

GENETIC TRENDS FOR PRODUCTION AND NON-PRODUCTION TRAITS IN SIMMENTAL BREED IN SLOVENIA**

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**Plenary invited paper

Abstract: The main part of Slovenian Simmental breed is selected for milk production. Genetic changes in a population should be checked in the case of selection on more traits at the same time. The estimation of genetic trend is the best tool to follow genetic changes in a population. In this paper we present the estimated genetic trends for traits with high economic weight in total selection of Slovenian Simmental breed. Results show that the greatest genetic progress was attained for milk production trait and conformation traits for udder. In other traits not so high genetic progress was attained. In the case of muscularity significant negative genetic progress was attained in the last 12 years.

Key words: Simmental, cattle, genetic trend, production traits, secondary traits

Introduction and literature review

Genetic trend examination is the most powerful analysis to evaluate the selection work in a population.

For good results we need a long-term strategy in a population selection. Breeding goals could be achieved only in exact national selection work, supported by breeders who believe in success and who make exact selection within a herd.

In this paper we present how good selection work of Slovenian Simmental breed was in the last two decades.

The main part of Slovenian Simmental breed is bred for milk production in the last two decades.

For the estimation of efficient selection the best parameter is genetic trend (*Falconer and Mackay, 1996*). In selection on more traits at the same

time, from the economical point of view, the greatest progress was attained. In the selection system we should follow genetic changes for all traits included in the selection program due to genetic correlations between traits (Pogačar, 1984).

In the populations of different countries different genetic progress was attained for each trait (Egger-Danner, 2007). This depends on economical weight for each trait in total selection. The greatest genetic progress in Simmental populations in several countries was attained for milk production traits (Egger-Danner, 2007, Dodenhoff *et al.*, 2006). This was expected because milk production traits have great heritability and economical weight in total selection.

Materials and methods

Routine breeding value estimation data was used for the analyses. In each evaluation more than 60 traits were evaluated. In Slovenia four evaluations for Slovenian Simmental, Black and White and Brown breed were done per year. For this research the results of April 2007 breeding values evaluation for 27 traits and indexes are presented. We chose traits and indexes with large economic effect for Simmental breed. For all presented traits animal models were used for breeding value estimation. In case of conformation traits a multivariate and for other traits a single trait animal model was used.

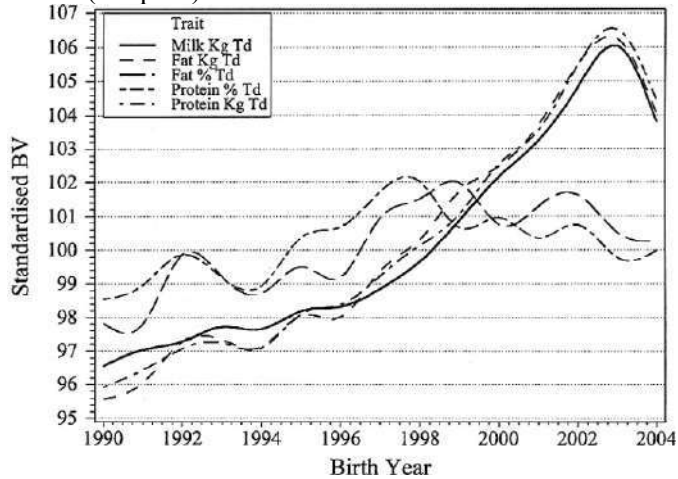
For all traits standardised breeding values were used in the analyses. Standardised breeding values were calculated from the estimated breeding values in a manner that the average is 100 and standard deviation is 12 for each trait.

Estimations of breeding value were done with MTJAAM (Gengler, 1998) and the evaluation of genetic trends by SAS software package (SAS Institute, 2001).

Results of investigations and discussion

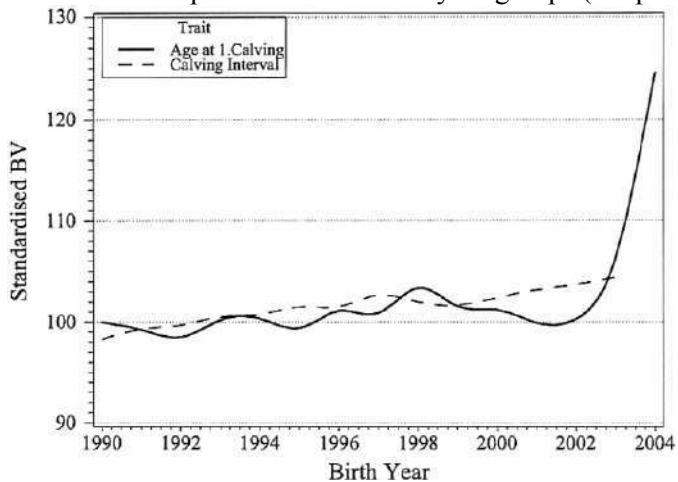
Genetic changes for milk production traits were presented for animals born between 1990 and 2004 (Graph 1). As we can see the large genetic progress were attained during this period for milk, protein and fat yields. In 12 years period almost one standard deviation of genetic progress was attained for all yields. In spite of negative correlations between yield traits

and content traits a slightly positive genetic trend for fat and protein content was attained too (Graph 1)



Graph 1. Genetic trends for test day (TD) milk production traits

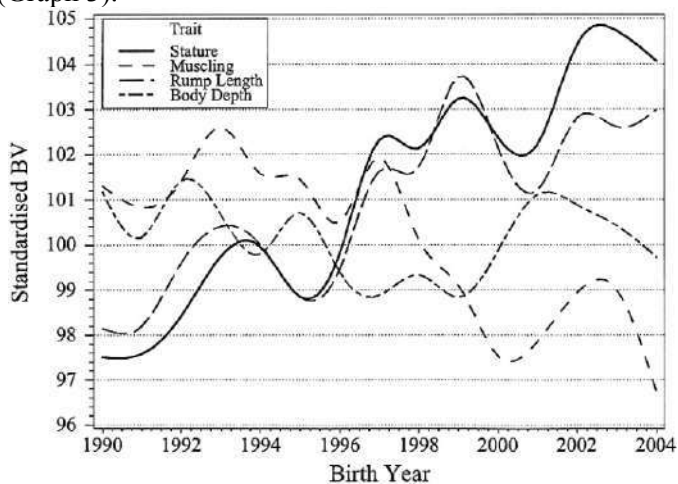
In case of fertility traits we can see just slightly positive genetic trend (Graph 2). Great genetic progress for age at first calving was estimated for the last two birth years. This was expected because animals which calved young for the first time represent the last birth year groups (Graph 2).



Graph 2. Genetic trends for fertility traits

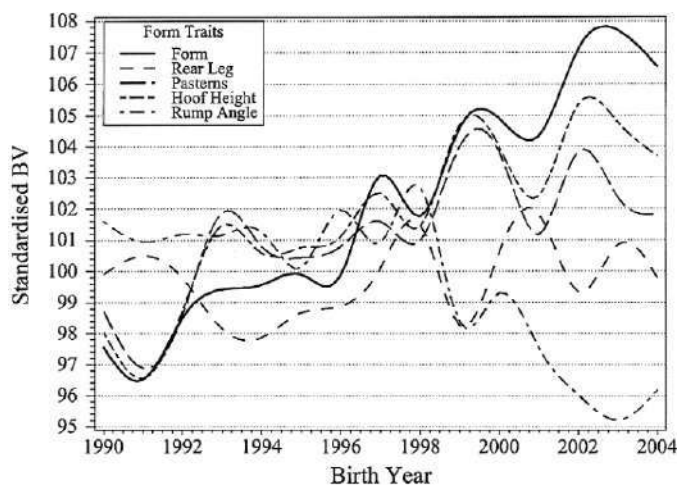
In frame traits we can see that stature and body depth have a strong positive genetic trend (Graph 3). In 12 years period genetic progress of about

half standard deviation was attained. For rump length there are no significant genetic changes in the estimated period. In case of muscling genetic trend is negative (Graph 3).



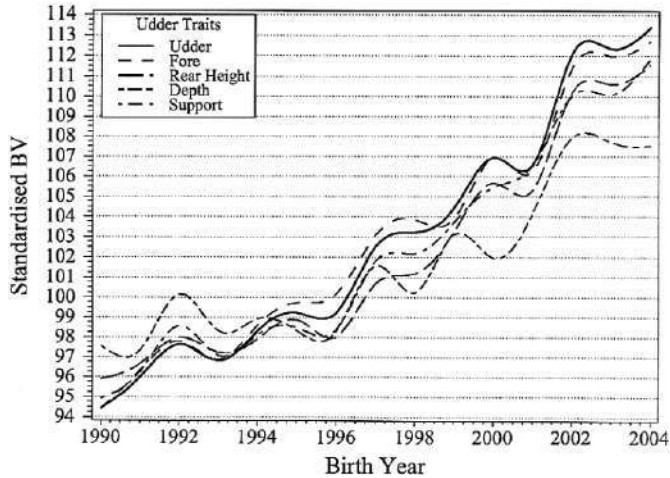
Graph 3. Genetic trends for stature and muscling

For form traits no significant genetic trend was attained (Graph 4). Only in the case of overall form we can see quite large genetic progress. For pasterns, rear leg and hoof height average value was desired. Therefore we expected no genetic progress. We don't want to make changes, but want to decrease variance for these traits.



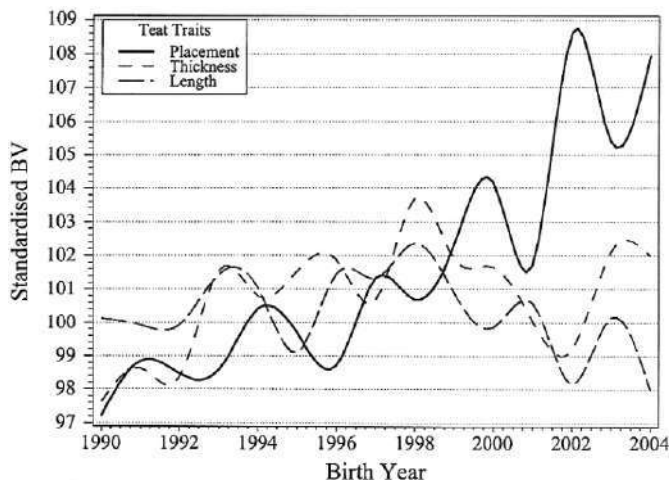
Graph 4. Genetic trends for form traits

For all udder traits great positive genetic trends were expressed in the last 12 years (Graph 5). In case of udder overall the greatest genetic progress of more than one and a half standard deviation was estimated.



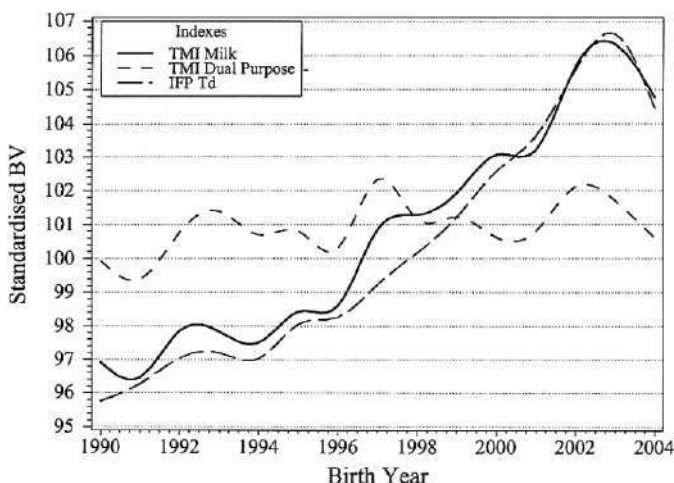
Graph 5. Genetic trends for udder traits

For teat traits no significant genetic trend was attained (Graph 6). Only in the case of teat placement we can see significant genetic progress. This means that younger animals have more inward teat placement than older animals. For all this traits the average value was desired. Therefore we expected no genetic progress. We don't want to make changes but want to decrease variance for these traits.



Graph 6. Genetic trends for teats traits

In the case of total merit index for milk production a great genetic progress was attended in the estimated period (Graph 7). The same conclusion we can make for the index of fat and protein. For total merit index for dual purpose breeding no genetic progress was noticed. This is understandable because the majority of milk recording population are dairy cows and these animals represent the average population.



Graph 7. Genetic trends for total merit indexes and fat and protein index

Conclusion

The studied part of Simmental cattle in Slovenia presents almost half of dairy cows population. The selection is oriented to the production of healthy, durable cows with good udders. Estimation of genetic progress in the last 14 years shows that the selection advanced in the right direction. The greatest progress was attained in milk production and udder traits. The general and most important picture of successful selection is the progress of total merit index for milk production. Here, in the analysed period, progress for almost one standard deviation was achieved.

GENETSKI TRENDOVI PROIZVODNIH I NEPROIZVODNIH OSOBINA SIMENTALSKE RASE U SLOVENIJI

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Rezime

Selekcija u najvećem delu goveda simentalske rase u Sloveniji se radi na proizvodnju mleka. Genetske promene u populaciji bi trebalo da budu proverene u slučaju selekcije na više osobina istovremeno. Ocena genetskog trenda je najbolji način za praćenje genetskih promena u populaciji. U ovom radu predstavljamo procenjene genetske trendove za osobine od izuzetnog ekonomskog/privrednog značaja u ukupnoj selekciji slovenačke simentalske rase. Rezultati pokazuju da je najveći genetski napredak ostvaren za osobine mlečnosti i konformacije vimena. Kod ostalih osobina nije ostvaren toliko izraženi napredak. U slučaju muskuloznosti utvrđen je signifikantno negativan genetski progres u poslednjih 12 godina.

Ključne reči: simentalska rasa, goveda, genetski trend, proizvodne osobine, sekundarne osobine

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