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# ABSTRACT BOOK

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Viasoft Experience





rate to high (0.794). The data confirm horses' resilience to initial and up to 10-month parasite challenges. Despite natural exposure, foals were under effective farm management, including balanced nutrition, large pasture areas, and constant health checks. In addition, the integration of FEC, body growth measurement, and frequent behavioral assessments allowed for effectively monitoring parasite-related risk, even the decision for treatment. Selective anthelmintic treatment should incorporate these values to promote equine health, minimize drug use, and maintain parasites in refugia.

### **Living with parasites: tolerance to nematodes in sheep**

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Productivity loss caused by gastrointestinal nematode (GIN) infection is a major problem in the livestock industry. Management of GIN infections has traditionally relied on anthelmintic drugs, but the evolution of anthelmintic resistance means this is unsustainable and alternative means of controlling GIN, including through genetic selection, are needed. Broadly, there are two ways individuals cope with infections: resistance and tolerance. Resistance reduces parasite burden through an immune response which directly targets the parasite, while tolerance is the maintenance of productivity despite increasing parasite burden. The overall effect of both resistance and tolerance is termed resilience. Breeding for resistance to GIN is a common strategy, but selection for tolerance has not been widely implemented. A potential drawback

of selecting for resistance is a trade-off with productivity, but such concerns do not apply to tolerance. While breeding for tolerance could be a useful tool in mitigating the impact of GIN, we first need to establish whether variation in tolerance exists. To do this, we monitored 200 Romney ram lambs from 16 different sires, 10 bred for resilience and 6 from unselected lines. Following weaning, faecal egg count (FEC) and body weight were measured fortnightly for 4 months. Using random regression models, we estimated tolerance as the slope of weight on FEC and quantified between-individual and between-sire variation. The overall relationship between weight and FEC was negative, but the slope of this relationship varied by individual and sire. Our models suggested that the least tolerant individuals experienced a check in their growth 10 times greater than that of those most tolerant. Further, individuals bred from resilient lines were heavier and treated later than those from unselected lines. These differences indicate the potential for selective breeding for tolerance to nematodes in sheep, reducing anthelmintic use.

### **Assessing the immune response of different $\beta$ -globin haplotypes and breed in *Haemonchus contortus* infected sheep**

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Sheep exhibit two distinct  $\beta$ -globin haplotypes, Hb-A and Hb-B. During anemic conditions, Hb-A animals can express juvenile  $\beta$ C, which displays a higher affinity for oxygen, an ability absent in Hb-B animals.  $\beta$ -globin haplotypes have been associated with variable sheep resistance/resilience to gastrointestinal nematode infection. This research aimed to compare the adaptive immune response in the abomasum of lambs of different breeds and  $\beta$ -globin haplotypes artificially infected by *Haemonchus contortus*. Twenty-one male lambs, comprising 12 Santa Inês (SI), 5 Texel (TX), and 4 White Dorper (DO), with six months old, were selected from the Embrapa Southeastern Livestock experimental farm based on their  $\beta$ -globin types (AA, AB, BB) through blood DNA analysis. Subsequently, those lambs were dewormed and received a single dosage of 4,000 *H. contortus* L3. Twenty-eight days post-infection, they were slaughtered, and the fundic region of abomasum tissue was formalin-fixed and paraffinembedded for immunohistochemistry analysis of MHC II (HLA-DR) and T lymphocytes (CD3) cells. Positive cell counting was performed in ten random fields under a 40x objective with a 1 mm<sup>2</sup> graticule. There was no effect of haplotype in MHC II<sup>+</sup> ( $p = 0.980$ ) (AA: 248 $\pm$ 60.6; AB: 234 $\pm$ 47.1 and BB: 254 $\pm$ 121.8) and in CD3<sup>+</sup> means ( $p = 0.140$ ) (AA: 1122 $\pm$ 304.9; AB: 976 $\pm$ 820.3 and BB: 520 $\pm$ 595.5). Similar results were observed for breed effect in MHC II<sup>+</sup> ( $p = 0.130$ ) (DO: 162 $\pm$ 77.7; SI: 263 $\pm$ 83.3 and TX: 280.6 $\pm$ 114.5) and CD3<sup>+</sup> means ( $p = 0.787$ ) (DO: 1360 $\pm$ 278.9; SI: 1233 $\pm$ 778.2 and TX: 1473 $\pm$ 497.4). The limited presence of AA animals in the flock may have influenced the absence of differences

among haplotypes. This similar immunological response is being better investigated with a larger number of animals, as there seemed to be a tendency for AA animals to have a higher average of CD3<sup>+</sup>, along with a breed effect in MHC II<sup>+</sup> of SI and TX compared to DO.

## Parasites of swine and poultry

### A novel way for *Eimeria inoculum* production

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Coccidiosis is one of the most economically devastating diseases of poultry industry in which difficulties remain to maintain an efficient program (vaccination, anticoccidials, etc.) to control infections. Registration and approval of such products requires in vivo trials demonstrating efficacy against artificial *Eimeria* infections. In latter, a mix of the most common and pathogenic chicken *Eimeria* species (*E. tenella*, *E. maxima* and *E. acervulina*) is often desired, yet restricted by regulation to recently collected strains, not replicated more than three times, with sufficient virulence as demonstrated by intestinal lesions. Replication of such field isolates to obtain ample oocysts for a trial however favours *E. acervulina* overgrowth due to its higher fecundity. This renders the inocula only adequate for *E. acervulina* on requirements, yet not for *E. tenella* or *E. maxima*. Hence to gain control over the inocula composition, the standard inoculum production method was revised. A novel method was created, circumventing risks of missing out sufficient lesion induction on minor *Eimeria* species. This enhances predictability in the infected untreated control thus improves predictability in the overall trial.