

## **OVINE B-GLOBIN POLYMORPHISMS AND RESISTANCE TO HAEMONCHOSIS IN DIFFERENT BREEDS**

**Rafaela Tami Ikeda Kapritchkoff<sup>1</sup>; Cintia Hiromi Okino<sup>2</sup>; Hornblenda Joaquina Silva Bello<sup>2</sup>; Gláucia Roberta Melito<sup>2</sup>; Maria Isabel Mariottini Fiorentino<sup>2</sup>; Juliana de Carvalho Santos<sup>2</sup>; Flavia Aline Bressani<sup>2</sup>; Waldomiro Barioni Júnior<sup>2</sup>; Sérgio Novita Esteves<sup>2</sup>; Ana Carolina de Souza Chagas<sup>2</sup>**

<sup>1</sup>. Via de Acesso Prof. Paulo Donato Castellane, s/n, 14884-900, Jaboticabal, São Paulo, Brazil. Faculdade de Ciências Agrárias e Veterinárias- Universidade Estadual Paulista ; <sup>2</sup>. Rodovia Washington Luiz, Km 234 s/n, Fazenda Canchim, PO Box 339, 13560-970, São Carlos, SP, Brazil. Embrapa Pecuária Sudeste

### **Abstract:**

The selection of naturally resistant sheep breeds to gastrointestinal nematodes (GIN) can be a tool for controlling infections caused by *Haemonchus contortus*, responsible for haemonchosis and resistant to all classes of anthelmintics. Therefore, the present study aimed to investigate the relationship between different haplotypes of ovine  $\beta$ -globin (Hb-AA, Hb-AB, and Hb-BB) and the resistant phenotypes of naturally *H. contortus* infected lambs. Previous studies pointed out that animals harboring the Hb-A allele are more resistant to infection by this GIN. The study was conducted at Embrapa Pecuária Sudeste in São Carlos, SP, and involved 126 lambs, including 42 Santa Inês (SI), 54 Texel (TX), and 29 White Dorper (DO) breeds. Blood samples were collected from the lambs for subsequent DNA extraction and qPCR analysis using a hydrolysis probe system to identify the  $\beta$ -globin haplotypes. Genotypic frequencies Hb-AA, Hb-AB and Hb-BB were respectively calculated for SI (21%, 50%, 29%), TX (0%, 91%, 9%), and DO (0%, 3%, 97%). Fecal egg counts (FEC) and packed cell volume (PCV) were monitored at D63, D84, D105, D126, D147, D168, and D189 (considering D0 as the day of birth). The data were analyzed over time into six groups: SI AA, SI AB, SI BB, TX AB, TX BB, and DO BB. The only one DO AB lamb was excluded from the analysis, which was performed using SAS Analytics Software. The FEC data indicated high infections in all groups over time (4030, 3153, 1853, 3221, 5445 and 5871 for SI AA, SI AB, SI BB, TX AB, TX BB and ODO BB, respectively), with no significant differences, probably due to variable parasite load during natural infections and the well-known high variation in the FEC results. The PCV means of SI AA lambs were the highest during whole experimental period (general mean of 34.8%) compared to SI AB (32.7%), SI BB (32.9%), TX AB (31.6%), TX BB (29.6%) and DO BB (29%) groups, excepted at D168. For the general mean SI AA was significantly higher than Hb-BB haplotypes, i.e., TX BB and DO BB. Since anemia is the main clinical sign of haemonchosis, our results suggest that lambs carrying the Hb-A allele may be more resistant to haemonchosis, presenting slighter clinical signs despite harboring a high parasite load. Further studies are still required, but selection of  $\beta$ -globin A animals could be applied for genetic improvement targeting animals naturally more resistant to haemonchosis. It is important to highlight that this is a promising research area, contributing to the improvement of agricultural production and reducing the losses caused by the disease.

**Palavras-chave:** ovine  $\beta$ -globin; resistance; *Haemonchus contortus*; haemonchosis;

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