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# The effect of early exposure to facial eczema on ewe lifetime production

R.W. MOORE, R.M.W. SUMNER AND B.W. DOW<sup>1</sup>

Whatawhata Research Centre, MAF Technology, Private Bag, Hamilton, New Zealand

## ABSTRACT

Romney, Coopworth and Perendale ewes were accidentally exposed to facial eczema before May 1 hogget mating at 9 months of age. Serum gamma-glutamyl transferase (GGT) levels of individual animals were determined on 21 April. The ewes were divided into 3 classes for analysis based on the GGT levels: 1. <100 IU/l; 2. 100-350 IU/l; and 3. >350 IU/l. At all matings over 4 years the ewes in class 3 had a lower fertility than class 1. These differences were only significant at the hogget and two-tooth mating. The total number of lambs weaned per ewe mated were class 1-5.0; class 2-4.3; and class 3-4.3 ( $P < 0.1$ ). There were no lifetime effects on fleece weight.

**Keywords** Ewes; Romney; Coopworth; Perendale; facial eczema; GGT; lifetime; fertility; fleece weight.

## INTRODUCTION

Towers and Stratton (1978) showed that serum gamma-glutamyl transferase (GGT) levels can be used as a measure of sporidesmin-induced liver damage in sheep. Following this finding the relationship between individual GGT levels and production levels within a flock were used to assess the effect of accidental exposure to sporidesmin on subsequent production (Smeaton *et al.*, 1983; Moore *et al.*, 1983; Smeaton *et al.*, 1985; Sheath *et al.*, 1987). In these studies the effects on live weight and reproduction after sporidesmin exposure was reported. In Moore *et al.* (1983) the effect of exposure before hogget mating on hogget and two-tooth live weights, fleece weights and reproduction was examined. The present paper is an addendum to Moore *et al.* (1983). The effect of this early exposure has been extended to the sheep's lifetime (hogget to full-mouth).

## MATERIALS AND METHODS

Matched groups of Romney (n=89), Coopworth (n=96) and Perendale (n=94) ewes born in August-September 1980 were mated as hoggets either to vasectomised or Southdown entire rams. In the subsequent 4 years (two-tooth to full-mouth) they were mated to entire rams of their own breed. In March-April 1981 the ewes were accidentally exposed to facial eczema, just before hogget mating in May-June. The ewes were blood sampled on

21 April and their serum GGT levels determined. For the purpose of finding the relationship between hogget GGT levels and lifetime production the ewes were divided into 3 classes based on their hogget GGT levels:

1. <100 IU/l
2. 100-350 IU/l
3. >350 IU/l.

All ewes were weighed pre-mating, pre-lambing in August and at weaning in November-December in each year of life. All hoggets were shorn pre-lambing in September and again in February before the two-tooth mating. They were subsequently shorn either once yearly in October or twice yearly in February and October (Sumner and Willoughby, 1988).

## RESULTS

### GGT levels

The mean April 1981 GGT levels were 311, 371 and 305 IU/l for the Romney, Coopworth and Perendale hoggets respectively ( $P > 0.05$ ). The percentages of ewes in classes 1-3 were Romney 30, 33 and 37; Coopworth 21, 32 and 47 and Perendale 34, 28 and 38.

<sup>1</sup> Ruakura Agricultural Centre, MAF Technology, Private Bag, Hamilton, New Zealand

**TABLE 1** GGT class and pre-mating live weight (kg).

GGT class	Age at mating (yr)				
	1/2	1 1/2	2 1/2	3 1/2	4 1/2
1	31.6 (79)*	38.0 (72)	51.4 (72)	51.5 (62)	50.7 (56)
2	31.9 (86)	37.8 (80)	50.7 (71)	51.1 (63)	49.2 (50)
3	30.5 (114)	37.0 (95)	51.1 (93)	50.8 (82)	48.8 (64)
Significance	**	NS	NS	NS	NS

\* number of ewes present

**TABLE 2** GGT class and fertility (ewes lambing/ewes joined).

GGT class	Age at mating (yr)				
	1/2	1 1/2	2 1/2	3 1/2	4 1/2
1	0.43	0.87	0.91	0.97	0.86
2	0.34	0.94	0.90	0.87	0.75
3	0.26	0.74	0.81	0.88	0.81
Significance	**	**	NS	NS	NS

### Live weights and survival

There was a significant difference between the 3 different GGT categories at pre-mating in May 1981. This significant effect of GGT on live weight persisted until September 1981 and did not reach significance thereafter (Moore *et al.*, 1983). The pre-mating live weights of the different classes throughout the lifetime are given in Table 1, they are significantly different only at the hogget (1/2 year) mating.

Culling independent of the GGT classes was carried between the hogget (1/2 yr) and two-tooth (1 1/2

yr) matings. The percentages of ewes surviving from the 1 1/2 to the 4 1/2 year mating were class 1-78%, 2-63% and 3-67% and from the 1/2 to the 4 1/2 year mating were 71%, 58% and 56% (both  $P > 0.05$ ).

### Reproduction

At all ages from hogget to full-mouth class 3 had a lower fertility (Table 2) than class 1. These differences were only significant at the hogget and two-tooth age for fertility.

At all except the 3 1/2 year mating class 3 had a

**TABLE 3** GGT class and prolificacy (ewes lambing multiples/ewes lambing).

GGT class	Age at mating (yr)				
	1/2	1 1/2	2 1/2	3 1/2	4 1/2
1	0.05	0.31	0.54	0.50	0.59
2	0.03	0.18	0.58	0.47	0.59
3	0.00	0.19	0.47	0.53	0.40
Significance	NS	NS	NS	NS	NS

**TABLE 4** GGT class and fleece weight (kg).

GGT class	Age at mating (yr)				
	1/2 Pre-mating	1 1/2 Post-lambing	2 1/2	3 1/2	4 1/2
1	1.97	1.99	3.80	3.74	3.56
2	1.97	1.98	3.77	3.75	3.56
3	2.11	2.04	4.02	3.85	3.62
Significance	*	NS	NS	NS	NS

lower prolificacy (Table 3). However none of these differences were significant.

The overall effect on lifetime reproduction can be summed up by the number of lambs weaned from hogget to full-mouth, class 1-5.0 lambs, 2-4.3 and 3-4.3 (P<0.1).

**Fleece weight**

The pre-mating two-tooth fleece weight was higher for class 3 than the other 2 categories (P <0.05, Table 4). There were no subsequent effects on fleece weight.

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