

COMPARISON OF GENETIC TREND OF DAIRY CATTLE AMONG DIFFERENT MODELS IN KOREA

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INTRODUCTION

Since 1995, the national genetic evaluation for dairy cattle using animal model has been undertaken in Korea. The main goal of national genetic evaluation is accurate selection of bulls and cows, which have good genetic potentials both production and conformation traits. For more than 20 years, the milk recording program has been run and hundreds of thousands of data were accumulated at present. However, it is appeared that a lot of data is inappropriate for genetic evaluation. The inadequateness was mainly caused by small herd size, shortage of repeated records and loss of records including pedigree records. The aim of this study was to select proper model using data, which includes some inadequate data, by comparison of genetic trend among models.

MATERIAL AND METHODS

Data sets. The 6 data sets classified by calving year were used for this study. For instance, the 1st data set included records up to 1995 of calving year, and the 2nd data set was composed as adding records on 1996 of calving year to the 1st data set. The remaining data sets were made by the same manner as described above.

Considered models. Henderson (1988) classified many different animal models with the types of data sets and associated models. To estimate breeding value, 3 models based on animal model were used for this study. The first model (Model 1) was single trait model with only first lactation records adjusted 305 day and was described as $y = \mu + hys + a + e$; where, μ is overall mean, hys is fixed effect of herd-calving year-calving season, a is random effect of additive genetic effect and e is random residual effect. The second model (Model 2) was single trait model with repeated lactation records adjusted for 305 day and was described as $y = \mu + hys + p + pe + a + e$; where, p is fixed effect of parity and pe is random effect of permanent environment effect. The third model (Model 3) was multiple trait model with each parity treated as a separated trait. Due to the fact that calving in different parities occurs in different years, hys effects associated with parity are different in Model 3.

RESULTS AND DISCUSSION

The distribution of parities of cow recorded for the first time in milk recording program is shown in table 1. Since more than 50 % of cows were first tested after 1st parity, it seems that the implementation of Model 2 results in a wrong evaluation by selection bias. Wiggans *et al.* (1988) reported that data from cows without a first lactation record are evaluated separately in the United States. The number of records in a contemporary group was few on every 3 models.

Especially, in Model 3, the shortage of records in a contemporary group of each parity mutually affects breeding values of each parity.

Table 1. Distribution of parities of cow recorded for the first time in milk recording program

Parity	No. of records	%
1	97 187	48.1
2	57 282	28.4
3 and over	47 562	23.5

The changes of genetic trend for milk yield by a series of data sets within model are shown from figure 1 to figure 3, respectively. The genetic trend in Model 1 was more consistent than those of other models according to increase in data. These results showed that the data are not suitable for Model 2 and Model 3. And, it may be inferred that these results mainly caused by selection bias and shortage of records in a contemporary group.

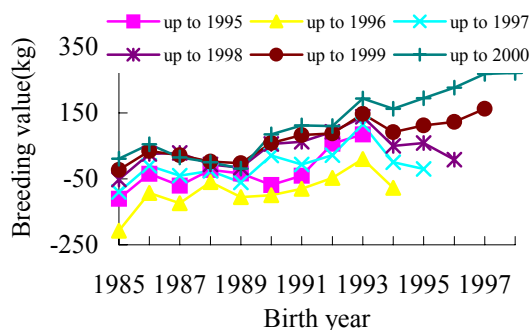


Fig. 1. Comparison of genetic trend for milk yield by a series of data set within Model 1

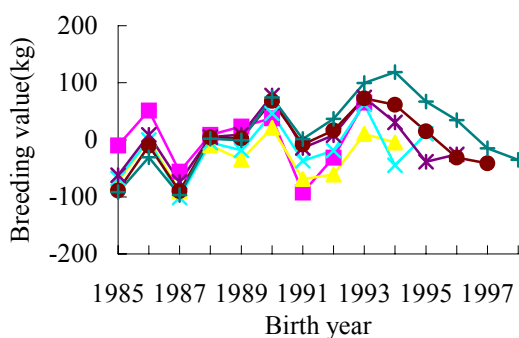


Fig. 2. Comparison of genetic trend for milk yield by a series of data set within Model 2

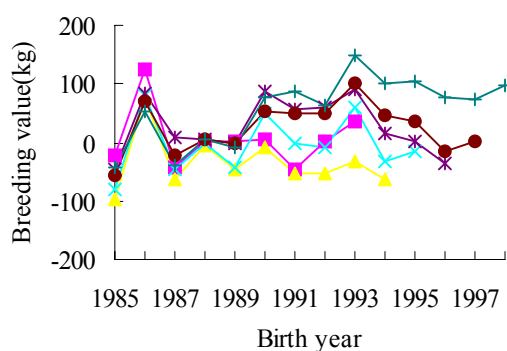


Fig. 3. Comparison of genetic trend for milk yield by a series of data set within Model 3

CONCLUSION

The results show that single trait model with only first lactation records is the most suitable model for genetic evaluation under the situation of data usable at present. As generally known, the more information is included in model, the more accurate result is expected. Wiggans (2000) reported that in choosing among the various model options, a more complete model is expected to be more accurate. However, if improper data are applied to model as additional information, the results may not be reliable. Therefore, it is important to study of data prior to select proper model in early stage of evaluation.

REFERENCES

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