AGE AT FIRST CALVING AND THE LONGEVITY OF BEEF COWS

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ABSTRACT

The length of time beef cows spend in production is an important component of the rentability of beef cattle husbandry. In spite of this fact, very few publications have dealt with this trait, either in Hungary or abroad. Therefore the aim of the present study was to evaluate some of the age parameters of beef cows related to the production period. A database of altogether 2115 cows belonging to five breeds (Hungarian Grey, Hereford, Aberdeen Angus, Limousin, Charolais) and two crossbred genotypes (Simmental x Hereford F_1, Simmental x Limousin F_1) born between 1977-1992 was evaluated. Age at first calving (AFC), age at culling (ACU), moreover longevity (LONG) were studied. Longevity is defined as the number of years from first calving to culling. MS Excel and SPSS for Windows 11.0 were used for statistical analyses. The mean values of AFC, ACU and LONG obtained were 2.71, 9.47 and 6.77, respectively. Breed/genotype and birth year had significant influence ($P<0,01$) on each evaluated trait, whereas birth month statistically affected only the AFC. Ages at first calving (AFC) of the different breeds and genotypes were: 3.51, 2.08, 2.76, 2.82, 3.02, 2.03, 2.62 years, respectively. Hereford crossbred and purebred cows were the youngest, whereas Hungarian Grey cows were the oldest at first calving. The values of this trait varied between 2.54 and 2.94 years, depending on birth year. Ages of culling (ACU) of the evaluated breeds and genotypes were as follows: 12.42, 11.09, 11.03, 10.61, 10.89, 12.73, 8.15 years, respectively. The longest life span was reached by Hereford crossbred and Hungarian Grey and the shortest by Limousin crossbred cows. This trait shows a decreasing trend (from 15.35 years to 5.91 years) from the birth year of 1977 to 1992. The longevity values (LONG) of the mentioned breeds and genotypes were: 8.59, 9.08, 8.29, 7.81, 7.91, 10.79, 5.55 years, respectively. Hereford crossbred and purebred cows had the longest, Limousin crossbred cows the shortest productive lives. This trait also shows a decreasing trend (from 12.45 to 3.31 years) in the case of cows born between 1977 and 1992.
Keywords:age at first calving, age at culling, live span, breeds

INTRODUCTION

The age at first calving, the life span and the longevity of cows have great importance in cattle husbandry, especially in beef cow husbandry, because the cost of raising weaned calves depends largely on how early cows calve and how long they remain in production. If cows are productive extendedly and raise more progeny, specific costs of raising per calf decrease proportionally.

In the case of cattle, natural death is by the present time nearly unknown, since the animals are culled at a relatively early age, out of necessity or on a voluntary basis. This is all the more true for beef cows, as after a late winter / spring calving period empty cows are usually culled in the fall. The natural life span of the species is estimated as 30-35 years, but significantly higher longevities have also been recorded. According to *Csukás* (1954), cows may live for as long as 40 years.

The longevity of cows is the time elapsing between first calving and culling and its length is affected both by the age at first calving and by the age at culling. Thus, analysis of these age parameters yields valuable information on longevity. According to *Szabó* (1980), the mean value of the age at first calving of purebred Hereford cows was 31.65-33.31 months, i.e. it varied between 2.63 and 2.77 years. In the case of crossbred Hereford cows the value of the same parameter was 27.55-30.81 months (2.29-2.56 years). *Gáspárdy et al.* (1993) determined the same parameter as 27.33 months (2.27 years). *Ráki and Szajkó* (1986) reported ages at first calving of 35, 34.53 and 35.06 months for Charolais, Limousin and Hereford breeds, respectively.

Ages at first calving are reported by national herd-book societies and the data are compiled in the yearbook annually published by the National Institute for Agricultural Quality Control (*NIAQC*), presenting the results of cattle husbandry. The cumulative data for the years 1998-2003 are shown in *Table 1.*

According to the data shown in the Table, based on the age at first calving of altogether 13651 first-calf cows recorded in the course of the six evaluated years, Hungarian Grey cows calved at the latest age (3.82 years) and Hereford (2.23 years), Hereford crossbred (2.29 years), Galloway (2.30 years), Angus (2.35 years) and Red Lincoln cows (2.44 years) at the earliest age. The ages at first calving of Belgian White-Blue (2.60 years), Simmental (2.64 years), Charolais (2.87 years), Limousin (2,90 years), Limousin crossbred (2.99 years) and Blonde d'Aquitaine (2.88 years) are intermediate between those of Hungarian Grey and British breeds.

The longevity of Simmental x Hereford (F_1 generation) was reported to be 5.6 years (*Nagy and Tozsér,* 1988). *Varga* (1990) studied culling data of the year 1988 of the registered beef cow population and found that the average ages at culling of Hereford, Limousin, Charolais and Hungarian Grey cows were 8.5, 5.9, 7.9 and 10.1 years, respectively. Limousin crossbred cows were removed from breeding at the age of 7.8 years and Hereford crossbreds at the age of 7.0 years. According to *Szabó* (1993), Hereford and Angus cows were culled at the age of around 8 years. *Selymes* (1996) determined the minimal life span of beef cow lines as 8 years but, in his opinion, 10 years would be optimal. The average life span of purebred Hereford, crossbred beef cow and crossbred dairy cow populations was reported as 4.2 years by *Arthur et al.* (1993).

Longevity (in the ordinary sense of the word) is a decidedly weakly heritable trait, whose manifestation is deeply influenced by environmental factors and keeping, feeding and breeding conditions. *Nagy and Takács* (1978) report a heritability of 0.2-0.4, similar to the value described by *Horn* (1995) (0.2-0.3) and Szabó (1998) (0.1), whereas *Rogers et al.* (2004) determined a value of 0.14. According to several authors, there may also be certain differences between the individual breeds.

Consideration of life span and, specifically, longevity plays an important role in practical breeding. The present work summarizes the results of our studies in this field.

MATERIALS AND METHODS

The present study is founded on a database containing pedigrees as well as calving data, made available to us by the breeders' associations. We used the pedigrees of cows born between 1977 and 1992, thus even the youngest individual studied could theoretically have been in production for at least 12 years.

We analyzed the data of altogether 2115 cows of the following breed distribution: Hungarian Grey, 254; Hereford, 98; Aberdeen Angus, 83; Limousin, 491; Charolais, 521; Simmental x Hereford crossbred, 635; Simmental x Limousin crossbred, 33. All crossbreds were of the F_1 generation. Only individuals with complete data sets were included in the analysis. Only the data of individuals already culled were analyzed, in order to be able to determine longevity. Cows of the population studied were culled between 1982 and 2002. Animals could also have been culled before 1982 and the distribution of age at culling in the different years could have been slightly modified by the data of these animals; however, the original database did not contain the data of these animals.

In the course of our analysis, three traits were evaluated: (1) age at first calving (AFC), (2) age at culling (ACU) and (3) longevity (LONG), all of which can be expressed in days, months or years. In order to facilitate comparisons, we calculated ages in years. The age at first calving is the period of time elapsed between the date of birth and the date of the first calving; the age at culling is, naturally, the length of time elapsed between the date of birth and the date of culling, whereas longevity is the period of time elapsed from the date of first calving to the date of culling.

The data were prepared for analysis with the help of the MS Office Excel program and statistical analyses were carried out using SPSS for Windows 11.5. In addition to evaluating the basic statistical parameters (mean, standard error of the mean, standard deviation, maximum and minimum values), the effect of various influencing factors on the variables was represented by generalized linear modelling (GLM).

We also seeked to determine whether or not the month and the year of birth have a statistically significant effect on age at first calving, age at culling and longevity and to what extent these traits are influenced by breed. Our model incorporates as fixed effects the year of birth (yob), the month of birth (mob) and the breed or genotype (b/gen).

The model is described by the following equation:

$$Y_{ijk} = \mu + f_i + e_j + h_k + \varepsilon_{ijk}$$

where

μ is the mean of the population
f is the fixed additive effect of the i-th breed/genotype
e is the fixed additive effect of the j-th year of birth
h is the fixed additive effect of the k-th month of birth
ε is other effects (e.g. the error of the model)

RESULTS

The results of the inclusive analysis of the entire database are summarized in *Table 2.* The average age at first calving for all breeds and genotypes was 2.59±0.65 years, whereas the average age at culling was 10.24±4.08 years. The earliest age heifers could be introduced to breeding was 1.70 years and the latest, 4. 98 years. The oldest cow culled was 21.81 years old and the youngest, 2.28 years old. The average longevity was 7.65±4.04 years; the minimal value of this parameter was 0 years and the maximal value 17.87 years.

Statistical analysis of the raw data revealed that the differences between the groups obtained by classification on the ground of breed/genotype and year of birth were significant ($p<0.01$) for all three traits studied, whereas in the case of groups formed according to month of birth, statistically significant differences were observed only in the case of age at first calving. The results of the analysis are shown in *Table 3.*

The contribution of the individual factors, i.e. breed, year of birth and month of birth to total variance is presented in *Table 4.* According to the data in the Table, breed/genotype was the most determinant factor in the case of age at first calving: its contribution to total variance was 97.85%. Breed/genotype played a much less important role in the case of the other two traits; its contribution was 31.56% and 45.83%, respectively. Total variance was affected by the year of birth in the opposite way: its contribution was only 1.45% for age at first calving but 68.43% for age at culling and 54.66% for longevity. Age at first calving was influenced the least by the month of birth, with a contribution of 0.68% to total variance. In the case of age at culling and longevity it became clear at an early stage of statistical analysis that the differences between the individual groups are independent of the month of birth and may therefore not contribute to total variance.

Values of life span for the different *breeds/genotypes* are summarized in *Table 5.* Data of age at first calving reveal that Hungarian Grey cows took the longest time to raise (3.51 years), followed by Charolais (3.02 years), Limousin (2.82 years), Angus (2.76 years), Limousin crossbred (2.62 years), Hereford (2.08 years) and Hereford crossbred (2.03 years).

The trend of our results is in agreement with the data published by the *NIAQC* (1998-2003), according to which Hungarian Grey cows were the oldest at the age of first calving (3.82 years old), followed by the group comprising Limousin crossbred (2.99 years), Limousin (2.90 years), Charolais (2.87 years) and Hereford crossbred (2.29 years) and, very close together, by Angus (2.35 years) and Hereford (2.23 years).

Based on the results of our own data processing, *age at culling* is the highest for Hereford crossbred cows (12.73 years), slightly preceding Hungarian Grey cows (12.42 years). Hereford (11.03 years) and Angus (11.09 years) are next with nearly identical values, followed by Charolais (10.89 years) and Limousin (10.61 years).

Longevity is the highest in the case of Hereford crossbred cows (10.79 years), followed by the group comprising Hereford purebred (9.08 years), Hungarian Grey (8.95 years) and Angus (8.28 years). The longevities of Charolais and Limousin were close to 8 years (7.91 and 7.81 years, respectively), whereas that of Limousin crossbreds was below six years (5.55 years).

Data of age and life span arranged *as a function of the year of birth* are presented in *Table 6*. The *age of first calving* is relatively independent of the year of birth and the data show little variation, with the lowest value recorded for cows born in 1981 (2.54 years) and the highest for those born in 1977 (2.96 years). In the case of the *age at culling*, a tendency to decrease is observed with the progress of years. The highest age was reached by the animals born in 1978 (15.41 years), whereas those born in 1992 had the shortest lives (5.91 years). The same decrease can be observed in the values of *longevity*: the 1978 generation spent an average of 12.71 years in production, whereas the average value of the same parameter is only 3.31 years for the 1992 age group. For cows born later than 1992 the period studied was of course shorter, but in the case of those born in 1992 there still remained 12 years between birth and the end of data collection. This value, however, is well above the average age at culling, 5.91 years. In the group of cows born in 1992 even the cow culled at the latest age was less than 10 years old.

The explanation for the latter results, i.e. that age at culling and longevity show a decreasing tendency may be that the size of the Hungarian beef cow population has also decreased during the period studied (*Table 7*). Owing to the unfavorable economic position of beef cow husbandry, cow numbers in the herds studied also decreased. Breeders reduced their herds and also culled animals that they would most probably have retained in a situation of boom and expansion.

Data of age and life span *as a function of the month of birth* are listed in *Table 8*. As mentioned above, a statistically significant difference linked to the time of birth was established only in the case of age at first calving. Individuals born in the spring and summer months usually calved at an earlier age than did those born in the fall and winter months. For instance, cows born in April calved at an average age of 2.59 years, whereas those born in December did at an average age of 2.77 years. The difference is 0.18 years, i.e. 2.16 months.

CONCLUSIONS

The conclusions of our analysis generally support the results of earlier studies and practical observations. Namely, our study demonstrates that, in addition to the breeders' decisions, the age and longevity of beef cows are also significantly affected by the breed/genotype and by the environmental effects manifesting themselves in intergenerational differences.

Our results also reveal that there are considerable differences between the individual breeds and genotypes, especially as regards the age at first calving. Among the breeds studied in the present work, Hungarian Grey cows calved the latest, followed by the French breeds. The earliest calvers were the breeds of British origin, and among those, Hereford cows. Our results are also supported, in terms of tendencies, by the official data published by the *NIAQC*. Values of age at first calving in the two data sets only differ by a few months.

As a consequence of differences between ages at fist calving and between ages at culling, differences in longevity also exist. Among the breeds and genotypes studied in this work, the longevity of cows of Hereford linage was the highest, followed by Hungarian Grey, Angus, Charolais and, finally, by animals of Limousin linage.

The ages of culling and longevities of the populations studied exhibit a decreasing tendency over the years. The reason for this most certainly is that the numbers of the overall beef cow population decreased during the period studied, since breeders culled more animals than they would have under more favorable conditions.

It is important to stress that values of the age at introduction to breeding and the age at culling, consequently longevity are predominantly determined by conditions of raising, keeping, feeding and tending as well as by the breeders' decisions. Our results should therefore be considered only as tendencies and they hold only for the populations kept under the conditions studied.

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Table 1. Age at first calving of performance tested beef cows (NIAQC 1998-2003)

BREED(1)	YEAR(2)													
	2003		2002		2001		2000		1999		1998		**Total (5)**	**Mean (6)**
	n(3)	age (4)	n(3)	age (4)	n(3)	age (4)	n(3)	age (4)	n(3)	age (4)	n(3)	age (4)	n	age
Hungarian Grey(7)	554	3.75	265	-	398	3.83	264	3.85	281	3.85	-	-	1762	3.82
Hereford(8)	214	2.41	228	2.22	86	2.47	114	2.24	142	2.00	114	2,08	898	2.23
Aberdeen agus(9)	257	2.45	176	2.16	118	2.16	219	2.41	80	2.58	74	2,37	924	2.35
Limousin(10)	200	2.83	249	2.88	168	2.97	108	3.06	123	3.03	188	2,66	1036	2.90
Charolais(11)	190	2.94	165	2.95	149	2.91	68	2.76	176	2.82	152	2,87	900	2.87
Hereford cossbred F1(12)	233	2.45	259	2.50	352	2.21	273	2.33	399	2.00	423	2,29	1939	2.29
Limousin crossbred F1(13)	629	2.83	505	3.05	486	3.12	439	3.16	415	3.25	474	2,58	2948	2.99
Simmental(14)	554	2.66	324	2.82	408	2.67	383	2.68	582	2.47	742	2,56	2993	2.64
Blonde d'Aquitaine(15)	33	2.91	20	2.80	10	2.90	13	2.92	17	2.91	-	-	93	2.88
Belgian blue(16)	3	2.45	10	2.71	8	2.71	7	2.65	7	2.36	16	2,75	51	2.60
Red lincoln(17)	32	2.45	10	2.37	8	2.28	14	2.59	14	2.53	-	-	78	2.44
Galloway(18)	7	2.05	6	2.05	6	2.82	-	-	6	2.50	4	2,08	29	2.30
Total(19)	2906		2217		2197		1902		2242		2187		13651	
Mean(20)		2.68		2.59		2.75		2.78		2.69		2,47		

Tabelle 1.: Das Erstkalbealter von den produktionskontrollierten Fleischvieh Herden (OMMI 1998-2003)
Rasse (1); Jahr(2); Anzahl den Kühe(3); Alte(4); Total(5); Durchschnitt(6); Ungarische Greuvieh(7); Hereford(8); Aberdeen Angus(9); Limousin(10); Charolais(11); halbblutige Hereford F1(12); halbblutige Limousine F1(13); Ungarische Simmenthal(14); Blonde d'Aquitaine(15); Belgische Blau(16); Red Lincoln(17); Galloway(18); Total(19); Durchschnitt(20)

Table 2. The mean values of the evaluated traits

Denomination(1)	N(2)	mean(3)	std.error(4)	std. deviation(5)	minimum(6)	maximum(7)
Age at first calving(8)	2115	2.59	0.01	0.65	1.70	4.98
Age at culling(9)	2115	10.24	0.08	4.08	2.28	21.81
Longevity(10)	2115	7.65	0.08	4.04	0	17.87

Tabelle 2.:Die durchschnittleiche Werte von den untersuchten Eigenschaften
Namung(1); Anzahl den Kühe(2); Durchschnitt(3); standard Fehler(4); Standardabweichung(5); Minimum(6); Maximum(7); Erstkalbealter(8); Merzenalter(9); nützliche Lebensdauer(10)

Table 3. Reliability of the effects influencing age data

Traits(1)	effects(2)		
	breed(3)	year of birth(4)	month of birth(5)
Age at first calving(6)	**	**	**
Age at culling(7)	**	**	Ns
Longevity(8)	**	**	Ns

** p<0,01

Tabelle 3.: Die Zuverlessigkeit von den Lebensdauer beeinflussenden Effekte
Eigenschaften(1); Wirkungen(2); Rasse(3); Geburtsjahr(4); Geburtsmonat(5); Erstkalbealter(6); Merzenalter(7); nützliche Lebensdauer(8)

Table 4. Distribution of variance components

Effects(1)	traits(2)		
	age at firs calving(3)	age at culling(4)	longevity(5)
Breed and genotype(6)	97.85	31.56	45.33
Year of birth(7)	1.45	68.43	54.66
Month of birth(8)	0.68	-	-

Tabelle 4.:Die Teilung von Varianzkomponenten
Wirkungen(1); Eigenschaften(2); Erstkalbealter(3); Merzenalter(4); nützliche Lebensdauer(5); Rasse und Genotype(6); Geburtsjahr(7); Beburtsmonat(8)

Table 5. Evaluated traits according to breed and genotype

Traits(1)	Breed(2)	n(3)	Age and life-span (year)(4)				
			mean (5)	Std.error (6)	Std. deviation(7)	Minimum (8)	Maximum (9)
Age at first calving(10)	Hungarian Grey(13)	254	3.51	0.03	0.57	2.05	4.98
	Hereford(14)	98	2.08	0.04	0.21	1.75	3.96
	Aberdeen Angus(15)	83	2.76	0.04	0.66	1.70	4.71
	Limousin(16)	491	2.82	0.02	0.39	1.94	4.61
	Charolais(17)	521	3.02	0.02	0.35	1.77	4.89
	Hereford crossbred F_1(18)	635	2.03	0.03	0.07	1.78	2.98
	Limousin crossbred F_1(19)	33	2.62	0.06	0.24	2.13	3.08
Age at culling(11)	Hungarian Grey(13)	254	12.42	0.20	4.99	2.28	21.81
	Hereford(14)	98	11.09	0.34	2.91	2.75	14.88
	Aberdeen Angus(15)	83	11.03	0.36	2.53	3.39	13.67
	Limousin(16)	491	10.61	0.16	4.42	2.31	19.13
	Charolais(17)	521	10.89	0.16	3.02	2.32	18.32
	Hereford crossbred F_1(18)	635	12.73	0.15	3.25	3.03	19.76
	Limousin crossbred F_1(19)	33	8.15	0.53	3.13	2.53	12.65
Longevity(12)	Hungarian Grey(13)	254	8.95	0.20	4.91	0	17.87
	Hereford(14)	98	9.08	0.34	2.86	0.85	10.93
	Aberdeen Angus(15)	83	8.28	0.36	2.67	1.20	11.71
	Limousin(16)	491	7.81	0.16	4.39	0	16.48
	Charolais(17)	521	7.91	0.15	3.06	0	15.45
	Hereford crossbred F_1(18)	635	10.79	0.15	3.25	1.04	17.81
	Limousin crossbred F_1(19)	33	5.55	0.53	3.14	0	10.38

Tabelle 5.:Die Gestaltung von den Eigenschaften nach Rasse und Genotype
Eigenschaft(1); Rasse(2); Anzahl den Kühe(3); Lebenalter,-dauer(4); Durchschnitt(5); Satndarfehler(6); Standardabweichung(7); Minimum(8); Maximum(9), Erstkalbealter(10); Mezenalter(11); nützliche Lebensdauer(12); Ungarische Grauvieh(13); Hereford(14); Aberdeen Angus(15); Limousin(16); Charolais(17); halbblutige Hereford F1(18); halbblutige Limousin F1(19)

Table 6. Evaluated traits according to year of birth

Traits(1)	Year of birth(2)	n(3)	Age and life -span (year)(4)				
			Mean (5)	Std.error (6)	Std.deviation (7)	Minimum (8)	Maximum (9)
Age at first calving(10)	1977	27	2.96	0.07	0.44	2.99	4.96
	1978	37	2.75	0.06	0.57	2.69	4.94
	1979	27	2.77	0.07	0.52	2.78	4.92
	1980	86	2.93	0.05	0.53	2.20	4.98
	1981	127	2.54	0.04	0.47	2.12	4.18
	1982	94	2.71	0.04	0.75	1.82	4.84
	1983	153	2.69	0.03	0.76	1.84	4.93
	1984	107	2.71	0.04	0.67	1.77	4.16
	1985	157	2.59	0.03	0.56	1.84	4.08
	1986	143	2.62	0.03	0.54	1.83	4.12
	1987	137	2.63	0.03	0.54	1.82	4.00
	1988	179	2.67	0.03	0.64	1.81	4.89
	1989	245	2.64	0.02	0.55	1.75	4.71
	1990	264	2.64	0.02	0.56	1.83	4.27
	1991	159	2.61	0.03	0.52	1.70	4.52
	1992	173	2.64	0.03	0.53	1.82	4.45
Age at culling(11)	1977	27	15.35	0.61	5.39	4.86	21.81
	1978	37	15.41	0.53	4.58	6.35	20.80
	1979	27	15.01	0.62	4.69	4.07	19.80
	1980	86	12.72	0.35	4.86	3.11	20.16
	1981	127	13.39	0.31	4.60	2.28	19.46
	1982	94	13.52	0.33	1.91	10.27	19.76
	1983	153	12.07	0.26	3.64	3.32	18.72
	1984	107	11.78	0.31	3.76	2.61	17.78
	1985	157	9.82	0.25	3.27	2.79	16.85
	1986	143	10.22	0.26	3.15	2.31	16.28
	1987	137	9.45	0.27	2.74	2.93	14.90
	1988	179	8.66	0.24	2.93	2.53	14.13
	1989	245	8.13	0.21	2.73	2.73	13.07
	1990	264	7.67	0.20	2.28	2.32	12.03
	1991	159	6.71	0.25	2.02	2.67	11.10
	1992	173	5.91	0.25	1.74	2.74	9.97
Longevity(12)	1977	27	12.45	0.61	5.59	0.95	17,84
	1978	37	12.71	0.53	4.58	2.40	17.87
	1979	27	12.29	0.62	4.75	0	16.79
	1980	86	9.85	0.35	4.79	0	15.34
	1981	127	10.88	0.31	4.47	0	16.48
	1982	94	10.85	0.33	2.15	6.51	17.81
	1983	153	9.43	0.26	3.73	0.58	16.81
	1984	107	9.13	0.31	3.88	0.13	15.81
	1985	157	7.28	0.25	3.49	0.32	14.92
	1986	143	7.63	0.26	3.13	0	13.81
	1987	137	6.87	0.27	2.95	0	12.81
	1988	179	6.03	0.24	3.18	0	11.81
	1989	245	5.52	0.21	2.84	0	10.81
	1990	264	5.07	0.21	2.38	0	9.81
	1991	159	4.12	0.25	2.22	0.16	8.88
	1992	173	3.31	0.25	1.87	0.18	7.83

Tabelle 6.:Die Gestaltung von den Eigenschaften nach Geburtsjahren
Eigenschaft(1); Geburtsjahr(2); Anzahl den Kühe(3); Lebensalter,-dauer(4); Durchschnitt(5);Standardfehler(6); Standardabweichung(7); Minimum(8); Maximum(9); Erstkalbealter(10); Merzenalter(11); nützliche Lebensdauer(12)

Table 7. Cow numbers in Hungary

Year(1)	Beef type(2)	Dual purpose(3)	Dairy type(4)	Total(5)
	tuousand(6)			
1972	-	761	-	761
1975	56	693	11	760
1980	73	438	191	692
1985	101	277	310	688
1990	75	161	394	630
1991	66	140	354	560
1192	48	124	325	497
1193	38	110	302	450
1194	24	101	290	415
1995	25	92	304	241
1996	24	86	304	414
1997	20	80	303	403
1998	19	84	304	407
1999	20	79	300	399
2000	21	77	292	390
2001	22	76	282	380
2002	24	71	280	375
2003	39	45	253	337

Tabelle 7.: Die Nummer von Kuhstand in Ungarn
Jahr(1); Fleischtype(2); Dualtyp(3); Milchtyp(4); Total(5); in Tausend(6)

Table 8. Evaluated traits according to month of birth

Traits(1)	Month of birth(2)	n(3)	Age and life -span (year)(4)				
			mean (5)	Std.error (6)	Std. deviation(7)	Minimum (8)	Maximum (9)
Age at first calving(10)	1.	91	2.75	0.04	0.48	2.20	4.61
	2.	224	2.64	0.03	0.42	2.13	4.21
	3.	488	2.67	0.02	0.67	1.77	4.98
	4.	825	2.59	0.02	0.55	1.83	4.96
	5.	177	2.66	0.02	0.69	1.75	4.90
	6.	92	2.61	0.03	0.98	1.93	4.22
	7.	69	2.64	0.04	0.23	1.99	3.53
	8.	38	2.77	0.06	0.32	2.05	3.84
	9.	17	2.74	0.08	0.63	2.25	4.08
	10.	24	2.77	0.07	0.61	1.75	4.52
	11.	31	2.73	0.06	0.51	1.70	4.12
	12.	39	2.77	0.06	0.31	1.94	3.38
Age at culling(11)	1.	91	11.07	0.35	4.46	2.28	21,00
	2.	224	11.01	0.24	4.41	2.53	20.87
	3.	488	10.14	0.17	4.51	2.31	21.81
	4.	825	10.96	0.17	3.57	2.75	20.77
	5.	177	11.10	0.25	4.02	2.67	20.63
	6.	92	10.64	0.33	4.83	3.29	20.58
	7.	69	10.47	0.39	3.79	2.73	16.93
	8.	38	11.29	0.51	3.52	2.93	18.49
	9.	17	10.87	0.74	4.06	3.16	15.57
	10.	24	10.77	0.63	2.84	4.34	13.75
	11.	31	11.53	0.57	3.16	3.24	13.69
	12.	39	10.51	0.51	2.67	2.88	15.35
Longevity(12)	1.	91	8.31	0.35	4.43	0	17.75
	2.	224	8.36	0.24	4.39	0	17.78
	3.	488	8.47	0.18	4.39	0	17.87
	4.	825	8.36	0.17	3.54	0	17.77
	5.	177	8.43	0.25	3.88	0	16.88
	6.	92	8.04	0.33	4.68	0	16.96
	7.	69	7.82	0.39	3.84	0	14.26
	8.	38	8.57	0.51	3.52	0	15.89
	9.	17	8.12	0.74	4.22	0.67	13.26
	10.	24	7.99	0.63	2.81	0.62	11.23
	11.	31	8.79	0.57	3.29	0.16	10.70
	12.	39	7.73	0.51	2.71	0.39	12.53

Tabelle 8.:Die Gestaltung von den Eigenschaften nach Geburtsmonat
Eigenschaft(1); Begurtsmonat(2); Anzahl den Kühe(3); Durchschnitt(5); Standarfehler(6); Standardabweichung(7); Minimum(8); Maximum(9); Erstkalbealter(10); Merzenalter(11); nützliche Lebensdauer(12)