

Growth, fertility, prolificacy and fleece weight of Romanov, Finnsheep and Booroola purebreds and their first cross and backcross with the DLS breed

M. H. Fahmy

Agriculture and Agri-food Canada, Dairy and Swine Research and Development Centre, Lennoxville, Québec, Canada
J1M 1Z3

Abstract

Records were collected on Romanov (R), Finnsheep (F), and Booroola Merino (B); first cross; and backcrosses of these breeds with a new synthetic breed of Dorset, Leicester and Suffolk (DLS). The data covered the period from the birth of ewes to weaning of their progeny. The heaviest lambs at birth were the B backcross and R first and backcrosses (4.1 to 4.0 kg) and the lightest were pure R (3.0 kg). The fastest pre-weaning average daily gain was that of R crosses. R purebreds were more fertile (109%, $P < 0.01$) than F (81%) and B (62%). They were also more prolific at birth and at weaning (2.44, 2.13) than F (2.04, 1.71, $P < 0.01$) and B (2.36, 2.09, $P > 0.05$) purebreds, respectively. Similarly, first-cross R ewes were more prolific than first-crosses of F and B (1.99 v. 1.86 and 1.70), also backcross R ewes were more prolific than backcrosses of F and B (1.63 v. 1.45 and 1.42, $P > 0.05$), respectively. R first-cross ewes had heavier litters (6.31 and 26.1 kg) than B (5.17 and 20.3 kg, $P < 0.01$) and F (5.52 and 24.4 kg) at birth and at day 50. The lambs born to DLS ewes were the heaviest at birth and at day 50 compared with those from prolific ewes. Fleece weight in B and its crosses was significantly higher than in R. Crosses showed generally positive heterotic effect in weights, prolificacy and wool production compared with pure breeds. In two data sets, additive direct effect of R was higher than that of F at birth (by 0.11 and 0.10 kg) and at day 50 (by 0.57 and 0 kg) but was similar at day 100 and day 365. The additive direct effect of both R and F was non-significantly different to that of B at birth in both data sets, but in only one data set was it higher ($P < 0.001$) at day 50 (by 2.29 and 1.72 kg), at day 100 (by 5.24 and 5.30 kg) and at day 365 (by 8.7 and 8.4 kg, respectively). Maternal direct effects of R was higher ($P < 0.05$) than F in lamb weights at day 1 and 50, and higher than B in lamb weight at day 50. Individual heterosis between both R and F and DLS were -3.7 and -3.6% in weight at birth, 1.46 and 2.09% in weight at day 50 respectively. The corresponding maternal heterosis were, -2.9, -5.2, 1.46 and -0.02%.

Keywords: growth, heterosis, reproduction, sheep, wool.

Introduction

There are two types of prolific sheep. Prolificacy is either controlled by numerous genes and transmitted quantitatively as in Finnsheep, Romanov and D'man breeds or, as in the Booroola and Cambridge breeds is controlled by what is believed to be one or a few closely associated genes with a large effect on ovulation rate.

Crossbreeding studies involving either type of prolific breeds with non-prolific breeds include those of Fahmy (1988b) with Finnsheep, Ricordeau, Tchamitchian, Thimonier, Flamant and Theriez (1978) and those of Romanov and McGuirk, Killeen, Piper, Bindon, Wilson, Caffery and Langford (1984) with Booroola. Studies comparing breeds from both

types of prolificacy simultaneously are still rare, and to the author's knowledge, only that of Young and Dickerson (1991) on Booroola and Finnsheep has been reported.

An intensive crossbreeding programme was initiated to improve prolificacy in DLS sheep by crossing with prolific breeds. DLS is a composite breed developed in Québec from crossing Dorset, Leicester, and Suffolk breeds, then selecting for extended breeding season (Fahmy, 1988a and 1990). Romanov and Finnsheep representing the first type of prolificacy, and Booroola representing the second type, were both crossed with and backcrossed to the DLS sheep. The objective of this paper is to report the performance of ewes of various genotypes.