The Hungarian Grey cattle: a traditional European breed

L. Bartosiewicz

Institute of Archaeological Sciences, Loránd Eötvös University, H-1088 Múzeum körút 4/B, ***Budapest****, Hungary*

Summary

In this paper, the Hungarian Grey, a traditional draught and beef cattle was studied. This breed was threatened by extinction due to the mechanization of agriculture and propagation of upgraded breeds which had almost completely replaced it. Following a crisis in the 1960's (in 1966 only 470 dams were registered) a pioneering conservation scheme was introduced. Thanks to scientific breeding, the number of cows increased to approximately 1 600 and the risk of inbreeding has been avoided. In addition to a historical review, body conformation, production characteristics and modern forms of exploitation for this rare but genetically valuable breed are discussed.

Resumen

Se ha estudiado el Gris Húngaro, una raza bovina tradicional de tiro y carne. Este tipo de ganado fue amenazado por extinción debido a la propagación de motocultura y razas mejoradas desplazando casi su población entera. A partir de la crisis de los años 60 (470 vacas fueron registradas en 1966) se implantó un plan piloto de protección. Gracias a la cría científica existen aproximadamente 1 600 vacas se ha evitado el riesgo de consanguinidad. Además de una revista histórica se trata la conformación, características de producción y posibilidades de explotación moderna de esta raza rara y de gran valor genético.

Key words: *Hungarian Grey cattle, Conservation, Mechanization, Domestication*

Introduction

The *Podolian* type of grey cattle was widely distributed in Eastern and Southeastern Europe between the Ukraine and Italy. The Hungarian Grey (HG) has emerged as a highly bred form that dominated stocks in the Carpathian Basin during the last centuries. Its dramatic decline and successful conservation is not only an object lesson in the management of gene reserves. It also illustrates the impact of history and economy on general attitudes toward domesticates.

Breed History

Several factors interacted during the evolution of this breed, although the extent and probabilities of their contributions differ. Speculations may be sub-divided into two main groups.

Local domestication

The idea that this cattle descended directly from aurochs (*Bos primigenius* Boj, 1827) was raised by, among others, Charles Darwin (1959). The ancient breeds Heinz Heck chosen for his reconstruction of aurochs included HG (Heck, 1952). Jankovich (1967) hypothesized that it was domesticated in medieval Hungary by '*venatores bubalinorum*' known from 13th century documents. He interpreted this term as meaning catchers of 'bubalus-calves', i. e. the offspring of aurochs. By that time, however, aurochs remains were rare at archaeological sites in Hungary (Bartosiewicz, 1996). Consonant osteometric data (Matolcsi, 1970; Bökönyi, 1974) show that

most 10-13th century cattle in Hungary were small, brachyceros type animals (withers height ca. 110 cm) with no transitional forms indicative of ongoing local domestication. The medieval impact of aurochs genes, however, cannot be entirely ruled out.

Migrations and trade

It has been suggested that the ancestors of HG cattle were brought by conquering Hungarians from the areas northeast of the Carpathians during the 9th century (Tormay, 1901; Hankó, 1936) or during the latest, 13th century waves of eastern migrations (Matolcsi, 1975) or, actually, anytime in between. Tenth century Hungarians regularly raided areas in Italy as well as Germany and may have brought such animals from the southwest (Ferencz, 1976). Commercial imports of such cattle from Italy during the 14th century Anjou rule in Hungary have also been hypothesized. Finally, the question must also be raised whether it was HG which was exported to Italy within the framework of envigorated trade links giving rise to similar breeds there.

A 1526 document mentions Hungarian cattle as having been introduced (*sic!*) to the Augsburg market (Takáts, 1927), although written evidence for westward exports is known from the mid-14th century (Miskulin, 1905). Explicit reference to long-horned, '*magnus cornuotes boves Hungaricos*', however, first appears only in a 16th century document (Milhoffer, 1904) when exports indeed culminated (Bartosiewicz, 1995b).

Huge late medieval stocks, potentially originating from all the aforementioned sources, provided an excellent basis for selection. Market driven, target-oriented breeding possibly played a decisive role in consolidating a trademark appearance which became *de facto* common by the 17-18th century (Bartosiewicz, 1996). Prior to World War I, breeding stock was exported to the Balkans where it was used in upgrading local grey cattle (Mattesz, 1927).

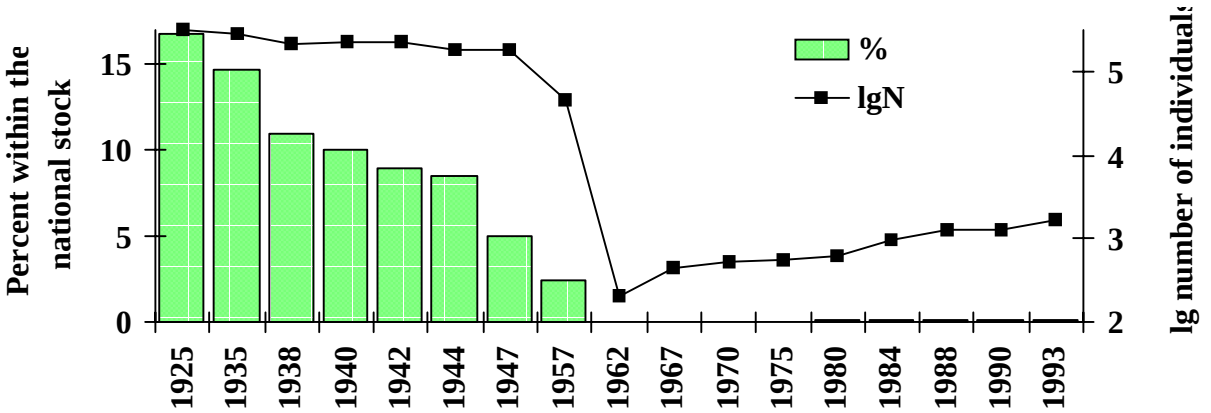
Population Statistics

While in 1884, 78 % of the 4.9 million cattle in Hungary were registered as HG (Mattesz, 1927), exactly half of the 6.7 million stock belonged to this breed at the turn of the century (Tormay, 1901). By 1911, this proportion fell back to 30 % (Bodó, 1987) due to the introduction of industrial crop-rotation that outcompeted extensive pasturing and to urbanization that increased demand for milk (Szöllõsy, 1994), better satisfied by Fleckvieh.

Following World War I, Hungary lost two thirds of its territory which makes the precise appraisal of the contribution of this breed difficult. Figure 1 shows that the radical decline in the remaining, central area continued. By 1925, the 321 000 HG cattle represented only 16.8 % of the national stock. Transylvania, an important breeding region, lay way beyond the new borders. Thus, the renowned Hortobágy plains became of pivotal importance. After World War II a radical decline followed (see the logarithmic tranformations in figure 1).

The 'elbow' seen in the 1947-1967 interval indicates near-extinction. The mechanization of tillage was inevitable in large, centrally established cooperatives. Draught exploitation, became irrelevant. Most HG cattle were slaughtered. During the late 1950's, some 1 800 of the 2 000-3 000 cows were mated with sires of the Kostroma dairy breed (Schandl, 1962). According to a 1962 central resolution only 200 purebred HG cows and 6 bulls were saved (Bodó *et al.*, 1996). In the face of this official initiative there were brave grass-roots efforts to save animals from culling or crossing, often illegally. Although the 1962 numbers would have been insufficient for maintaining genetic diversity, Hungary won an internationally acclaimed pioneering position in the conservation of ancient breeds (Alderson, 1989; Grünenfelder 1994). The scientific evaluation of conformation and performance was begun by Imre Bodó (1968). Inbreeding was avoided by using a rotational mating scheme of originally inbred lines (Bodó, 1990) based on six local HG sires, two imports of the same breed and three Maremman sires introduced during the

Figure 1. Changes in the contribution of Hungarian Grey to the cattle stock after World War I



early 1970's. After 7-9 generations, the initial lines became completely randomized (Bodó, 1996). Quantitative recovery is shown in official statistics (Table 1).

HG bones (including 18 complete skeletons) kept in the Hungarian Agricultural Museum (HAM) originate from 74 individuals, mostly slaughtered in 1963. This unique collection is an important source of osteological information (e. g. Matolcsi, 1970; Bartosiewicz, 1984; Bartosiewicz *et al*., n. d.) and often includes complementary data on the animals.

Table 1. The recovery of Hungarian Grey breeding stock relative to the 1962 official figures. (Raw data: Bodó et al.*, 1996:)*

Year	Dam	Sire	Increase (%)	Cumulative (%)
1962*	200	6	0	100.0
1966	470	12	133.9	233.9
1970	500	19	7.6	251.9
1975	550	20	9.8	276.7
1980	600	25	7.8	303.4
1982	800	30	32.8	402.9
1984	900	35	12.7	453.9
1986	1 000	40	11.2	504.9
1988	1 200	50	20.1	606.8
1990	1 200	55	> 0.1	609.2
1992	1 500	60	24.3	757.3
1994	1 600	70	7.1	810.7

* Official directive

Physical Characteristics

In rare breeds, special attention is paid to stabilizing external traits which are manifestations of the traditional form targeted by conservation efforts.

Colour and horns

This breed has alternately been called 'Hungarian White / Silver' or referred to by the vernacular term '*crane-coloured*' (Tormay 1901). While light coats are not preferred by modern breeders, animals occur in all shades of grey. Bulls have dark, 'smokey' markings especially in the front quarters and around the eyes. In adults the horns' tips are black, their lower portions white. The muzzle, eyelashes and claws are black. Calves are born reddish and turn grey at six months.

The present horn conformation probably resulted from long and meticulous selection. The attention devoted to the impressive horns is reflected by a complex terminology.

One hundred and seventy-two such expressions recorded by Herman (1914)

include *shacko*, *tulip* and *forked*, to name only a few descriptive ones. Long and slender, symmetric horns separated by a broad intercornual ridge are traditionally considered a sign of good constitution (Tormay, 1901). While shapes may vary (Bodó ed. 1991), horns must be at least as long as the head in bulls. In cows, a minimum of 1.5x skull length is required. Horn dimensions taken in the HAM collections are summarized in table 2.

Horn cores provide the only osteological evidence for early HG cattle. While Matolcsi (1975) made a passing reference to early medieval cattle finds of comparable, *primigenius* cranial type from the area of the former Soviet Union, to date the longest intact horn core of relevance in Hungary is known from the excavations of 17th-19th century Kecskemét (Table 2; Bökönyi 1974). The horn sheath measured almost 60 cm along its lateral curvature.

Body conformation

Traditionally, emphasis was laid on draught exploitation (Bodó 1990). Large size and long legs have been a priority over early maturation in the selection for draught cattle (Wijngaarden-Bakker 1979). As is often the case with traditional breeds, sexual dimorphism is pronounced in both size and body proportions (Figure 2). Bulls have stronger forequarters, larger dewlaps and more robust horns than cows. Oxen are more gracile than bulls and have longer horns.

Bodó (1987) distinguished four types within this breed. Their basic body dimensions are summarized in table 3. The small 'primitive' and 'fine' types have been most endangered. Following World War II the so-called 'large estate' type has been most widely distributed and is best represented by the HAM sample (originating mostly from the Hortobágy and Ohat state farms; cf. table 6). The museum sample of horns must be somewhat biased by selection for 'trophies': several skulls were collected for the sake of well, developed, spectacular horns.

Exploitation

Between the world wars, a widely advocated way of modernizing HG was the development of a triple-purpose breed. There was not, however, enough time for combining three differing sets of traits within a homogeneous, purebred population. First draught exploitation disappeared, then even dual-purpose Fleckvieh lost ground to specialized breeds.

Draught

Traditionally, HG yearlings designated for draught were castrated during the spring

Table 2. Means and standard errors (cm) of measurements taken on complete horns in the collections of the Hungarian Agricultural Museum and the 17th-19th century horn core from Kecskemét

	Cow (n = 16)	Bull (n = 4)	Ox (n = 7)	Kecskemét (17th-19th century)
Horn core				
Lateral length	51.9±1.6	42.0±4.4	64.1±2.6	42.7
Base circumference	21.6±0.4	23.9±0.5	27.8±1.2	26.6
Distance between tips	83.5±3.6	86.8±4.1	102.5±6.2	-
Horn sheath				
Lateral length	68.4±1.9	50.3±5.5	82.3±3.2	59.2*
Base circumference	24.7±0.4	26.9±0.4	31.4±1.2	-
Distance between tips	97.5±6.3	95.3±4.8	117.7±9.6	-

* Estimated on the base horn core lengths (r = 0.844***; Bartosiewicz 1995a)

Figure 2. A high degree of sexual dimorphism is characteristic of the Hungarian Grey cattle (After Bökönyi, 1974)

(Nagyváthy, 1821-1822). Typically, oxen worked between the 4-14th years of their lives (Schandl, 1962). HG oxen, however, could be used for longer than other breeds even on a meager forage (Bodó, 1973).

The 4.8-5.1 km/h speed cited for HG draught oxen was a normal speed for humans who often walked in front of the oxen when there was no marked way ahead (Viires, 1973). Ploughing 14 cm deep 23 cm wide furrows was possible at a speed of 2.8-3.3 km/h (Tormay, 1901). Depending on soil quality, the *per diem* areal performance reported for HG oxen ranged between ploughing 0.28 and 0.43 hectares (Varga, 1872). HG draught oxen often worked 270 days a year (French *et al*., 1967) in contrast to the 60-70 days recorded in Russia at the turn of this century (Langdon, 1986).

Beef

HG cattle mature late and deposit relatively little fat. Only sporadic data are available on fattening characteristics. The 1526 Augsburg document praised Hungarian beasts as '*die pesten Ochsen*' (Takáts, 1927), but objective grading of beef has yet to be carried out. Some lines in modern HG cattle certainly show potentials of superior beef production (Figure 3). Visual inspection shows that the meat itself is dark and not particularly marbled since most of the suet forms subcutaneous and intestinal fat deposits.

Traditionally, beef production could be combined with draught exploitation by fattening working oxen at a relatively young age. At the end of the last century, ADG values recorded for such oxen ranged between 650-1 100 g (Tormay 1901). The lack of consistent recording, however, limits compatibility even between existing data. This would be all the more important, because the culling of draught oxen has been replaced by fattening young steers. Table 4 shows sporadic data (Tormay 1901; Schandl, 1962; Bodó *et al*. 1996) complemented with data for the closely related Maremman cattle (Lucifero *et al*., 1977). Although this latter is a larger and more robust breed than HG, its data clearly illustrate the differences between fattening animals of comparable type but different ages. While dressing percentages are in practice missing, the weights of six skeletons were recorded in the HAM (Table 5). On average, they weigh less than 7 % of the live weight illustrating a fine skeletal make-up.

In 14 herds published by Wellmann (1926), weaning weight averaged 132.5±11.6 for 6.5 month calves of HG dams of a mean live weight of 549.4±12.2 kg. These relatively small figures should be seen in the light of

Table 3. Body dimensions of mature Hungarian Grey cattle. Shading indicates correspondence between production types and the parameters museum sample (After Tormay, 1901; Schandl, 1962; Bodó, 1987).

Measurement	19th century range	Modern standard	Main Types				Hungarian Agricult. Museum*
			Primitive	Heavy draught	Fine ("dairy")	Large estate	
Cow							n = 51
Live weight, kg	-	540	300-400	600-700	400-500	500-600	413±8.9
Horn circumference, cm	-	-	16.5-17.5	19-21	17-18	18-20	21.6±0.4
Head length, cm	50-54	52	-	-	-	-	50.8±0.5**
Frontal breadth, cm	21.2-23	24	-	-	-	-	24.5±0.3**
Heart girth, cm	171-218	196	175-190	210-230	185-195	195-210	184±1.2
Chest width, cm	36-47	41	-	-	-	-	-
Chest depth, cm	-	72	-	-	-	-	-
Withers height, cm	127-155	135	120-125	145-155	125-130	135-140	135±0.7
Trunk length, cm	153-165	161	140-150	160-180	140-150	150-170	153±0.9
Rump width, cm	39-48.5	46	-	-	-	-	44.6±0.3**
Rump length, cm	-	52	-	-	-	-	-
Shank circumference, cm	-	19	-	-	-	-	19.7±0.1
Bull							n = 2
Live weight, kg	-	800	600-700	950-1050	700-800	800-950	829-835
Horn circumference, cm	-	-	19-21	23-25	21-20	22-23	26.9±0.4
Head length, cm	52-57	56	-	-	-	-	-
Frontal breadth, cm	25-33	31	-	-	-	-	-
Heart girth, cm	170-230	214	200-220	230-250	200-220	220-230	229-232
Chest width, cm	40-54.5	48	-	-	-	-	-
Chest depth, cm	-	77	-	-	-	-	-
Withers height, cm	130-158	146	130-140	155-170	135-145	145-155	151-154
Trunk length, cm	151-183	179	150-160	180-190	155-165	175-185	179-185
Rump width, cm	42-52	48	-	-	-	-	-
Rump length, cm	-	56	-	-	-	-	-
Shank circumference, cm	-	23	-	-	-	-	21-25

*Mean±SE for horns and cow dimensions in the Hungarian Agricultural Museum
** n = 35

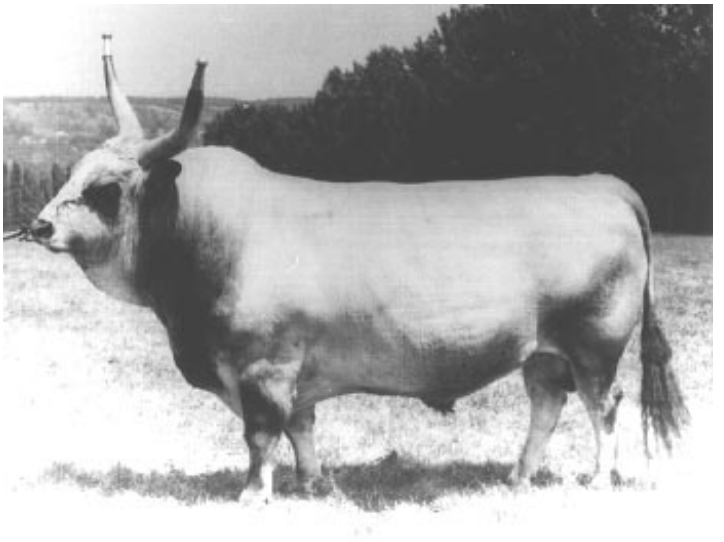


Figure 3. The 'Mérges' bull showing that genetic diversity within the Hungarian Grey breed can even be a basis for developing a beef population

easy calving. More recent birth weights of some HAM specimens (1950's) averaged 38 kg for male calves and 35 kg for females. These relatively high values may result from the non-random nature of the museum sample. Easy calving is combined with usually favourable fertility parameters and longevity of cows (9-10 calves in 10-12 breeding years). The record dam lived for 32 years (Bodó *et al.*, 1996).

Dairy

Data on systematically milking HG cows were already recorded at the beginning of the last century (Bodó *et al.* 1996). The small and hairy, '*range*' udders of cows, however, show that in spite of renewed efforts, the average breeder has not assertively improved dairy production. This traditional breed usually

Table 4. Compilation of fattening data for Hungarian Grey and Maremman steers

Breed / source	n	Initial (kg)	Final (kg)	Interval (days)	ADG (g)	Dressing (%)
Draught oxen (Tormay)	300	554	680	148	810	-
Draught oxen* (Tormay)	204	533	646	143	790	-
Oxen (Tormay)	533	-	-	237	630	-
"Young" oxen (Tormay)	-	630	726	130	740	-
"Old" oxen (Schandl)	-	-	-	270	700-900	
Bulls (Bodó *et al.*)	7	269	536	300	891	(58.0)
Maremman Group AI	-	295	546	238	1 056	57.3
Maremman Group AII	-	281	506	236	954	56.8
Maremman Group BI	-	280	546	273	974	57.0
Maremman Group BII	-	224	476	307	821	56.4

*"in sandy regions"

Table 5. The absolute and relative weight of bones in some adult Hungarian Grey cows and bulls in the collections of the Hungarian Agricultural Museum (Hortobágy State Farm)

Name	Age (years)	Live weight (kg)	Skeletal weight (kg)	Bone (%)
Cow				
Meggyes	7	360	20.6	5.7
Arany	6	500	32.7	6.5
Szemes 2	9	430	33.0	7.7
Táncos	15	544	35.6	6.5
Mean±SE	9.3 ± 2.0	454.5 ± 40.4	30.5 ± 3.4	(6.6)
Bull				
Buda	12	-	64.5	-
Anonym	2	560	32.1	5.7

produces 800-1 000 kg milk annually (Schandl 1962). Improving milk production was regarded as the key to the last-minute modernization of this breed.

The average milk production of almost 700 cows presented in table 6, was 1 762±0.3 kg during 232±0.2 days of lactation. The amount of butterfat produced during this period corresponds to 4.5-4.6 %. Even better results are shown by some individuals in the HAM (Table 7).

Other

One more traditional form of direct exploitation is worth mentioning: the manufacturing of large horn sheaths into

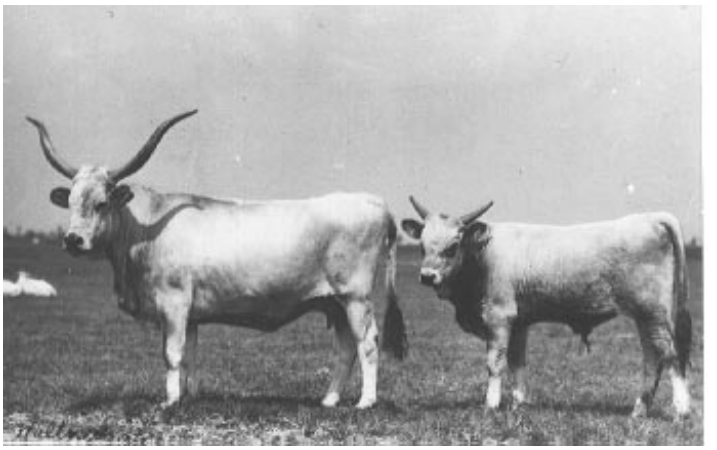


Figure 4. Hungarian Grey dam and bull calf (Photo B. Waltner)

Table 6. Milk production statistics of Hungarian Grey cows at the Hortobágy (I) and Hosszúhát (II) State Farms (Raw data: Bodó et al *1996)*

	n	n	Days of lactation		Milk (kg)		Fat (kg)	
State farm	I	II	I	II	I	II	I	II
1952-1953	64	-	227	-	1 530	-	71.2	-
1953-1954	128	50	231	189	1 600	1 611	72.6	70.4
1954-1955	126	49	239	232	1 893	1 733	83.3	81.3
1955-1956	117	60	247	247	1 929	1 963	86.0	93.0
1956-1957	102	-	228	-	1 730	-	78.8	-
Weighted means±SE	537	159	235 ± 0.3	224 ± 1.9	1 757 ± 7	1 781 ± 12	79 ± 0.2	82 ± 0.7

decorative objects. The removal of large horns by craftspeople may have reduced the survival rate of large horn cores in archaeological deposits. Given a reasonable market demand, artisans could make use of this exquisite raw material even today (Chartier *et al*. 1986).

Cattle were prominent symbols of status, affluence and even masculinity throughout the history of civilization (Bartosiewicz, 1996). Recently, the HG breed has been exploited for this most ancient product, image, for commercial and even ideological purposes. Preoccupation with the breed's origins shows that this animal has remained strongly bonded with cultural identity in Hungary, fostering an attitude that has helped its survival in modern times.

The conservation of HG cattle contributes to the maintenance of genetic diversity in domesticates. Its long-term impact on sustaining productivity in animal husbandry is a crucial point that needs no special emphasis in this publication.

Conclusions

This century witnessed a sharp decline and rather spectacular recovery in HG cattle. The increasing popularity of Fleckvieh, the geopolitical isolation of breeding stocks and the mechanization of agriculture each undermined the dominant position of this breed.

Conservation and crossings

HG provided a maternal line in several crossings. Upgrading efforts frequently involved dairy breeds such as Montafon and Kostroma cattle (Zólyomi 1931; Magyari 1958). The creation of Hungarian Fleckvieh was the only lasting success along this line. While further eroding the purebred stock, most crosses were no match for single purpose dairy breeds that produce quantities of low fat consumers' milk. The rich milk of HG dams, however, should be regarded as an asset in range farming. Other merits of this breed are also related to reproduction. They include easy calving, good maternal behaviour and the resistance of animals to disease that make extensive management with minimal human assistance cost-efficient (Figure 4).

The extinct Transylvanian form of this breed was stockier and thus better suited for beef production. The first importation of Maremman sires in 1934 was also inspired by the recognition that the merits of HG cattle can be best exploited in range management (Bodó *et al*., 1996) and that the breed's traditional characteristics should be upgraded. Genetic effects of the next wave of Maremman crossings during the 1970's were slowly eliminated as the risks of inbreeding declined and purebred conservation became a priority. Following a genetic bottleneck, the

Table 7 - Milk production statistics of individual Hungarian Grey cows in the collections of the Hungarian Agricultural Museum (Hortobágy State Farm)

Name	Age (years)	Live weight (kg)	Meat weight (kg)	Days of lactation	Milk (kg)	Fat (%)
Pöszi	11	475	204	201	1 176	5.0
Csendes	15	393	161	205	1 205	4.4
Boglár	9	350	146	126	1 301	4.3
Páva	9	386	163	300	1 736	5.0
Lárvás	11	492	242	236	1 896	4.2
Csibi	10	495	-	262	2 470	4.2
Amália	-	486	215	222	2 138	4.3
Szárcsa	10	400	-	300	2 168	4.9
Szajkó	12	443	-	300	3 215	4.5
Mean±SE	10.9 ±0.7	435.6 ±18.1	188.5 ±15.3	239.1 ±19.4	1 922.8 ±222.7	-
Adó*	-	650	-	300	3155	5.0

*Ohat State Farm (Schandl 1962)

present population is stable and inbreeding can be avoided. The HG breed has become an adequate genetic reservoir for the future.

Future perspectives

In addition to the breeders' culturally idiosyncratic concept of how animals 'should look' (Kroeber and Richardson 1940), stocks are continuously adapted to changes in historical and economic situations. As Györffy (1983) wrote at the turn of the century: "The types of people and animals that were destroyed by river regulations will never be brought back. The fiery herdsmen and fiery [grey] cattle will never return!"

However, there are new perspectives in marketing that improve the economic viability of the breed beyond its mere survival as a gene reserve. When appropriately promoted, the rich, venison-type meat of HG cattle (specially grown 'organically') could become a sought after upmarket product. While demand for such delicacies will probably shrink in present day Hungary, supervised commercial crossings may increase the efficiency of beef production as is the case with, for example, Texas Longhorn sires in crossings aimed at lowering the incidence of dystocia (Garrett *et al.* 1982). In this regard, commercial crossings between HG and Charolais cattle have proven to be most promising.

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