Targeted sequencing approach identifies immune loci associated to resistance to *Haemonchus contortus* in sheep and goats

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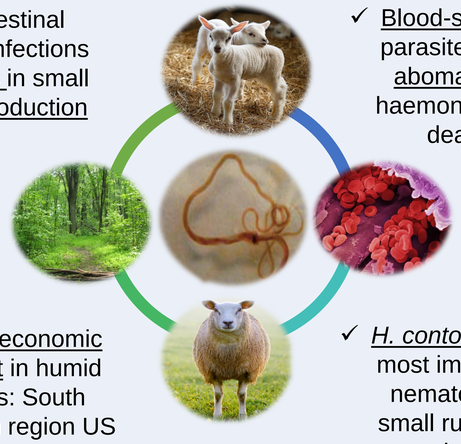
INTRODUCTION

- ✓ Gastrointestinal nematode infections main issues in small ruminant production
- ✓ Blood-sucking parasite of the abomasum: haemonchosis, death

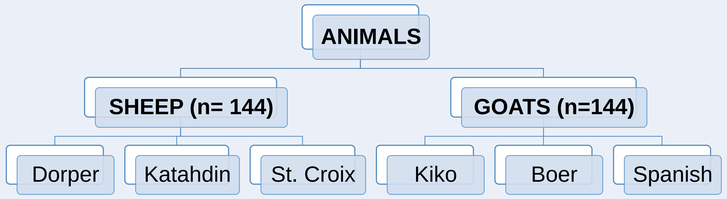


- ✓ Great economic impact in humid areas: South Eastern region US
- ✓ *H. contortus* the most important nematode in small ruminant production

OBJECTIVE

- Identify single nucleotide polymorphisms (SNPs) associated to resistance in sheep and goats exposed to *H. contortus*, using a targeted sequencing approach

MATERIALS AND METHODS



- **Fig. 1.** Representation of breeds in the present study. Animals were infected with 10, 000 larvae of H. contortus per oral route.

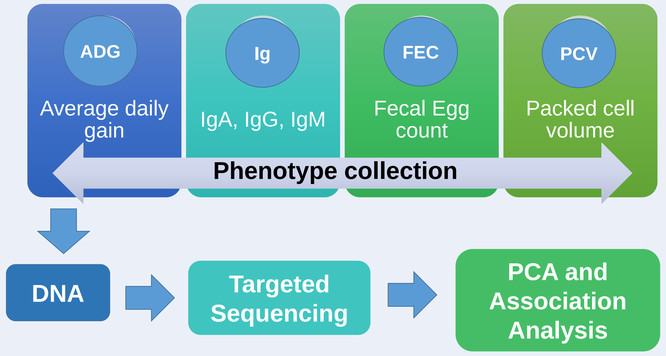


Fig. 2. Variables measured and outline of methods used in the present study. SNPs were discarded if call rate < 95% and minor allele frequency ≤0.01 . A mixed model was used and included the identity by state matrix and year as fixed effect. Bonferroni correction was used to control for multiple testing.

RESULTS

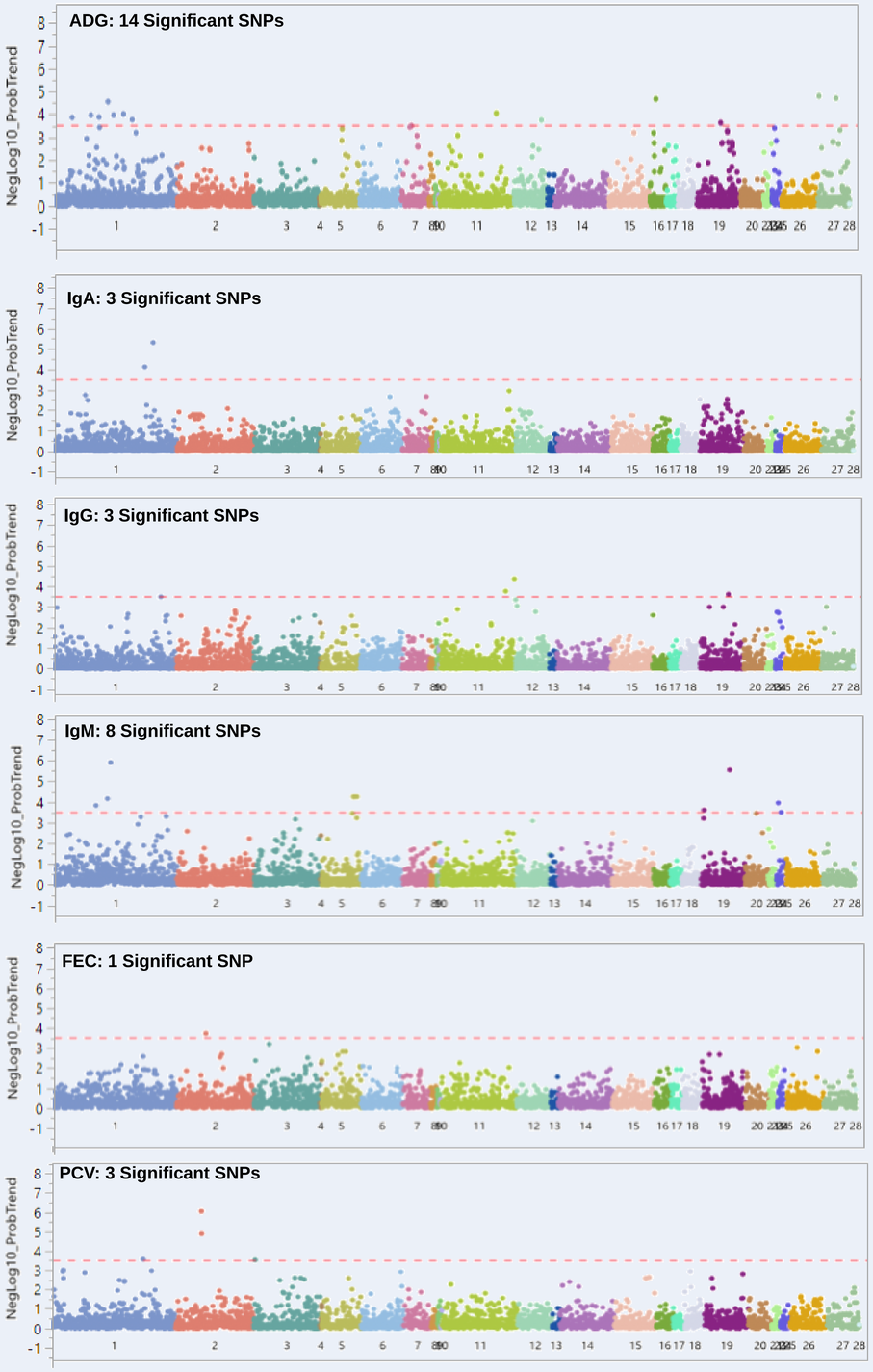


Fig. 3. Manhattan plots from association analysis per trait.

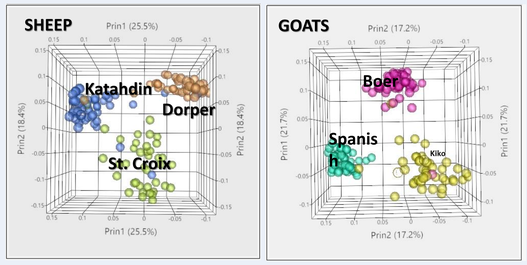


Table 1. Percentage of variance explained by the first three principal components for species

Species	PC1	PC2	PC3
Sheep	25.5	18.4	7.1
Goats	21.7	17.2	7.6

Table 2. Genes located in significant regions observed from association analysis.

ADG	IgA	IgG	IgM	FEC	PCV
• LRP8 • **IL12RB2** • STAT5B • DUOX1 • LAMC1 • IL7R • **IL5RA** • CYBB • CRLF2	• **Exon 2**, 4, 5 **CD86**	• IL12A • **IL5RA** • STAT3	• **IL12RB2** • IL9 • ITGA9 • **IL5RA** • IL4R	• Exon 2 **NFIL3**	• **Exon 2** **CD86** • **NFIL3** • IL1B

CONCLUSION

Chromosomal regions related to cytokine receptors and membrane proteins expressed by antigen presenting cells, play an important role in the expression of resistant phenotypes.

Potential immune like loci could be used as DNA markers for resistance in sheep and goats exposed to H. contortus.

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