

merino sheep.



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# Random regression model of growth during the first three months of age in Spanish Merino sheep'

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## ABSTRACT

A total of 88,727 individual BW records of Spanish Merino lambs, obtained from 30,214 animals between 2 and 92 d of age, were analyzed using a random regression model (RRM). These animals were progeny of 546 rams and 15,586 ewes raised in 30 flocks, between 1992 and 2002, with a total of 45,941 animals in the pedigree. The contemporary groups (animals of the same flock, year, and season, with 452 levels), the lambing number (11 levels), the combination sex of lambs with type of litter (4 levels), and a fixed regression coefficient of age on BW were included as fixed effects. A total of 7 RRM were compared, and the best fit was obtained for a model of order 3 for the direct and maternal genetic effects and for the individual permanent environmental effect. For the maternal permanent environmental effect the best model had an order 2. The residual variance was assumed to be heterogeneous with 10 age classes; the covariance between both genetic effects was included. According to the results of the selected RRM, the heritability for both genetic effects ( $h_a^2$  and  $h_m^2$ ) increased with age, with estimates of 0.123 to 0.186 for  $h_a^2$  and of 0.059 to 0.108 for  $h_m^2$ . The correlations between direct and genetic maternal effects were  $-0.619$  to  $-0.387$  during the first 45 d of age and decreased as age increased, until reaching values from  $-0.366$  to  $-0.275$  between 45 to 75 d of age. Important changes in ranking of the animals were found based on the breeding value estimation with the current method and with the random regression procedure. The use of RRM to analyze the genetic trajectory of growth in this population of Merino sheep is highly recommended.

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