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LENGTH OF PRODUCTIVE LIFE IN VICTORIAN DAIRY HERDS

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Dairy farmers regard length of productive life as an important trait of dairy cattle and this is supported by recent studies. This paper presents an analysis of the age structure and culling patterns in Victorian dairy herds and makes a preliminary assessment of the usefulness of the herd recording data for evaluating sires for stayability.

MATERIALS AND METHODS

Records of all Victorian cows having NASIS (National Sire Identification Scheme) sires were extracted from the Australian Dairy Herd Improvement Scheme files. A sample of 96,000 cows from the files were taken for analysis of their termination codes, age at first calving, length of lactation, age structure and survival.

Cows were considered to have been culled if they were not milk recorded for a period of one year. The proportion of each age group which survived was defined as the proportion that were still present in the herd one year later. Only cows for which survival could be definitively determined were included, so data recorded less than one year before a predetermined cut-off date were not used. The cut-off date was either the date on which the herd was withdrawn from herd recording or the date of the last data (April 1984). Similarly the stayability to n years (n=1-6) post first calving was defined as the proportion of cows which were still present in the herd n years after first calving. Again only cows for which stayability could be definitively known were included. Consequently only cows which first calved n+1 years before the cut-off date were included. Friesians from the sample with known stayability to 2 years post first calving (8,768 cows) were used in a least squares analysis which absorbed herd year and fitted age at first calving and month of first calving. This data was reduced to 7,459 cows from 86 sires, and a model fitting herd year, month of first calving and sire used to estimate heritability.

Termination Codes

Termination codes were poorly and infrequently used. Of the cows recognised as being culled 98% had no termination code on their last lactation, 0.86% had a code indicating dried off and only 0.76% had a code indicating sold or died. The proportion of cows with termination codes improves in the more recent data. Of the cows with termination codes, the codes "dry for low production" and "dry-other" were most frequently used.

Yet, because of the ambiguity of their definition, those codes were almost meaningless. The relative frequency of the codes sold and died are given in Table 1.

TABLE 1: Relative frequency of Termination Codes for Sold and Died

	Sold						Died	
Code	Low Prod.	Infert.	Mast.	Age	Dairy	Other	Bloat	Other
Percent (n=5475)	22	6	4	4	5	44	9	2

Length of Lactation

The average length of final lactation was 6.942± 2.48 mo for all cows and 6.8997± 2.51 mo for cows known to be culled. This indicates that except for involuntary reasons, culling of cows is effected after the completion of a lactation.

Age Structure, Survival and Stayability

The structure, survival and stayability percentages are given in Tables 2 and 3. Heifers enter the herd at both 2 years old (y.o.) and at 3 y.o. which is evidenced by the high proportion of 3 y.o's/2 y.o's (.93) compared with a 2 y.o. survival rate of only .83. The average survival over all age groups was 82% which implies an 18% replacement rate. The discrepancy between this value and the proportion of 2 y.o's in the herd (20%) is possibly due to small increases in herd size over this time (1975-83) plus the tendancy for new herds to contain a larger proportion of young cows. The average productive lifespan was 4.7 years. The stayability figures are in agreement with the survival figures. Table 3 shows that stayability was known only for a small fraction of cows on file (e.g. only 27% had a known 2 year stayability). This proportion will improve as the number of years data on file increases. Other systems of analysis capable of utilising all available data would be advantageous if sires are to be evaluated for daughter longevity.

TABLE 2: Age Structure and Survival

Age	2	3	4	5	6	7	8	9	10+
% of herd	20.4	19.0	15.2	12.4	10.3	7.9	5.7	3.8	5.0
Survival (%)	83	84	85	85	84	82	79	75	70

TABLE 3: Stayability

Years post first calving	1	2	3	4	5	6
Number	30387	22981	17415	13098	8821	5295
Stayability (%)	83	71	61	52	44	36

The least squares analysis showed the effect of age at first calving on stayability to be negligible ($p > .995$) and the effect of month of first calving to be highly significant ($p < 0.001$). The least squares constants (Table 4) show that autumn calvers have a higher stayability than spring calvers. Among the spring calvers, early calvers are more likely to be retained than later calvers. The heritability of stayability was estimated to be approximately 0.06.

TABLE 4: Least squares constants for month of calving

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Number	24	50	137	322	473	842	2172	3025	1184	390	114	31
Constant	-.066	-.178	.081	.051	.090	.063	.017	-.006	-.051	-.090	-.169	-.112