

Phenotyping and selecting for genetic resistance to gastro-intestinal parasites in sheep: the case of the Manech French dairy sheep breed

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Abstract

The genetic selection of sheep for a better resistance to gastro-intestinal nematodes is a challenge for sustainable production on pastures, especially to face the increasing resistance to anthelmintic treatments and to limit these treatments in order to mitigate the chemical releases on the environment. A strategy of phenotyping resistance to parasites has been elaborated in sheep in the veterinary school of Toulouse in France, based on an original experimental design. Young rams are experimentally infected twice with a given dose of larvae of the nematode *Haemonchus contortus*. Measures of fecal egg counts and hematocrit level 30 days after infection respectively assess the resistance to parasites and control the resilience to infestation. So far, few French sheep breeding programs have experimented this design of phenotyping. In this study, we considered 450 AI rams of the Breed Society of the Blond-Faced Manech dairy sheep breed, phenotyped for parasitism resistance from 2009 to 2015. We firstly aim at describing the experimental protocol and underlining the main results, interests and limits of the phenotyping. Then, the genetic valorization of the phenotypes is presented, through the estimation of genetic parameters and the genetic evaluation proposed to the Breed Society. Finally, strategies and perspectives to include selection for resistance to parasites in the breeding program are considered, especially as genomic selection will offer greater selection efficiency in the upcoming years.

Keywords: gastro-intestinal parasites, genetic resistance, phenotyping, genetic parameters, genetic evaluation, sheep