

# INTROGRESSION OF THE FEC<sup>B</sup> ALLELE OF THE BOORoola MERINO INTO A RAMBOUILLET FLOCK - A PROGRESS REPORT

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Objectives: (1) Determine the effect of the Fec<sup>B</sup> allele of the Booroola Merino in a U.S. sheep population unconfounded by background genotype, and (2) develop a flock of high percentage Rambouillets with the Fec<sup>B</sup> allele.

Procedure: A project to introgress the Fec<sup>B</sup> allele into a Rambouillet flock was initiated at the Dixon Springs Agricultural Center of the University of Illinois in 1985, and the project was moved to the Arlington Agricultural Research Station of the University of Wisconsin-Madison in 1991. This report presents results obtained during the 1996 breeding and 1997 lambing.

Rambouillet (Fec<sup>++</sup>) and Booroola Merino (Fec<sup>BB</sup>) rams initially were mated to a flock of Rambouillet ewes during the autumns of 1985 through 1988. Booroola Merino-Rambouillet cross female progeny from this mating and subsequent matings were backcrossed to Rambouillet rams, and Rambouillet ewes continued to be mated to Rambouillet rams. The same Rambouillet rams were mated with the Rambouillet and Booroola Merino-cross ewes. Lambs were weaned at approximately 60 days of age. Rambouillet replacement ewes and rams were selected on estimated genetic merit for litter size using the "Number of Lambs Born" FEPDs from NSIP. Rambouillet/Booroola Merino-cross (RB) replacement ewes had to be an F<sub>1</sub> or have a dam that had been classified as a carrier (Fec<sup>B+</sup>). Selection preference was given to RB ewe lambs with higher percentages of Rambouillet breeding. Ewes were mated in order to lamb first at approximately 2 years of age and annually thereafter. Prior to breeding each year, ovulation rate of ewes was determined by counting number of corpora lutea viewed with a laparoscope. RB ewes were classed as carriers (Fec<sup>B+</sup>) if they had 3 or more ovulations at their first examination at approximately 19 months of age and as non-carriers (Fec<sup>++</sup>) if they had 1 or 2 ovulations. After their first or second lambing, the Fec<sup>++</sup> RB ewes generally were culled to make room for RB replacements from dams classified as Fec<sup>B+</sup>. Approximately 60 Rambouillet and 60 RB ewes were mated each year.

In 1997, the majority of the RB ewes were of 7/8 or 15/16 Rambouillet breeding. Given the replacement policy used, the average age of the ewe groups differed and ranked from oldest to youngest, was Rambouillet, RB Fec<sup>B+</sup>, and RB Fec<sup>++</sup>.

Results: Mean performance of each of the breed groups in the 1996/1997 production year is reported in Table 1. For the first time since this study began, the Fec<sup>B+</sup> ewes had the greatest ewe productivity (lb. of lamb weaned per ewe exposed). Fec<sup>B+</sup> ewe weaned 13.0 to 16.9 more lb. of lamb than the two Fec<sup>++</sup> groups. In previous years, the increased prolificacy of Fec<sup>B+</sup> ewes was negated by lighter lamb weaning weights and lower lamb survival. In 1997, The Fec<sup>B+</sup> ewes again had a higher prolificacy and lighter lamb weaning weights, but lamb survival was similar to that of Fec<sup>++</sup> ewes.

There may be at least three reasons for the increased lamb survival of Fec<sup>B+</sup> ewes relative to previous years. Firstly, in the fall of 1996, the entire flock was used in an AI trial. As a result,

overall reproductive rate was less than in previous years. Fertility in 1997 was about 10 percentage units less, and prolificacy was about .30 lambs less than in previous years. It may be that Fec<sup>B+</sup> ewes can adequately cope with a 2.30 to 2.35 lamb crop as in 1997 but not with the 2.60 to 2.65 lamb crops of previous years. Secondly, by virtue of the introgression procedure, the Fec<sup>B+</sup> ewes in 1997 were of a higher percentage Rambouillet breeding compared to ewes in previous years, and Rambouillet genes may provide a better maternal environment than Booroola Merino genes. Thirdly, the 1997 data is based on a relatively small number of ewes, and the superiority of the Fec<sup>B+</sup> ewes may be a chance happening which is unlikely to be repeated in future years.

**Table 1. Ewe Performance.**

Trait	Dam breeding and genotype		
	Rambouillet, Fec <sup>++</sup>	RB, Fec <sup>++</sup>	RB, Fec <sup>B+</sup>
Ewes mated, no.	59	20	46
Ovulation rate, no.	2.24	1.98	3.99
Fertility, %	83.1	85.0	84.8
Prolificacy, no.	1.69	1.35	2.33
Lamb survival, %	91.6	91.3	91.2
Lamb wean. wt., lb.	39.6	44.9	35.6
Ewe productivity, lb.	51.0	47.1	64.0