The genetic improvement of various traits in domestic livestock depends upon the identification of superior male and female members of the population, to act as sires and dams for the following generation. As castrated male animals produce relatively large proportions of the total clip in many Merino wool growing enterprises, Jackson et al. (1986) raised the possibility that any interactions between genotypes and sex for wool traits would decrease the efficiency of genetic improvement programs, based on ram and ewe selection only. In this paper, we examine the genetic responses of female and castrated male progeny, produced from the mating of a common ewe flock to rams with a high or low genetic capacity to produce clean wool.

A flock \((n = 300)\) of mature medium wool Merino ewes was randomly divided into 10 groups. Five of these were joined individually with 5 rams from a Fleece Plus flock, and 5 with rams from a Fleece Minus flock. The ram flocks are part of a long term single character selection experiment (Pattie and Barlow 1974). After joining, all ewes grazed together, as did their progeny after identification at birth. The rams were castrated at 4–6 weeks of age and thereafter grazed with the ewe progeny until 3 years of age. These ewes were not mated.

Various wool and body traits were measured for comparisons of the effects of sire group and of sex, and any interactions between these factors, using least squares analyses.

At each shearing (\(n = 3\)), sheep sired by Fleece Plus rams produced more greasy fleece (total 13.6 v. 10.8 kg; \(P < 0.01\)), had higher yields (average 77 v. 70%; \(P < 0.01\)), staple length (average 106 v. 91 mm; \(P < 0.01\)), and fibre diameter (average 21.9 v. 20.6 \(\mu\)m; \(P < 0.05\)). The greater greasy fleece weight and clean washing yield resulted in the progeny of the Fleece Plus rams producing 38% more clean wool fibre. Castrated male sheep produced more greasy fleece than ewes (total 12.5 v. 11.9 kg; \(P < 0.05\)), which had a greater fibre diameter (21.0 v. 20.6 \(\mu\)m; \(P < 0.05\)) at the 25 month shearing. They also consistently weighed more than ewes from birth to 37 m (+5 to +16%). No interactions between sire group and sex were revealed in these analyses. We conclude that the genetic responses to selective breeding for clean fleece weight are similar in non-parous ewes and castrated male sheep.