Establishing a Database for Common Bulls of the Braunvieh- and Fleckvieh Breed and Conversion Factors for Braunvieh and Fleckvieh.

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1. Introduction

The exchange of genetic material for the Braunvieh/Brown Swiss and Fleckvieh/Simmental breed naturally is only important for those countries, where the breeds are located. This is true for Central Europe with a concentration in the Alpine region, but also for some of the Eastern European countries, like the CSFR, Romania, Hungary and the states following the former Soviet Union. Of course a lot of importing countries in the Mediteranian area and the Near East are interested in a comparison of different strains of both breeds.

Exchange of semen for these breeds is mainly conducted for planned matings and a regular joint proof is rather seldom. Exceptions are the use of American Brown Swiss test bulls in Austria and partially in Switzerland and a cooperation between one Bavarian AI-stud and one Austrian AI-stud in the Fleckvieh-breed. Results of this last cooperation will be reported by POTUCEK (1992) at this meeting.

There have been several discussions for joint comparisons in both breeds, but concrete results for long term programms have not yet been acchieved. Health restrictions and governmental limits were in some cases prohibitive for such approaches. A small joint project with the Braunvieh breed was recently finished with 5-6 bulls and showed some limitations of a short-term comparison (HAUßMANN 1991).

2. Situation for the Braunvieh/Brown Swiss breed

The European Braunvieh-Conference has appointed a working group for the discussion of possibilities to convert breeding values and to compare sire evaluation methods. This group met first in 1982 after initial discussions at several European or world conferences (Paris 1974, Innsbruck 1978, Madison 1980). An initial report was presented at the meeting in Prague (AVERDUNK & SCHNEEBERGER 1984).

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In the meantime we created a database of common bulls in most of the European populations and the size of this database is given in table 1. Bulls are only included in the database, if they have progenies in other countries. The database is updated once a year, including all newly used AI-bulls from other countries. Through this approach it is possible to have the relationship ties available, when the first progenies become available in animal model evaluations. Of course such an approach depends upon the cooperation of the people responsible for such an exchange and personel change and/or language problems could influence such efforts. Hopefully such problems can be minimized in the future.

One problem faced in all breeds is the tendency to renumber foreign bulls in order to fit in the system of the importing country. We have this problem in Bavaria too, but we hope to get a solution in the future. Fortunately foreign herdbook numbers have been used in Italy and with the omission of the leading digit in Switzerland also. Through the comparison of parents and birth dates it was possible to locate a lot more common bulls. Hopefully we get also the communication gap closed with France, which might be a result of this meeting.

In Table 2 the most recent common bulls are given and we see, that the available numbers are not large. As already mentioned, most of these bulls have been used in planned matings. For the calculation of conversion factors we took the most recent years, starting with sire birth year 1975 and younger. Table 3 contains the number of pairs available with progeny test results and those meeting a minimum accuracy of 0.75. The results given here are all animal model evaluations: USA and Italy with the repeatability model and Austria and Bavaria with a multi-trait model. The correlations given in table 3 are in agreement with former comparisons (Haußmann 1991); of course their expectations are influenced by the requirements regarding accuracy.

The conversion factors are summarized in table 4, together with the means and standard deviations of the bulls included. The figures given here are factors according to Wilmink's method, but it should be mentioned, that the differences between this approach and Goddard's Method or the "Ordinary Least Squares" approach are marginal[2]. The last method has been favoured by ZHANG (1990) and HAUßMANN (1991).

The scale of conversion factors depends of course upon the dimensions used for publishing sire proofs: pounds and ETA's vs. kg and EBV's. The larger population differences with Austria can be explained through differences in base definitions: Austria still is applying the sire base 1975. This is the reason for the larger difference in a-values for yield traits.

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2) The availability of a programm with input flexibility for all three methods, developed by ZHANG and HAUßMANN is especially aknowledged.

Unfortunately sire proofs from France and Switzerland were not available in a complete file. We hope that this will be possible in the near future after the introduction of the Animal Model in Switzerland by the end of this year (Casanova 1992).

3. Situation for the Fleckvieh/Simmental breed

The possibilities for achieving conversion factors for the Fleckvieh breed are much more limited, because there is no common base population for imports as in the Holstein or the Brown Swiss situation. The use of Red-Holstein bulls is mainly restricted to Switzerland. As already mentioned, links are rather scarce and mainly through planned matings. At present there is limited interest by the official European or World Association, mainly because the interest is divided into dairy and beef activities.

At present the database of common bulls consists of data from Germany, Austria and Italy. Switzerland and France intend to exchange information in the near future, but ties to the latter countries are rather limited.

The correlations between the available common bulls are given in table 5, where 34 resp. 91 bulls fullfill the minimum accuracy of 0.75. Compared with the Braunvieh results, these correlations are somewhat lower and close to the border of acceptance for conversion factors. The difference between the correlations for milk and protein yield vs. fat yield for the Italien data can not be explained and needs further internal discussions.

The conversion factors, means and standard deviations are given in table 6. Regarding the base definition, Italy and Bavaria apply the same, while Austria still has the sire base 1975, which is the main explanation for the difference in a-values. The results presented here are in agreement with former calculations on a limited data set and those given by Potucek (1992). We hope that some more populations may join our database, but the possible ties with France (Pie rouge and Montbeliard) and Switzerland are up to now limited to less then 10 bulls in planned matings.

4. Future tasks

Competition between breeds and strains within breeds will increase in the years ahead. Nevertheless we should try to conserve and document genetic diversity and need therefore valid comparisons. Sire evaluation methods are today more comparable than in recent decades and across country comparisons can be done more easily, hopefully with a common base in the near future.

We should try to favour more the common use of test bulls across countries. Since some of the populations involved are rather small, a limited number of joint test bulls in several years has the advantage, that the test capacity for the breed as a whole is not too much reduced and the AI-units remain independent. Such an approach has recently been discussed with the member countries of the Euopean Braunvieh Conference (Averdunk 1992) and it was agreed upon to test jointly four test bulls each year over a period

of at least 4 - 5 years. Each country will nominate one test bull (Austria, Italy, Switzerland, Germany) and the smaller populations could participate to use one or two of these bulls. A continous use would reduce expectations from such a trial in the view of practical breeders, which do not have an imagination of standard errors of EBV's, but also would reduce the risk of running into an abnormal environmental/political situation, which was experienced with the first comparison in 1985 with the quota-introduction.

In the Fleckvieh/Simmental breed further discussions are needed to convince breed organizations and AI-studs about the advantage of joint test-bull usage. It may be, that the incorporation of beef comparisons could increase the pressure for such an approach.

If INTERBULL is intending to include other breeds into the international sire-evaluation, some of the limits derived from the Friesian situation have to be reevaluated. This will be true for the minimum number of sires to be required as well as the accuracy limit.

We would be willing to cooperate with Interbull, provided that the international or European organizations are contacted in advance and the advisory body consists of representatives of the main countries of the breeds.

Finally I want to thank the members of the Braunvieh-working group for a decade of fruitful cooperation in international sire evaluation.

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Table 1: Cross-Reference-Table of Brown-Swiss Bulls used in different Countries (all bulls)

	A	CH	F	I	SL	BW	BY	USA
A	337	95	51	98	43	104	154	189
CH		164	24	39	17	39	63	120
F			74	35	21	42	37	57
I				141	37	54	73	102
SL					68	21	28	31
BW						158	91	93
BY							208	86
USA								307

Table 2: Cross-Reference-Table of Brown Swiss Bulls used in different Countries

	A	CH	F	I	SL	BW	BY	USA
birth years 1976 - 1980								
A	94	22	18	29	11	34	41	47
CH		34	8	8	6	8	9	21
F			24	13	4	9	8	22
I				35	4	18	21	22
SL					17	5	5	4
BW						43	27	18
BY							49	11
USA								66
birth years 1981 - 1985								
A	68	20	9	10	6	25	32	33
CH		35	4	6	3	13	20	16
F			16	3	3	10	6	14
I				18	2	8	7	17
SL					10	4	4	6
BW						41	22	28
BY							48	18
USA								60

Table 3: Correlations between breeding values in different countries (Braunvieh)

	USA - BY	I - BY	AUT - BY
Number of common bulls	24	(24)	(27)
Bulls with $r^2_{AI} \geq 0.75$	15	19	24
BV Milk-kg	0.75	0.84	0.86
BV Fat-kg	0.84	0.85	0.86
BV Protein-kg	0.76	0.81	0.84
BV Fat-%	0.93	0.97	0.89
BV Protein-%	0.92	0.93	0.92

Table 4: Conversion factors of Breeding-values between Bavaria and USA, Italy and Austria

Conversion from X to Y		BRAUNVIEH $\bar{x}$	s_x	a	s.e.(a)	b	s.e.(b)
X	Y						
a) Milk-yield (kg)							
USA	BY	269	552	128	58	0.40	0.10
BY	USA	236	279	-97	137	1.58	0.38
Italy	BY	366	323	-44	62	0.77	0.12
BY	Italy	219	297	132	61	1.01	0.16
Austria	BY	553	318	-258	64	0.84	0.10
BY	Austria	191	275	353	41	0.96	0.12
b) Fat-kg							
USA	BY	15.8	23.6	0.9	3.1	0.60	0.11
BY	USA	11.1	15.6	2.0	4.5	1.36	0.24
Italy	BY	17.6	13.5	-5.4	3.3	0.97	0.14
BY	Italy	11.0	14.5	8.0	2.4	0.84	0.13
Austria	BY	32.0	13.7	-24.6	4.5	1.08	0.13
BY	Austria	8.5	15.2	24.4	1.7	0.76	0.10
c) Protein-kg							
USA	BY	10.3	18.8	4.4	2.5	0.45	0.12
BY	USA	8.9	10.3	-1.6	5.0	1.40	0.36
Italy	BY	15.1	10.9	-2.4	2.7	0.83	0.14
BY	Italy	9.9	10.4	6.3	2.3	0.90	0.15
Austria	BY	21.9	9.7	-13.5	3.3	0.99	0.14
BY	Austria	7.7	10.3	15.6	1.4	0.76	0.11
d) Fat-%							
USA	BY	0.03	0.08	-0.06	0.03	2.39	0.29
BY	USA	0.03	0.19	0.03	0.01	0.45	0.04
Italy	BY	0.06	0.14	-0.05	0.01	1.48	0.09
BY	Italy	0.05	0.19	0.03	0.01	0.71	0.06
Austria	BY	0.26	0.17	-0.26	0.04	1.14	0.12
BY	Austria	0.02	0.19	0.23	0.02	0.80	0.09
e) Protein-%							
USA	BY	0.01	0.06	0.01	0.01	1.70	0.21
BY	USA	0.02	0.11	-0.00	0.01	0.58	0.07
Italy	BY	0.05	0.09	-0.03	0.01	1.35	0.13
BY	Italy	0.05	0.12	0.02	0.01	0.72	0.07
Austria	BY	0.14	0.10	-1.12	0.02	1.09	0.10
BY	Austria	0.03	0.11	0.11	0.01	0.86	0.08

Table 5: Correlations between breeding values in different countries (Fleckvieh)

	I - BY	AUT - BY
Number of common bulls	63	108
Bulls with $r^2_{AI} \geq 0.75$	34	91
BV Milk-kg	0.74	0.80
BV Fat-kg	0.80	0.77
BV Protein-kg	0.71	0.77
BV Fat-%	0.87	0.85
BV Protein-%	0.92	0.88

Table 6: Conversion factors of Breeding-values between Bavaria and USA, Italy and Austria

Conversion from X to Y		FLECKVIEH $\bar{x}$	s_x	a	s.e.(a)	b	s.e.(b)
X	Y						
a) Milk-yield (kg)							
Italy	BY	234	266	-81	50	0.82	0.13
BY	Italy	131	264	168	36	0.73	0.12
Austria	BY	329	281	-262	33	1.01	0.08
BY	Austria	74	314	273	18	0.78	0.06
b) Fat-kg							
Italy	BY	9.3	10.9	-2.5	1.9	0.97	0.13
BY	Italy	7.3	14.7	5.0	1.4	0.74	0.10
Austria	BY	20.6	11.9	-13.9	2.0	0.99	0.09
BY	Austria	6.9	14.6	15.5	0.9	0.76	0.06
c) Protein-kg							
Italy	BY	6.0	7.9	0.7	1.5	0.81	0.15
BY	Italy	5.6	8.9	2.8	1.3	0.68	0.13
Austria	BY	12.2	8.7	-7.6	1.2	0.94	0.08
BY	Austria	4.0	9.1	9.1	0.6	0.79	0.07
d) Fat-%							
Italy	BY	0.01	0.17	0.03	0.02	1.26	0.11
BY	Italy	0.05	0.25	-0.02	0.01	0.73	0.07
Austria	BY	0.19	0.17	-0.13	0.01	1.16	0.07
BY	Austria	0.09	0.23	0.12	0.01	0.80	0.05
e) Protein-%							
Italy	BY	-0.04	0.10	0.09	0.01	1.09	0.09
BY	Italy	0.03	0.13	-0.08	0.01	0.89	0.06
Austria	BY	0.06	0.10	-0.03	0.01	1.15	0.07
BY	Austria	0.03	0.12	0.03	0.01	0.84	0.05