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FUTURE REQUIREMENTS FOR PERFORMANCE TESTING AND BREEDING AIMS

B. Luntz

Summary

In regard to the rising pressure of expenses and the heavy workload in companies the significance of traits relevant to health will continue to gain in importance. In addition to that the demand for high product quality goes hand in hand with a changed consumer awareness.
The protection of animals and a correct animal husbandry are in the focus of public interest.
The performance test will have to incorporate a more precise recording system of health data, in which the computer could find greater application. Most companies have now internet access.
Moreover, companies have to take more and more responsibility for the recording of data. Whether a test herd is the appropriate instrument is worth considering.
Reserves in the breeding programme could be achieved through a wider spread of bulls sires.
That puts demands on the structure of organisations. The aim of testing must be to achieve most reliable results. Despite the rising pressure of expenses for the organisations it is important for the survival of dairy farms to work with heredity results that provide a solid basis. Depending on the economic conditions all possibilities need to be exploited.
In future the great challenge for insemination stations will be to assure the ideal use of test bulls, without a loss of data accuracy.

Introduction

Although Simmental Fleckvieh is recognized worldwide today as dual-purpose breed, the focus in the last years has been on the selection of traits in the milk production. Retaining the beef performance an increase in the milk yield was definitely noticeable. This development was important to keep the

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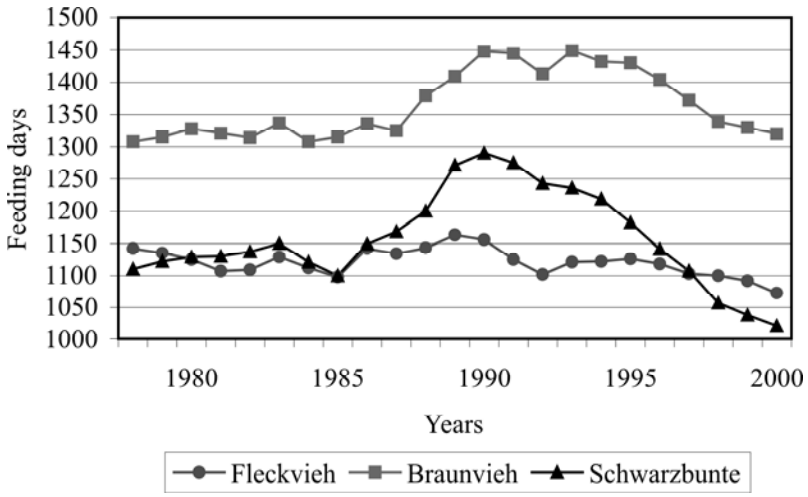
B. Luntz, Bayerische Landesanstalt für Landwirtschaft, Institut für Tierzucht, Grub.

Simmental Fleckvieh breed competitive in the economic trend.

Meanwhile many companies have reached a level where management and environmental design for the exploitation of the genetic potentials are the limiting factors. There is a demand for the willing cow to deliver high performance, without any additional workload for the management.

In contrast to this the longevity of our cows has continuously decreased in the last years. In figure 1 the Bavarian Simmental Fleckvieh data shows a decline of feeding days from the mid-nineties onwards.

Figure 1 - FEEDING DAYS OF THE CULLED COWS BY BREEDS



For many companies a reversal has become a significant cost factor. Internationally for most cattle breeding companies there is a trend towards stronger emphasis on cost reducing traits, which are subsumed under functional traits. In Simmental breeding there are still some possibilities open in this regard. Therefore one of the most urgent tasks of performance testing will be to pay more attention to those characteristics.

What are functional traits?

Functional traits are considered part of animal health. According to Swalve (2003) functional traits reduce the cost on the input side of production and take into consideration the marketing of animal products.

The main problem in the breeding evaluation of this health and fitness traits is the generally low heredity. According to Distl (2001) there is a great genetic variability in our breeds which should be used. Particularly the trait health combines a number of components which refer to various organs. The following illnesses as breeding aim characteristics are being discussed:

- fertility interference
- metabolic disorders
- udder disease
- feet and legs

In Scandinavia those illnesses have been recorded and dealt with. Lower heredity can be compensated in several ways. The breeding aim for Norwegian cattle stipulates a proportion of 40 % of test bulls, so that 250 to 300 daughters result from that.

Alternatively it is possible to integrate parameters into the breeding value estimation. For the criteria somatic count we use in the breeding value estimation a parameter, because the actual trait "mastitis" cannot be meas ured.

In some areas the inclusion of additional data in the stations performance test seems promising, but cannot done in all populations due to the costs. Therefore future approaches should aim to integrate traits outside traditional system of farm performance tests. Future findings of the molecular genetics will support the classic possibilities.

Breeding possibilities for the improvement of health in udder and claws

Among all the health relevant traits the area of udder and feet and legs deserve particular attention. In the Sim-mental Fleckvieh breeding programme udder health is recorded through the parameter of somatic cell count. Heredity with a cell count of 0,10 is about twice as high as the actual trait mastitis with about 0,05. Both traits refer only partly to the same facts, since the correlation of the traits lies at 0,65 (Swalve 2003).

Surveys from Scandinavia show that a detailed recording of traits is possible, and the findings of the Danish cattle population justify this effort.

Here the Danish model is taken to represent the Scandinavian breeding strategy. In an integrated system of farmers and veterinary doctors all the treatments are registered and assigned to the specific animal in a central data bank. On the basis of that data a health index is set up with 100 as average. According to Danish statistics the frequency of mastitis in daughters of bulls with >107 is only half as high as from bulls with an index of <93. Interesting is also the correlation to other traits.

Table 1 - PERCENTAGE OF COWS WITH AT LEAST ONE TREATMENT IN THE TIME OF 10 TO 100 DAYS AFTER BIRTH (acc. to Hansen 2000)

Illness	1. Lactation		3. Lactation	
	Rote Dänen	Dänische Jersey	Rote Dänen	Dänische Jersey
Udder	21,9 %	23,6 %	27,9 %	21,3 %
Fertility	11,6 %	2,5 %	15,3 %	5,1 %
Metabolism	2,8 %	2,2 %	12,0 %	9,9 %
Feet and legs	6,0 %	3,8 %	5,0 %	2,3 %

Table 2 - CORRELATION UDDER HEALTH INDEX (= EGI) TO OTHER TRAITS IN DANISH HOLSTEIN COWS

Characteristics	r zu EGI
Milk yield	-0,25
Feet and legs	0,19
Udder	0,31
Temperament	-0,16
Other illnesses	0,44

This udder health index comprises also selected characteristics for type traits. Compared to the sole criteria of somatic cell count the accuracy can be greatly increased.

Also other research supports the Danish results. According to Boettcher et.al (1998) accuracy can be increased by 15 % when the traits somatic cell count, milking speed and udder depth are combined in the udder health index (instead of cell count as breeding value only).

Another approach for the improvement of the health of herds is the assessment of claw traits.

The practical importance is not to be underestimated, in particular for loose housing.

A frequent topic of discussion is the question, whether in the past the intensive breeding for milk yield led to a general neglect of feet and legs. However, if we consider the genetic trend towards feet and legs, a slight rise in the breeding value of feet and legs in the Simmental Fleckvieh test bulls of the last few years can be noted.

Surveys for particular claw characteristics are not new, but were negligible in the past.

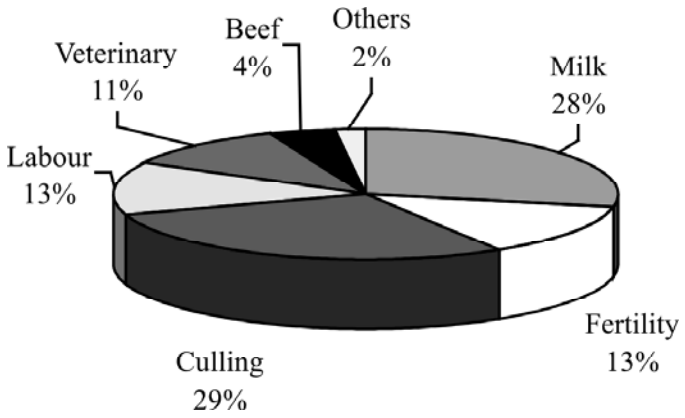
At present a project is trying to systematically classify claw parameters for the German Holstein population, with the aim of setting up a breeding value estimation for a claw index.

Health data from the farms as well as additional information from the claw groom are to be used. For the German Simmental Fleckvieh population Distl (1999) found out that heredity for claw measurements is 0,2 to 0,5, so that breeding efforts seem to be successful. Relations between claw measurements and functional time of usage show a value of 0,06 to 020.The problem lies certainly in data recording. So far the hoof height was recorded with the classification of progeny. An extended recording of claw traits would be possible, but a description is problematic, due to various management situations.

Which possibilities are there for the future?

The idea of a more exact trait recording within the progeny testing involves also the aspect of bull testing. Daughters in test herds allow a more comprehensive data recording. A feasible approach would be an integrated data recording system as we have seen in Scandinavia. Already in 1997 the programme BayHerd was set up in Bavaria, which is a joint project between LKV Bayern and the Veterinary Chamber of Bavaria. All treatments for the monitoring of herds are to be recorded on the farms so that they can be used for breeding purposes. A project with the same objective was set up in LKV Baden-Württemberg.

Figure 2 - ECONOMIC LOSS RESULTING FROM ILLNESSES OF LEGS AND FEET (Distl 1999)



In a central data base “animal health” specific treatments are recorded and by including diagnosis data can be applied in the breeding value estimation. In the long run such a common data bank in RDV makes sense.

A recording of further traits within the scope of the classification of progeny needs to be weighed. Too much information might have a negative effect and must be questioned on its validity for practical purposes. In Bavaria and shortly also in Austria second evaluations are done, which can be an element in the mosaic of functionality. Furthermore results from the BCS-recording and the trait locomotion constitute further parameters.

Feasible is also a functional type traits index, which enables us to do a ranking of bulls according to type traits. All relevant type traits for longevity should be combined.

Testing of bulls

It is the aim of bull testing to get most reliable results from the testing. Reliability means that in further tests the results are as close as possible. For testing bulls different systems exist: in Austria the regulation of second calving is in use, while in most German stations the stipulated minimum proportion is about 20–25 %. The French organisation Urceo tests the bulls in 7.500 companies on the basis of a breeding value list for female animals on the farm.

The test bulls should have the same level for mating as the positive selected bulls. In that case the daughters of test bulls would then have an equivalent rival in the stable, which would be absolutely advantageous for the stability of breeding values.

Since functional traits come more and more into focus the number of daughters from test bulls should not be too few. In Bavaria the numbers of daughters per test bull considered for a breeding value estimation has levelled out at about 100.

Modifications in breeding aims in favour of traits with lower heredity may demand a greater number of daughters. In Canada the rule is that at least 100 daughters should be aimed at. (Doormal 2002).

However, there are also surveys in which for controlled tests in contracted companies 60 to 80 daughters per bull are sufficient (Schomaker 2001).

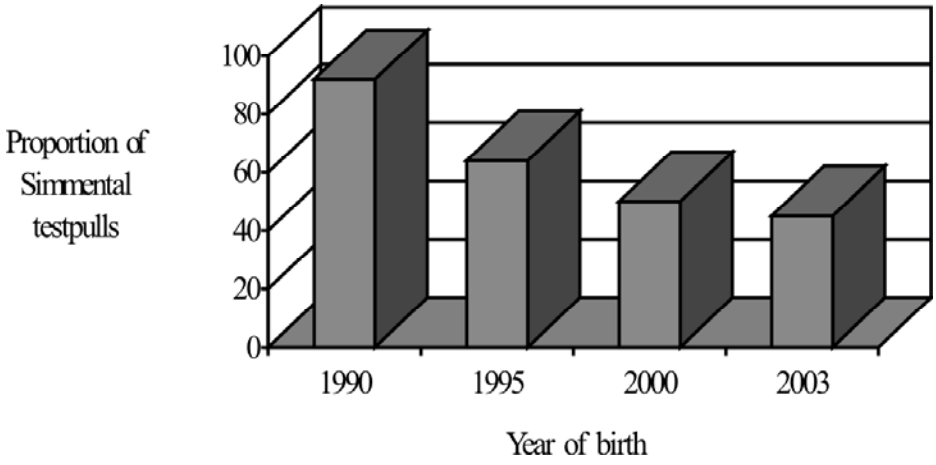
When building up a test herd it is important to check, how much a genotype-environment interaction will influence the test result. Also the size of the herd has an influence on the breeding value estimation (Swlave et.al 2001) Under the conditions of Holstein–breeding value estimation the daughters of test bulls from larger herds achieve a higher weight, so that with the same number of daughters safety tends to increase in regions with larger herds.

According to Dodenhoff (2003) an important aspect in bull testing is the transregional use of testing. As diagram 3 shows more test bulls are acquired

by associations, but that does not necessarily mean that they are commonly tested.

The cooperation of Bavarian and Austrian insemination stations is a landmark in the right direction. Thus there are connections between regions and the bulls are tested on a wider basis. The Italian breeding organisations, for instance, put great emphasis on an ideal spread of test bull semen. Companies in different parts of the country with very different conditions for production test the bulls in the individual stations. According to Callegaro (2002) the proportion of bulls with good breeding values is relatively high. König (2002) maintains that a trans-regional use of tests as well as an improved data structure would contribute to create new markets for the organi-sation. Highly positive tested and selected bulls will be used more intensively in a wider population.

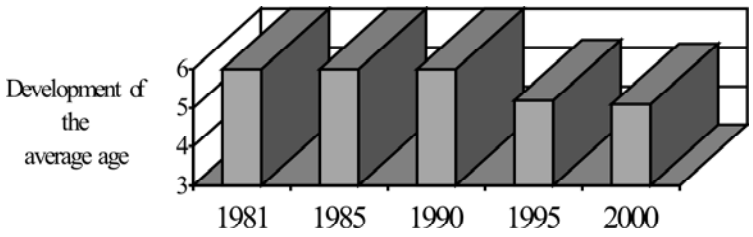
Figure 3 - PROPORTION OF SIMMENTAL TESTBULLS IN THE OWNERSHIP OF ONE BAVARIAN INSEMINATION CENTER



Young cow or older bull dame?

Some years ago already Graser and Averdunk (1992) found out that the age of the bulldam has an influence on the success of the test in the selection of her son. As can be seen in diagram 4 the average of bulldams has decreased since the mid-nineties.

Figure 4 - DEVELOPMENT OF THE AVERAGE AGE OF BULL DAMES IN BAVARIA



In the course of an innovative breeding programme more young cows and young cattle are being used in ET since 1998 in Bavaria. Beside a good initial performance also the milk yield is estimated to be high. Soon it will show whether the shorter interval between generations can compensate the reduced safety at the time of selection.

Too great expectations in bulldams with a high life performance and a lower total merit index, connected with the hope of a long productive life (ZW = BV) of her sons must be viewed sceptically. Analysis of Bavarian data material have shown that. And when old bulldams are mated with new sires, just coming from being tested, such a method cannot work.

Avoid narrowing of line

A frequently asked question is: how much inbreeding in a population can be tolerated?

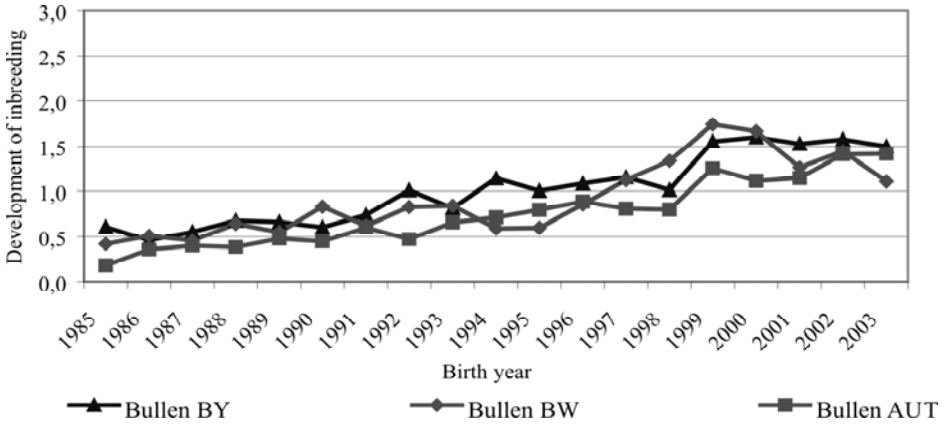
The consequences of an increase in inbreeding is knows, but the different lines within a breed are under economic pressure. Strongly positive bulls are used widely, while variations with a lower level of performance are cut short in the breeding programme. This method accelerates the breeding progress, but leads to higher degrees of inbreeding. Table 3 indicates the domination of individual sires.

Table 3 - MOST FREQUENT FATHERS IN 2004 OF TEST BULLS IN BAVARIA.

Name	HB-Nr.	n	%
Regio	191190	78	17
Hippo	187293	52	12
Poldi	184248	46	10
Repuls	169110	22	5
Rumba	605190	19	4
		217	48

The table shows that of the bought test bulls in 2004 – about 50 % descend from 5 different fathers. Of the total of 448 test bulls 69 have a father who shows up only once in that test year. That is a very uneven use of bull sires in the breeding programme. For Simmental Fleckvieh the inbreeding coefficient is still relatively low, in contrast to other breeds.

Figure 5 - DEVELOPMENT OF INBREEDING –BY THE YEAR OF BIRTH OF SIMMENTAL BULLS



The development should be continuously checked so that the diversity of lines is assured.

Results of research on American Jersey cows indicate that an increase in inbreeding by 1 % reduce the longevity of cows by 40 days. Through the extensive use of very positive tested and selected bulls a further increase in inbreeding is to be expected in the coming years, and there will also be a corresponding supply of bulldams.

Inclusion of Red-Holstein

Cross-breeding of Red-Holstein with Simmental Fleckvieh has proved to be unfavourable. In Bavaria an evaluation of test bulls with a proportion of over 25 % Red-Holstein has shown that of 34 test bulls (beginning with the birth year 1990) only three have reached the permits for insemination. Particularly functionality in regard to legs and feet and somatic cell count are significantly limited, therefore a further inclusion of Red-Holstein in Fleck-vieh breeding cannot be recommended. Furthermore the character of a dual-purpose breed becomes questionable.

BUDUĆE POTREBE TESTIRANJA PERFORMANSE I UZGOJNI CILJEVI

Sažetak

S obzirom na sve veći pritisak troškova i veliko radno opterećenje u poduzećima važnost osobina koje se tiču zdravlja i dalje će dobivati na važnosti. Osim toga, zahtjevi za visokom kakvoćom proizvoda prate promijenjenu svijest potrošača.

Zaštita i ispravno gospodarenje životinjama u središtu su javnog interesa.

Test performanse morat će uključiti precizniji sustav bilježenja zdravstvenih podataka u čemu bi kompjutor morao naći veću primjenu. Većina poduzeća ima danas pristup internetu.

Osim toga, poduzeća moraju preuzimati sve više odgovornosti za bilježenje podataka. Vrijedi razmotriti da li je testiranje stada pravi instrument.

Rezerve u uzgojnom programu mogle bi se postići većim rasprostranjenjem bikova.

To postavlja zahtjeve na strukturu organizacija. Cilj testiranja mora biti postizanje najpouzdanijih rezultata. Unatoč sve većem pritisku troškova na organizacije važno je za opstanak mliječnih farma raditi s rezultatima nasljednosti koji pružaju solidnu osnovu. Ovisno o ekonomskim uvjetima, treba iskoristiti sve mogućnosti.

U budućnosti će veliki izazov za stanice za osjemenjivanje biti osigurati idealno iskorištavanje testnih bikova, bez gubitka točnosti podataka.

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