GENETIC RESOURCES AND THEIR MANAGEMENT IN HUNGARY

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INTRODUCTION
Since the 1980 FAO conference in Rome, the preservation of domestic animals has been more and more popular all over the world. The most important argument for the preservation of the breed threatened was that it would not be possible to resuscitate them after extinction if the human society probably should need their products again. A narrow sex ratio, a rationalized mating system, composition of lines and families, using the results of immunogenetics and molecular genetics are the most important components of breeding activity of conservationists. The financing of non-commercial breeds can be based either on governmental subsidies (e.g. in France or Hungary), or directly by the society (e.g. UK, the Rare Breeds Survival Trust). To emphasize the special importance of maintaining genetic resources, the Agricultural Quality Control Institute supervises this activity in Hungary. The recent development, however, shows the increasing demand of the market for special products.

GENETIC RESOURCES

Hungarian Grey cattle. The origin of the Hungarian Grey belonging to the breed group of Podolic cattle is not quite clarified. A couple of decades ago the opinion still generally prevailed that the Hungarian conquerors brought the breed with them at the time of the conquest of the Carpathian Basin in the 9th century (Hankó, 1952). Recent archeological research has proven otherwise. The Podolic cattle breeds inhabit a range from Altai mountains through the Ukraine and the Carpathian Basin down to Southern Italy. The reddish colour of the new-born calves, the grey hair of the mature animals, the darker shade of the males are common to the breed group. The “long horned bullock with its martial bearing” driven on foot to Western Europe from the Hungarian Puszta did rank among the world trade marks. The primary market was Vienna but the Hungarian herds got as far as Nürnberg, Strassburg and Venice. However, a permanent and deep decline in the Grey population has been caused by constant wars, by the customs and monopolism. The population size decreased, at the end of 1940’s there were some 5% cattle left in the cattle stock of the country. After the second World War the need for animal power decreased to a minimum because of mechanization of agriculture and the maintainence of the breed was limited to the preservation of genetic resources. The population size was reduced to 160 cows in the sixties. After that an increase was generated due to the utilization of pastures of National Parks and other pastures by the private breeders, and it was supported by permanent governmental subsidies.

Hucul horse. The Hucul horse was bred by the Huculs in the East-Charpats. Its low size (height at withers 130-150 cm), thin and strong bones excellently adapted to the harsh, extreme environment of the mountains. The breed quiet, unassuming, irrespective of its high working performance. The Hucul possibly originated from crossings the Taki and the Tarpans. In the
past centuries, it was crossed by Lipitzaner and Anglo-Arabian horses. At one time the breeding was supervised by the army, then it was abandoned. It survived in the hands of farmers.

**Racka sheep.** In both Egyptian and Mesopotamian paintings, the representation of sheep with laterally protruding, twisted horns and long tail can be found, presumably the one-time descendants of *Ovis vignei arkal* or *Ovis ammon arkal*, i.e. the wild sheep of Southeast Asia. (Dunka, 1984). These wild sheep are believed to have been the ancestors of the Hungarian Racka. The special characteristics of the sheep is the long tail, multicoloured fleece, nicely curling coat, and characteristically straight, longitudinally twisted horns protruding at an angle. The breed grows fast and matures early. Following a suckling period of 50-60 days ewes are capable of producing 50-70 litres milk even in low-yield pasture. The hoofs are very firm and not susceptible to paranthium. The Hungarian Racka population, which was the dominant breed until the 18th century, began to decline in number from cca. 3 million to 5 thousands nowadays. (65:35 white and black variety). The breeding of Merino was preferred for its wool production, and the wool became the most profitable commodity in the 19th century.

**Mangalica pig.** The Mangalica was developed by crossing the pig of Avarian, Celtic and Hungarian origin with the Serbian origin of Sumadia pig between 1750 and 1850, in Hungary. Its body is short, cylinder form with short legs. The hair is curly. Three colour varieties are known: blond, red and swallow-bellied. The sows produced 6-8 piglets per farrowings. The breed was unassuming, good grazing. For 100 years it was the best fat pig in Europe. The fattening performance was excellent, by 12 month of age it reached 160-180 kg, the killing out percentage was 80-90%, with 60-65% fat. It produced more income for the country than all the other species together. As the consumer preference changed, by 1970 the breed almost disappeared, the number of sows was 154.

**Bronze turkey.** The turkey was introduced in Hungary around 1590. The intensive selection resulted a sound conformation, resistant and economically viable breed. It can be kept in extensive environment where it searches for food all year round. It lays 25-40 eggs per year. After the 1950s with the large scale poultry farming, the Bronze turkey became overshadowed, and maintained in village backyards only.

**MANAGEMENT AND RESEARCH**

**Hungarian Grey cattle.** In Hungarian Grey breeding the pedigrees are going back only to the first years of the State farms established after World War II (1948-1952). The older herd books were annihilated. The best first bulls established genealogical lines (i.e. the origin in paternal side), from which 6 remains up to now. Through some generations the rotation of lines was a good method for avoiding inbreeding, but now it is not useful any more. To establish new genealogical or breeding lines based either upon inbreeding on a good bull or the fixation of some morphological traits is the task of the near future. The parentage control by blood groups and other polymorphisms is obligatory in preservation policy. The bulls serving together in a herd of cows are selected according to their different blood factors in order to separate their descendence in higher percentage. The knowledge and maintainance of rare immunogenetic factors is used for decreasing the damaging effect of genetic drift. The breeding is controlled.
by the Hungarian Grey Association. Nowadays the number of purebred Hungarian cows amounts to more than 3500. The Association was established in 1989, and it has already more than 100 members.

**Hucul horse.** The population size is 92 mares and ten stallions in Hungary, but a larger population can be found in Slovakia, Poland and Romania. The third of the mare population is related, the inbreeding coefficient rates from 1.25-25%, two stallions can be traced back to the same stallion in the fifth generation. To import mares and stallion was a must. Seven geneological lines have been formed (Hroby, Goral, Gurgul, Ousor, Prislop, Pietrosu and Polan). The aim is to select stallions from each lines. The breeding is supervised by the Pony and Small Horses Association in Hungary, which is a member of the Hucul International Federation.

**Racka sheep.** The Racka Breeders’ Association has been formed, now it operates with 70 flock owners. The maintenance of the breed is of symbolic importance. The aim of the selection is to stabilize the breed characteristics, only the animals with faults are not kept for replacement. There are no lines formed in the breed it is under way. Previous research was conducted on blood polymorphism to map the whole population and determine population dynamics. The inheritance of black and white Racka hair colour was also investigated. According to the results both recessive and dominant white genes seemed to be present in the breed (Bodó et al., 1991). A DNA research is being conducted to compare the Racka with the Tzigai breed.

**Mangalica pig.** As the Spanish meat industry discovered the Mangalica, its ham is used for the famous Serrano ham. The population size has increased, and it presently counts 1325 breeding females. Because of the one-time small population size, signs of inbreeding depression occurs. Nine boar lines are kept with 5-6 boars per line, the boars are rotated between the lines in order to avoid further inbreeding. Research has shown favourable fat content of the Mangalica, especially in unsaturated fat. The cholesterol level is lower than the that of the modern breeds. A DNA research is about to start to evaluate similarities and differences between the three colour varieties.

**Bronze turkey.** A large nucleus is kept at the university farm as a gene reserve with 500 females. Eleven lines with 3-4 males have been formed. Males hatched in a line rotate to other line in the next breeding season. At certain times males immigrate to the nucleus from different farms. Genotype-environment interaction has been investigated for meat characteristics in extensive and intensive environment between the Bronze turkey and the BIG-6. In extensive envoronment, in edible characteristics and in micro-element content the Bronze turkey surpasses the BIG-6.

**FUTURE ROLE**

**Hungarian Grey cattle.** The Society published a book on the history, traits and future tendencies concerning the breed (Bodó et al., 1996). There are already shops where higher price meat of Hungarian Grey bullocks is offered for those consumers who require guaranteed healthy food. The special value is based on the healthy organic environment and technology.
There has been some attempt to produce special sausages (Salami) produced from the meat of Grey cattle. All these trials want to find the niches of solvent demand. The planned scientific work in the future aims to clarify some rules of inheritance. A new idea for a breed comparison is planned for the molecular genetic research of Hungarian Grey, Maremmana and Hungarian Simmental cattle. The aim is not only to justify the genetic distance between these breeds but the expressivity of microsatellites and mtDNA would be checked as well.

**Hucul horse.** The Hucul horse finds its place in tourism, especially in the mountain regions, and its low size with its quietness specially fits to train children for riding.

**Racka sheep.** The size of the population will probably increase, but not for the increasing economic importance of the breed, but by the interest of hobby animal keepers. From the twisted thread warm knitted pieces of clothing, stockings, home slippers, waistcoats, sleeveless coats can be made. Thick woolen blankets called „cserge” have become again fashionable.

**Mangalica pig.** The Mangalica ham found its place as a Serrano ham producer. The breed can play a role in ecoligical farming. Using in crossings the intramuscular fat – which contributes to the taste of the meat – can be increased.

**Bronze turkey.** As the consumers are inclined to pay more for healthy food produced in free range environment, the Bronze turkey is a major breed to utilize this opportunity. The state subsideses the maintance and reseach relating to the maintance, like mating structure and genetic polymorphism.

The policy is that the responsible breeders’ association should find a place for the breed in a section of the economy. This can be either a special product, called *Hungaricum* produced by purebred animals, either a role in crossbreeding, or a hobby animal, or a role in the village tourism. If a breed has not got a value at present, its distinction from the most numerous breeds needs to be justified by DNA comparison. This research is supported by the state.

**REFERENCES**


