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Genetic evaluation for milking speed, temperament, likability and survival in Australia.

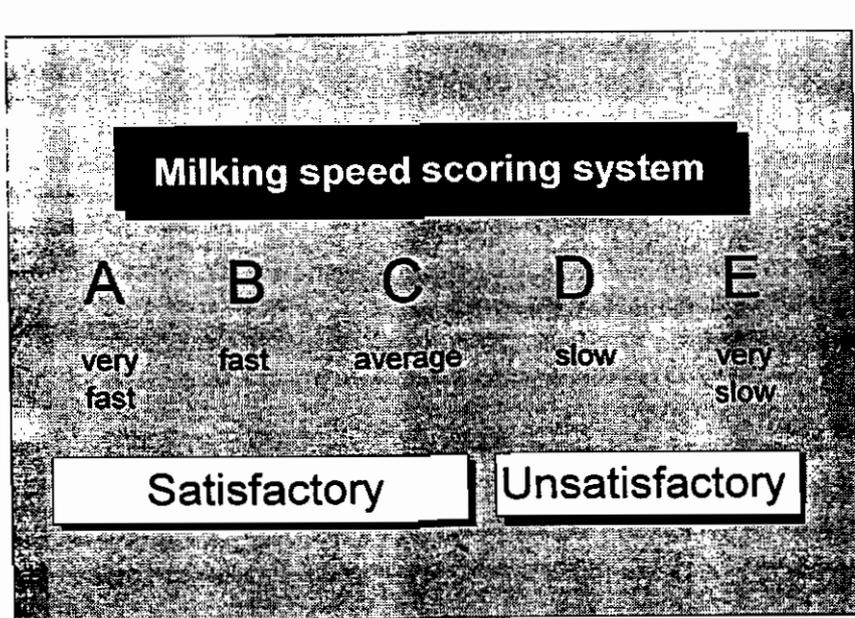
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Workability traits

Australian Breeding Values (ABVs) for the workability traits (milking speed, temperament and likability) were first released in Australia in 1988. They are conducted within the Holstein, Jersey and Red breeds.

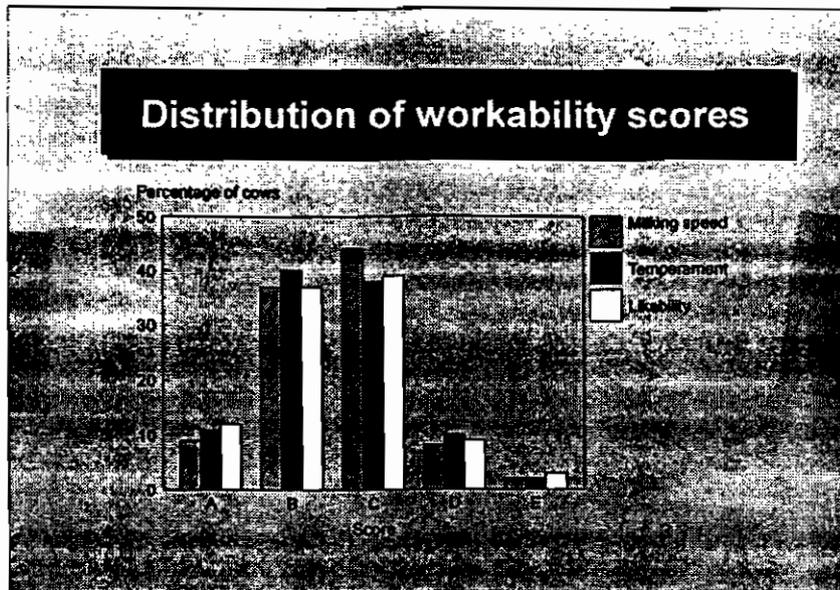
The data comprises subjective scores made by farmers as part of the milk recording system. Farmers are asked to score cows on a five point linear scale (A to E) during mid lactation. Cows at the 'A' end of the scale are considered very desirable and cows scored with an 'E' are considered very unsatisfactory. A description of the scores for milking speed is given in Figure 1. For temperament the range is from very docile (A) to very agitated (E). For the likability trait farmers are asked "Would you like more cows like this one in your herd?". A response of 'A' is very positive about the cow and 'E' is very negative.

Figure 1



Only one score taken in first lactation is used in the genetic evaluation. In 1993 there were approximately 187,000 cow records included in the evaluations for the workability traits. Figure 2 gives the distribution of scores made by farmers.

Figure 2



At present a Sire-MGS model is used fitting HYS, and covariates for age and stage of lactation. The analysis is conducted on the raw scores without transformation. The heritabilities used are 0.25 for milking speed, 0.16 for temperament and 0.20 for likability.

The ABVs for the workability traits are expressed as the percentage of future daughters expected to be satisfactory. Scores of 'D' and 'E' are considered as unsatisfactory, as shown in the example for milking speed in Figure 1. The genetic evaluation for a sire is transformed from the raw score to the published ABV scale using a normal distribution. An average sire has 12% of his daughters scoring 'A', 37% 'B', 39% 'C', 9% 'D' and 3% 'E'. As 'D' and 'E' are considered unsatisfactory, his ABV would be 88%. A sire that is worse than average will have more daughters in the 'D' and 'E' categories, and have a lower ABV.

In 1993 in the Holstein breed there were 5715 sires evaluated for workability traits and 1410 of these were published. Sire ABVs required 20 effective daughters to be published. The range in ABVs for the top sires (ranked on protein + fat ABV) with semen available at commercial prices in Australia was 82 to 96% for milking speed, 88 to 95% for temperament, and 89 to 96% for likability. A few sires have clearly been culled because they were unsatisfactory for milking speed or temperament but the number would be small.

Survival

Survival ABVs were first released in 1989. They are also computed for the Holstein, Jersey and Red breeds. The data is derived directly from the data used to calculate ABVs for the production traits. At present we ignore the reasons why a cow left the herd and only take note of whether she did or did not.

The survival analysis is conducted on a binomial scale, with cows that survive scoring '1' and cows that leave the herd scoring '0'. A cow is considered to have

survived if she is still in the herd one year after she calves. She is considered not to have survived if she had the opportunity to be present in the herd and was not present (for example, if there are milk records for her herd at least 18 months after she calved). The average survival is 83% in Australian herds.

The genetic evaluation is conducted with a sire model and the heritability used is 0.025. HYS effects are fitted and a separate analysis is conducted for each parity. The evaluations are then pooled across parities. This assumes that survival at each parity is the same trait and that the observations for a cow at each parity are independent measures of her survival. Only cows that survived one parity will have a record in the next parity. We have assumed the genetic correlation between survival at different parities is unity, even though this is not fully justified due to the different reasons for culling at different parities.

The advantage of using this type of approach is that survival can be continuously evaluated from reasonably early in life. It has the useful statistical property that the errors are independent and so can be treated as independent measures.

Survival ABVs are expressed as a deviation from the average expected survival of future daughters. An ABV of +10 for a sire means that we expect that 5% more of his daughters in the herd this year will still be in the herd next year than those of the average bull.

There were 2500 Holstein sires with publishable ABVs (at least 40% reliability) for survival in 1993. The range of publishable ABVs is approximately -10 to +17.

Relationships between traits

ABVs for workability were developed because it is apparent that Australian farmers take account of milking speed and temperament when selecting sires and when culling cows. Table 1 indicates the relationships between milk yield and scores for workability traits and survival in a sample of 22,942 Holstein cows. The correlation between protein yield (and milk yield) and milking speed is very low, indicating farmers take some account of the amount of milk a cow is giving when scoring for milking speed.

Table 1

Phenotypic Correlations between cow scores				
	M.S.	Temp	Like	Survival
Protein yield	+01	+12	+32	+22
Milking speed (M.S.)		+18	+29	+05
Temperament (Temp)			+58	+09
Likability (Like)				+20

The likability trait is highly correlated with temperament, milking speed and protein yield. Likability is a 'catch all' trait that allows the farmer to give emphasis to the traits that he or she considers important.

The survival score in Table 1 is early survival, or survival from first parity. This is a binomial trait so we expect correlations to be low. The correlations with survival indicate that more culling takes place on production than milking speed or temperament but that temperament may still be important when farmers are culling cows at the end of first lactation.

The relationships between early survival and protein yield and the workability traits are also demonstrated in Figure 3. As would be expected, cows with low production, and very unsatisfactory scores for the workability traits were more likely to be culled during or at the completion of first lactation.

Figure 3

