivity to offer a better quality to consumer demand that guarantee healthy animals suitable for human consumption. From the above, the objective of the research was focused on analyzing the prevalence of haemoparasites in dual-purpose cattle in Pallatanga canton, Chimborazo Province, Ecuador.

Glenda Elizabeth Sghirla-Herrería; Fabián Segundo Guamán-Quinche; Raúl Lorenzo González-Marcillo;
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METHOD

The methodological section is developed based on the following aspects:

Location and duration of the investigation

The research was developed in Pallatanga Canton, Chimborazo province- Ecuador. For the study, four cattle ranches were selected: Los Llanos, Lugmapata, Capata and Santa Isabel, with duration of 120 days; while the clinical analyzes of the collected sample were carried out in the laboratory of the Faculty of Livestock Sciences located in Chimborazo Polytechnic Higher School located in the city of Riobamba, Chimborazo Province, Ecuador.

Sample collection

To determine a haemoparasite prevalence of 50%, with a margin of error of 5%, a random sampling was performed, taking two samples, one from peripheral blood from the ear and the other from the coccygeal vein, with which a direct blood smear from the ear and another from the caudal vein with the use of K3E lilac cap Vacutainer tubes "EDTA 7.2 mg, with a vacuum chamber and 22 x 1½ gauge needles, thin blood smears were made on a slide plate", for which the procedure suggested by (Fonseca-Turruella, et al., 2019; Molina-Hoyos, et al., 2018) was applied.

From the first group of animals under 6 months of age, 28 samples were taken, corresponding to 19.44%; from the second group between 6 months and 1 year, 22 samples were taken with 15.28%; from the third group, between 1 and 2 years of age, 8 samples with 5.55%; and from the fourth group of 2 years and older, 86 samples that represented 59.72%.

Procedure

Selection of possible farms was established. The owners were sensitized in order to provide them with information about the importance of the investigation for obtaining the necessary permission to collect the sample.

Visits and sample collection schedule was made. For each sample, 3 ml of blood from the middle coccygeal vena were obtained in tubes with anticoagulant, which were transported in refrigeration to be later analyzed in the laboratory of the Faculty of

Glenda Elizabeth Sghirla-Herrería; Fabián Segundo Guamán-Quinche; Raúl Lorenzo González-Marcillo;
Carlos Mestanza-Ramón

Livestock Sciences of the Polytechnic Higher School of Chimborazo for the respective diagnosis of Babesia and Anaplasma.

Diagnostic technique

The proposal of (Mabunge, et al., 2017) on smear staining (Giemsa) was followed. The blood smear was fixed with absolute methanol for 5 minutes directly on the dry film (lamina seca), it was left to dry for 5 minutes, 4 ml of Giemsa was diluted in 60 ml of Buffer solution with pH of 6.6. For the 100 ml of the previous solution 0.16 ml of 10% Triton chis was added. The sheet was introduced for a better fixation; this was left to rest for 45 minutes, with the aim of obtaining a better concentration of the Giemsa. After this time, the plates were washed with Buffer solution and were exposed to air dry for a time of 15 minutes, and then observed with the microscope with an immersion lens and 100X objective.

Statistic analysis

Descriptive statistics were used to calculate the percentage of affected animals, according to age, race, disease, farm, in order to characterize the population sample.

RESULTS

In the general results, it was found that 19.44% of the animals analyzed obtained a positive result for hemoparasites: 14.58% corresponded to Anaplasma marginale, 1.39% to Babesia bovis, 2.08% to Babesia bigemina and 1.39% to Babesia bovis + Babesia bigemina. The Brown Swiss breed was the one with the highest prevalence with 28.57%, followed by the Mestizo and Holstein breeds, both with 25%.

Based on the laboratory analysis, the Capata farm had the highest incidence of hemoparasites with 38.46%, the Lugmapata farm had the lowest parasitic incidence with 14.29%, defining that the highest hemoparasitic incidence corresponds to animals older than 2 years of age and the lowest from 6 to 12 months.

Calves are more resistant to disease and infection than adults. In the races, the most common haemoparasite was Anaplasma marginale followed by Babesia bovis, although the latter was only observed in the Brown Swiss breed.

Glenda Elizabeth Sghirla-Herrería; Fabián Segundo Guamán-Quinche; Raúl Lorenzo González-Marcillo;
Carlos Mestanza-Ramón

According to age, cattle under 2 years of age were the most parasitized. In this case, Anaplasmosis was the most prevalent. In the other age groups, the haemoparasitic incidence was very low and dispersed. Even the age group between 1 and 2 years was null. In all age groups, the most prevalent haemoparasite was *Anaplasma marginale*, followed by *Babesia bigemina*; the levels of *Babesia bovis* observed were very low.

DISCUSSION

In Latin America, due to climatic conditions, the generation of haemoparasitic diseases associated with bovine livestock is frequent, thus damaging the productivity of the farms dedicated to raising these animals, since the disease brings with it a delay in weight, which is a primary factor to comply with the supply - demand of the market associated with meat and dairy, being essential to overcome the problem in order to improve productivity and health of both animal and human beings (Medina-Naranjo et al., 2017). Thus, the climate of Los Andes tends to produce a low volume of forages with the necessary nutritional quality in their pastures, which contributes to establishing a high parasite load in cattle, being haemoparasitosis the most frequent according to (Pinilla, et al., 2018; Paul et al., 2016). This leads to the low productivity of livestock and to generation of bacterial and viral diseases that causes loss of quality in the animal, being necessary for the producer to invest in supplementary food for grazing in order to project a healthy production to the public.

Infectious diseases generated by hemoparasites are the common ones in South America, specifically, in dry, tropic and Andean climates, so it is pertinent to generate a prevention and disinfection campaign as part of the public health policies of the countries in conjunction with the producers (Blanco-Martínez, et al., 2015). Other affections such as anaplasmosis and babesiosis are caused by intracellular-hemotrophs, which increase high rates of morbidity and mortality in cattle, generating weight loss, decrease in the production of meat or milk and death of cattle (Julon et al., 2020; Villamil-Jiménez, 2018; Gonzales & Meléndez, 2007).

Glenda Elizabeth Sghirla-Herrería; Fabián Segundo Guamán-Quinche; Raúl Lorenzo González-Marcillo;
Carlos Mestanza-Ramón

The symptoms generated by haemoparasites show similarities and cooperate with the characteristics of their transmission and epidemiologies (Benavides et al., 2017). On the other hand, anaplasmosis is characterized by the high destruction of infected cells, producing depression, weakness, weight loss, jaundice, fever, progressive anemia as well as decrease in milk production and death (Rymaszewska and Grenda, 2008).

Livestock in Ecuador has projected a significant growth in quality in recent years, improving investment in health policies that have contributed to strengthen the health of livestock and, therefore, the productivity; however, there are diseases related to parasitism that stand out as one of its main enemies (Lozina et al., 2019; Kumar et al., 2016). Bovine livestock is one of the pillars of production at the national level, but it is marked by the effects of parasites in the blood, called hemotropic (due to the affinity with tropical and subtropical areas) or hemoparasites (due to its metabolism in blood), generating direct or indirect economic losses to the farmer; since the low rate of meat and milk production, high morbidity and mortality are reflected in the cost of medicines (Rimbaud-Giambruno, et al., 2018).

CONCLUSION

Highly dangerous diseases in a livestock farm such as *Babesia bovis*, *Babesia bigemina* and *Babesia bovis* + *Babesia bigemina* and *Anaplasma marginale* were identified by laboratory analysis. The farmers do not have a timely diagnosis and treatment in the livestock farms. Animals under 2 years of age were the most affected and those under 1 to 2 years of age, while Brahman and crossbred cattle were not affected. Of all the exploitations investigated, only one keeps records and the respective identification of the animals, which makes data collection difficult. The farms in which the investigation was carried out are at different heights; however, this was not a definitive factor in the presence of haemoparasites.

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Glenda Elizabeth Sghirla-Herrería; Fabián Segundo Guamán-Quinche; Raúl Lorenzo González-Marcillo;
Carlos Mestanza-Ramón

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Glenda Elizabeth Sghirla-Herrería; Fabián Segundo Guamán-Quinche; Raúl Lorenzo González-Marcillo;
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