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# Tooth eruption patterns in New Zealand sheep breeds

W. M. AITKEN and H. H. MEYER

Ruakura Animal Research Station, Hamilton

## ABSTRACT

Permanent incisor eruption patterns varied widely for 13 genotypes of ewes examined. Progeny of Ruakura High Fertility Romney sires displayed markedly earlier teeth eruption than other strains while Southdowns were later than any other genotype in the study. The wide variation observed both between and within breed types questions the reliability of dentition for ageing individual animals for sale.

## INTRODUCTION

This is a preliminary report on a project, initiated in 1980 at the Rotomahana Research Station to study the pattern of eruption of permanent incisor teeth in sheep, to determine the extent of variation in mean eruption times, both between and within genotypes, and to relate eruption patterns to performance parameters such as growth rate, hogget oestrus and lifetime performance.

## METHODS

A group of 1350 ewe hoggets, born 1979 in genetic trials were serially observed for teeth eruption. Genotypes included were purebred Romney, Perendale, Suffolk, Southdown; Booroola x Romney, Booroola x Perendale crosses and the progeny of Border Leicester rams and sires from 1 Coopworth and 6 Romney strains which had all been mated to comparable Romney ewes. Both the means and the ranges of birth dates were similar for all groups. All genotypes had similar pre-weaning management and were managed as a single flock from weaning onwards.

Since the length of fully erupted incisors varies considerably, teeth were scored rather than measured for length. Scoring indicated presence or absence of deciduous teeth and whether the permanent teeth were still erupting or had reached the stage where wear could occur. During the 1980/1 season the flock was observed 4 times with the Southdowns subsequently observed a fifth time. Age of eruption of first incisors was estimated for each animal using birth date and the mid point of the period during which the teeth erupted. In August 1981 the flock was re-examined before lambing to observe the eruption of the second pair of permanent incisors.

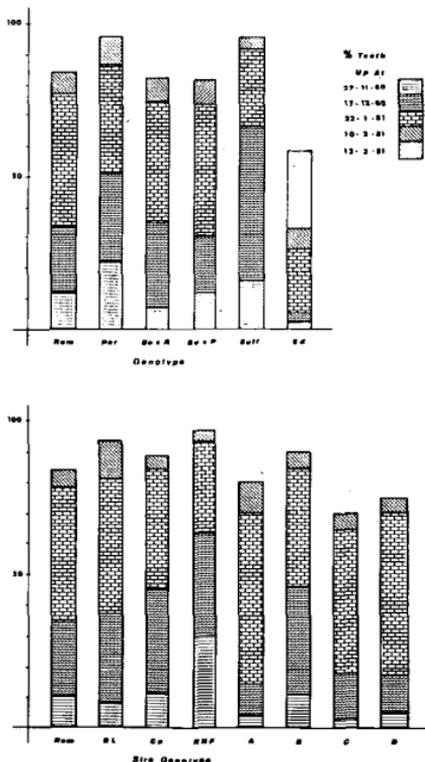


FIG. 1 Cumulative eruption patterns of 1st permanent incisors

## RESULTS AND DISCUSSION

The two-tooth eruption patterns for all groups are shown in Fig. 1 while Table 1 gives the proportion of ewes calculated to have their first pair of incisors up by 460 days of age and their second pair of incisors fully up at the pre-lambing observation.

TABLE 1 Percentage of ewes with permanent incisors erupted

Genotype	Eruption stage	
	2 tooth <sup>a</sup>	4 tooth <sup>b</sup>
Romney*	29	34
Perendale	43	45
Booroola x Romney	26	26
Booroola x Perendale	28	27
Suffolk	47	40
Southdown	2	5
Border Leicester*	29	48
Coopworth*	43	35
Ruakura High Fertility*	56	54
Romney Source A*	23	28
Romney Source B*	33	51
Romney Source C*	17	41
Romney Source D*	14	34

\* Sire genotype; ewes born to comparable Romney dams a First incisor pair up by 460 days of age

b Second incisor pair up at pre-lambing observation

Breeds differed markedly in their patterns, particularly the Southdown, normally considered to be an early maturing breed, which was very late in teeth eruption. At the final observation when two-tooth eruption in all other groups was 70 to 95% completed, only 33% of Southdowns had their first pair of permanent incisors.

The two Booroola crosses were somewhat later in eruption than the respective Romney and Perendale groups. This is in keeping with the later eruption observed for Merinos relative to other breeds at the Tokanui Research Station (J. L. Dobbie, personal communication).

Estimated age at two-tooth eruption was compared for the 4 purebreds by the method of Carr (1962), which is commonly used in human dental surveys to estimate the median and the central 80% span of ages at the time of eruption. The estimated median ages for Romneys, Perendales, Suffolks and Southdowns were 475, 465, 460 and 530 days, respectively, and the 80% spans covered 80, 100, 70 and 130 days respectively, indicating the breed differences in both age and spread of teeth eruption.

Considerable genetic variation was also apparent between groups of animals born to comparable Romney dams but sired by rams from different origins (Fig. 1). At 460 days of age 56% of Ruakura

High Fertility Romneys had their first permanent incisors up whereas the other 5 Romney sires averaged 23% (range 14 to 33%). Long-term selection for increased fertility may have produced a correlated change toward earlier maturation (as it has in incidence of hogget oestrus) and accelerated tooth eruption. Age at tooth eruption and incidence of hogget oestrus were compared within lines. The mean age at tooth eruption was found to be slightly later for animals which had shown oestrus as hoggets than for those not cycling.

The possible relationship between age of tooth eruption and animal growth was examined by comparing time of tooth eruption with regularly collected body weights. Sheep getting their teeth up early (not necessarily younger) were consistently 3 to 6% heavier between 5 and 13 months of age.

When date of tooth eruption (estimated as the midpoint in the period when eruption occurred) was regressed on birth date the pooled within-breed regression coefficient was approximately 0.2, indicating that factors in addition to birth date influenced the date of teeth eruption.

Analysis of teeth eruption by 460 days of age as an all-or-none trait yielded a heritability estimate of  $0.18 \pm .06$  indicating that moderate within-breed genetic variation exists as well as the between-group differences noted earlier. By increasing the frequency and number of observations in subsequent years it is intended to estimate the age at tooth eruption and the heritability of the trait better.

The comparison of eruption of the first and second pairs of permanent incisors (Table 1) showed fairly consistent ranking of genotypes. Progeny of sires from Romney strains C and D which were late in getting their first pair of permanent teeth appeared to have caught up in getting their second pair, while the opposite applied for the progeny of sires from the Coopworth strain. The Ruakura High Fertility-derived ewes remained early in tooth eruption while the Southdowns remained very late.

The current emphasis placed on ageing by dentition over-estimates the age of sheep whose permanent incisors erupt at an early age. If selection for performance results in earlier teeth eruption, as seems to be the case with the Ruakura High Fertility, progressive breeders may be penalised by this method of ageing at time of sale. Continuing work will examine relationships between eruption patterns and rate of teeth wear and numerous measures of subsequent performance.

## REFERENCE

Carr, L. M., 1962. *Aust. dent. J.*, 7: 367.