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## PROSPECTS FOR CONSERVING TRADITIONAL POULTRY BREEDS OF THE CARPATHIAN BASIN

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### Abstract

History of traditional Hungarian poultry, including several chicken, turkey, guinea-fowl, goose and duck breeds demonstrate their important role in agriculture and households of the Carpathian Basin. As the expansion of poultry industry made traditional breeds gradually disappear from the countryside, Hungarian preservation programmes with governmental subsidies, had to be started at the beginning of 1970's to maintain original stocks of certain rare poultry breeds and varieties. Since 1997 conservation of traditional Hungarian poultry breeds has been managed and controlled by a non-governmental organisation (NGO): the Association of Hungarian Small Animal Breeders for Gene Conservation (MGE), which is at present the only officially registered breeding organization for all poultry genetic resources in the country.

Conservation of local breeds of both field crops and farm animals, through the maintenance and development of different ecological types of production systems and products may have real importance in maintaining local agro-biodiversity and agro-ecosystems, which is the basis of sustainable agriculture. In this process, local poultry breeds should play a significant role, even in the near future. To achieve this goal, the first step should be the proper execution of the conservation programmes elaborated for local breeds.



On the other hand, additional, new strategies to conserve traditional, local breeds are needed for multifunctional use of poultry genetic resources, including: the maintenance of functional in situ gene banks, research directed to the assessment of production, education at different levels, elaboration of sustainable production methods and marketable products, development of family poultry, making use of the capabilities of fancy breeders, completing field studies and surveys of local breeds in marginal regions and reintroduction of the breeds to villages, seeking for demonstration and popularization potentials, and adaptation of breeds in diverse environments. Some examples for the new prospects taken from the conservation experiences and practices are given in the paper.

**Keywords:** poultry genetic resources, carpathian basin, conservation, utilization of local breeds

## A Kárpát-medencében honos régi baromfifajták génmegőrzésének lehetőségei

### Összefoglalás

A géntartalékként fenntartott, tradicionális magyar baromfifajták – azaz a régi magyar tyúk-, pulyka, gyöngytyúk- lúd- és kacsafajták – története igazolja korábbi jelentős szerepüket a Kárpát-medence mezőgazdaságában, családi gazdaságaiban. A baromfiipar fejlődésével azonban a régi fajták fokozatosan eltűntek vidéki élőhelyükről, ezért az 1970-es évek elején a ritka fajták és változatok eredeti állományainak megőrzését célzó, állami támogatást is magában foglaló génmegőrzési programok bevezetése vált szükségessé. 1997-től a régi magyar baromfifajták génmegőrzési programjait civil szervezetként a Magyar Kisállatnemesítők Génmegőrző Egyesülete (MGE), régi baromfifajtáink jelenleg egyetlen, hivatalosan bejegyzett tenyésztő szervezete irányítja és ellenőrzi.

A helyi kultúrnövény- és haszonállatfajták a különböző, ökológiai típusú termelési rendszerek és termékek fejlesztése révén kiemelt jelentőségűek lehetnek a helyi agro-biodiverzitás és agro-ökoszisztémák megőrzésében, ami az agrártermelés fenntarthatóságának alapja. Ebben a folyamatban a helyi baromfifajták már a közeli jövőben komoly szerepet játszhatnak. Ennek érdekében, első lépésként a helyi fajtákra kidolgozott génmegőrzési programok pontos végrehajtása szükséges. A biztonságosan megőrzött állományok hosszú távú fenntartása és sokrétű hasznosítása új szemléletet igényel.



A génmegőrzést ki kell terjeszteni a funkcionális, *in situ* génbankok kialakítására, a termelési tulajdonságok értékelését célzó kutatásokra különböző éghajlati környezetben, többszintű oktatási tevékenységre, a fenntartható termelési módok és piacképes termékek kidolgozására, a családi gazdaságok baromfitartásának fejlesztésére, beleértve a hobbitenyésztők által nyújtott lehetőségeket is, a helyi fajták felmérését és visszatelepítésük lehetőségeit célzó terepvizsgálatok végzésére a gazdaságilag hátrányos helyzetű térségekben, a fajtabemutató és népszerűsítő feltételeinek kialakítására. A tanulmány a magyar baromfi génmegőrzés tapasztalatait és gyakorlatát az említett új szemlélet eredményeként megvalósult néhány példával alátámasztva mutatja be.

**Kulcsszavak:** baromfi géntartalékok, Kárpát-medence, génmegőrzés, helyi fajták hasznosítása

## Introduction

Historically, the most famous poultry breeds of the Carpathian Basin are the Transylvanian Naked-neck Chicken and the Frizzled Hungarian Goose, often referred to as “Hungarikum” poultry breeds, and believed to be characteristic only for this region. Three domestic bird species, chicken, goose and turkey are listed by *Bartosiewicz* (2002) as having autochthonous breeds in Hungary; however, according to the archaeozoological records the idea of direct continuity between ancient birds and the modern autochthonous ones would be difficult to accept. Nevertheless, local breeds and varieties of landrace poultry had been common in the countryside until 1960-ies, while organised breeding activities started in the second half of the 19<sup>th</sup> century (*Contemporary literature, cited by Szalay, 2002*). Characterizing the Hungarian activities on the conservation of domestic animal genetic resources, *Bodó* (1985) listed only the Speckled, Yellow, White and two colour varieties of Naked-Neck (black and speckled) chicken, and the Frizzled Feather Goose, as old Hungarian poultry breeds threatened by extinction, and which deserve consideration as genetic resources. Within the species of domestic fowl in Hungary, *Bodó et al.* (1990) suggested for preservation the White, Yellow and Speckled Hungarian Chicken mentioning their naked-neck variety, and the Transylvanian Naked-neck, similar to the above variants, but having different origin.

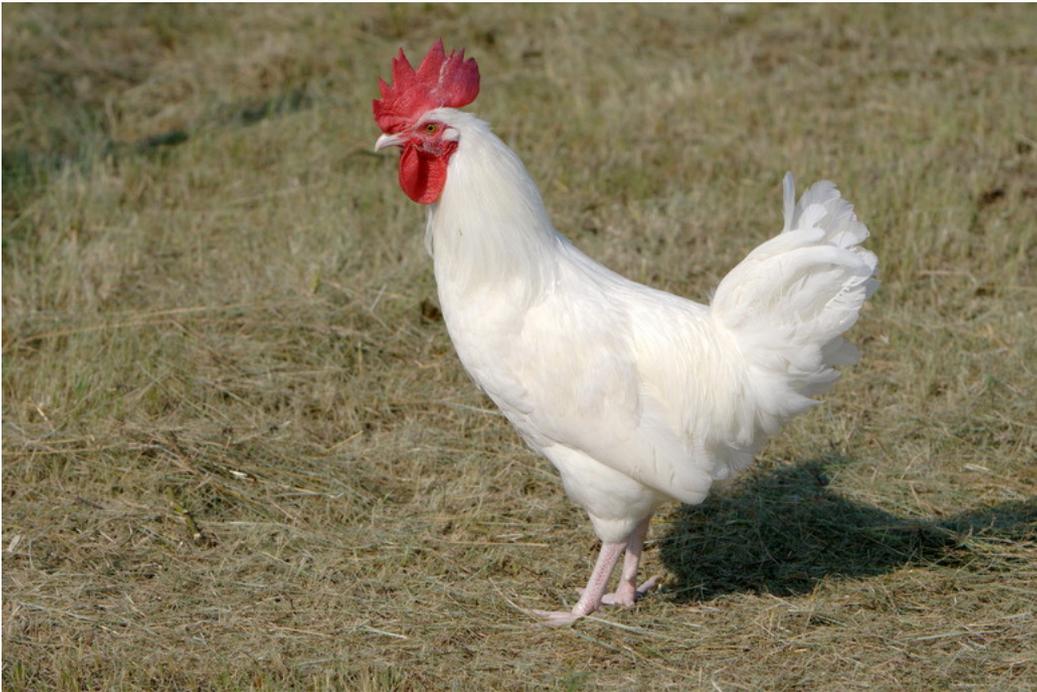


By developing conservation activity and setting up in situ gene banks for traditional poultry breeds of Hungary, it was made clear, that there are two more species (duck and guinea-fowl), and several breeds and varieties of other species having long breeding history in the Carpathian Basin (Szalay, 2002; Szalay et al., 1992; Szalay et al., 1995). At present, traditional poultry breeds, registered and protected in Hungary for their genetic value are represented by seven breeds of chicken – distinguished by their plumage colour –, two breeds of turkey, one landrace type of guinea-fowl, Hungarian goose breeds, distinguished by colour and feather varieties and Hungarian Duck colour varieties. Main features of official conservation programmes and alternative approaches to conserving traditional Hungarian poultry breeds are discussed in the following sections.

## **Traditional poultry breeds of the Carpathian Basin**

### ***Hungarian chicken breeds***

Until the beginning of commercial chicken breeding Hungarian chicken breeds of different colours (white, speckled, yellow, partridge-colour and naked neck variants) were widespread in the country. They were preferred here not only for their relatively good egg production under harsh conditions, but for their excellent meat quality coming from the "seeking habit" of these birds, scratching for food regardless of hot or cold weather. Starting in the 1960s, breeding programmes and production of local breeds were replaced by commercial chicken hybrids, resulting in fast decrease of the population number of old Hungarian chicken breeds. In 1973, majority of breeds and colour varieties were declared and conserved as official gene reserves. In 1991, based on historical literature of Hungarian poultry breed standards, Transylvanian Naked-neck chicken was declared to be an independent breed represented by three colour varieties: white, speckled and black, while White, Speckled and Yellow Hungarian chicken breeds having no naked-neck varieties. Since 1997, all breeds and colour varieties have been conserved separately. In 2004 – following a long term field study, collection and breeding work, the Partridge-colour Hungarian Chicken was redeveloped, making the seventh chicken breed in conservation (*Pictures 1-7*).



**Picture 1: White Hungarian Chicken, male and female (Hungarian Poultry Gene Bank, ÁTK, Gödöllő). Photo: Brém Zsolt**

*1. kép: Fehér magyar tyúk, hím- és nőivar (Magyar Baromfi Génbank, ÁTK, Gödöllő). Fotó: Brém Zsolt*



**Picture 2: Partridge-colour Hungarian Chicken, male and female (Hungarian Poultry Gene Bank, ÁTK, Gödöllő). Photo: Somfai Sándor**

*2. kép: Fogolyszínű magyar tyúk, hím- és nőivar (Magyar Baromfi Génbank, ÁTK, Gödöllő). Fotó: Somfai Sándor*



**Picture 3: Speckled Hungarian Chicken, male and female (Hungarian Poultry Gene Bank, ÁTK, Gödöllő). Photo: Somfai Sándor**

*3. kép: Kendermagos magyar tyúk, hím- és nőivar (Magyar Baromfi Génbank, ÁTK, Gödöllő). Fotó: Somfai Sándor*



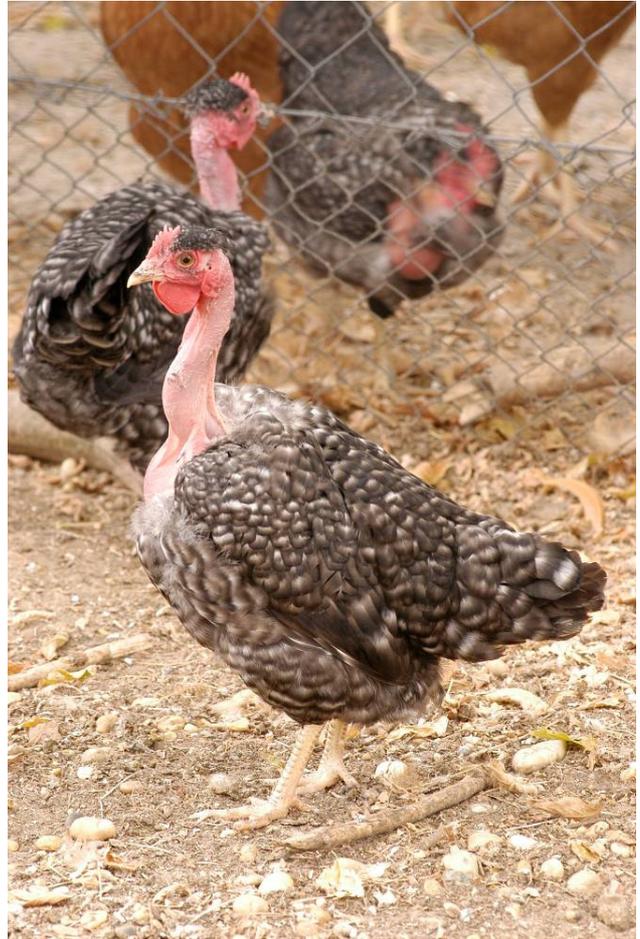
**Picture 4: Yellow Hungarian Chicken, male and female (Hungarian Poultry Gene Bank, ÁTK, Gödöllő). Photo: Somfai Sándor**

*4. kép: Sárga magyar tyúk, hím- és nőivar (Magyar Baromfi Génbank, ÁTK, Gödöllő). Fotó: Somfai Sándor*



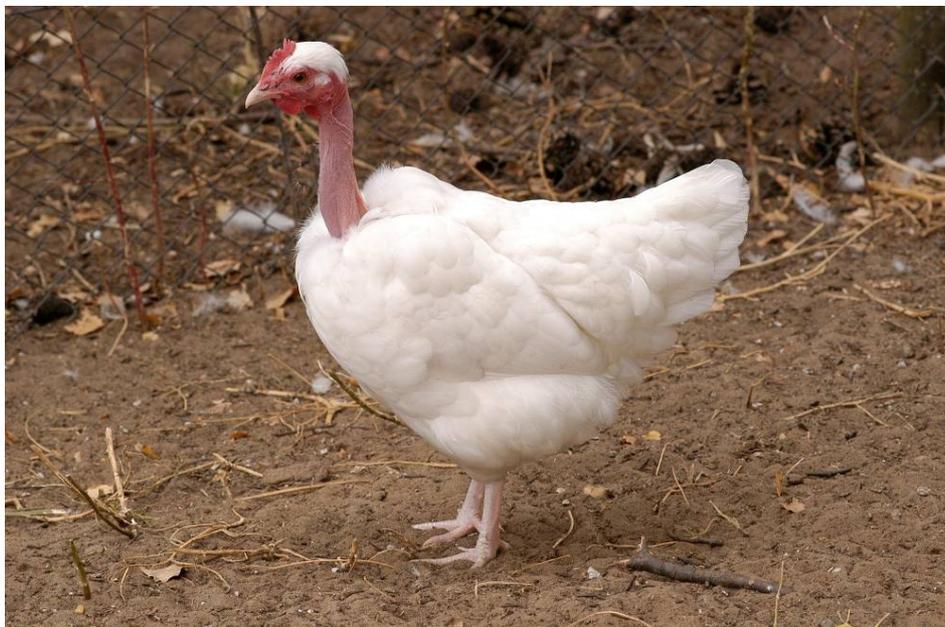
**Picture 5: Black Transylvanian Naked-neck Chicken, male and female (Hungarian Poultry Gene Bank, ÁTK, Gödöllő). Photo: Somfai Sándor**

*5. kép: Fekete erdélyi kopasznyakú tyúk, hím- és nőivar (Magyar Baromfi Génbank, ÁTK, Gödöllő). Fotó: Somfai Sándor*



**Picture 6: Speckled Transylvanian Naked-neck Chicken, male and female (Hungarian Poultry Gene Bank, ÁTK, Gödöllő). Photo: Somfai Sándor**

*6. kép: Kendermagos erdélyi kopasznyakú tyúk, hím- és nőivar (Magyar Baromfi Génbank, ÁTK, Gödöllő). Fotó: Somfai Sándor*



**Picture 7: White Transylvanian Naked-neck Chicken, male and female (Hungarian Poultry Gene Bank, ÁTK, Gödöllő). Photo: Somfai Sándor**

*7. kép: Fehér erdélyi kopasznyakú tyúk, hím- és nőivar (Magyar Baromfi Génbank, ÁTK, Gödöllő). Fotó: Somfai Sándor*



### *Hungarian turkey*

Turkey breeding has existed in the Carpathian basin for many centuries. Originally, white and black colour variants of turkey were usual. Later the black variety practically disappeared following its crossing with Bronze and other imported turkey breeds at the beginning of the 20<sup>th</sup> century. As the result of crossings, however, the Bronze turkey became adapted to the local conditions and now it is considered as an old Hungarian poultry breed. Copper turkey used to be popular in the southern part of Hungary. Body weight of this breed is somewhat lower than that of other turkey breeds, however, it is very strong, resistant to diseases and well adapted to the local conditions (*Pictures 8-10*).



**Picture 8-9: Bronze and Copper Turkey males (Hungarian Poultry Gene Bank, ÁTK, Gödöllő). Photo: Kisné, Do thi Dong Xuan)**

*8-9. kép: Bronz- és rézpulyka kakasok (Magyar Baromfi Génbank, ÁTK, Gödöllő). Fotó: Kisné, Do thi Dong Xuan*

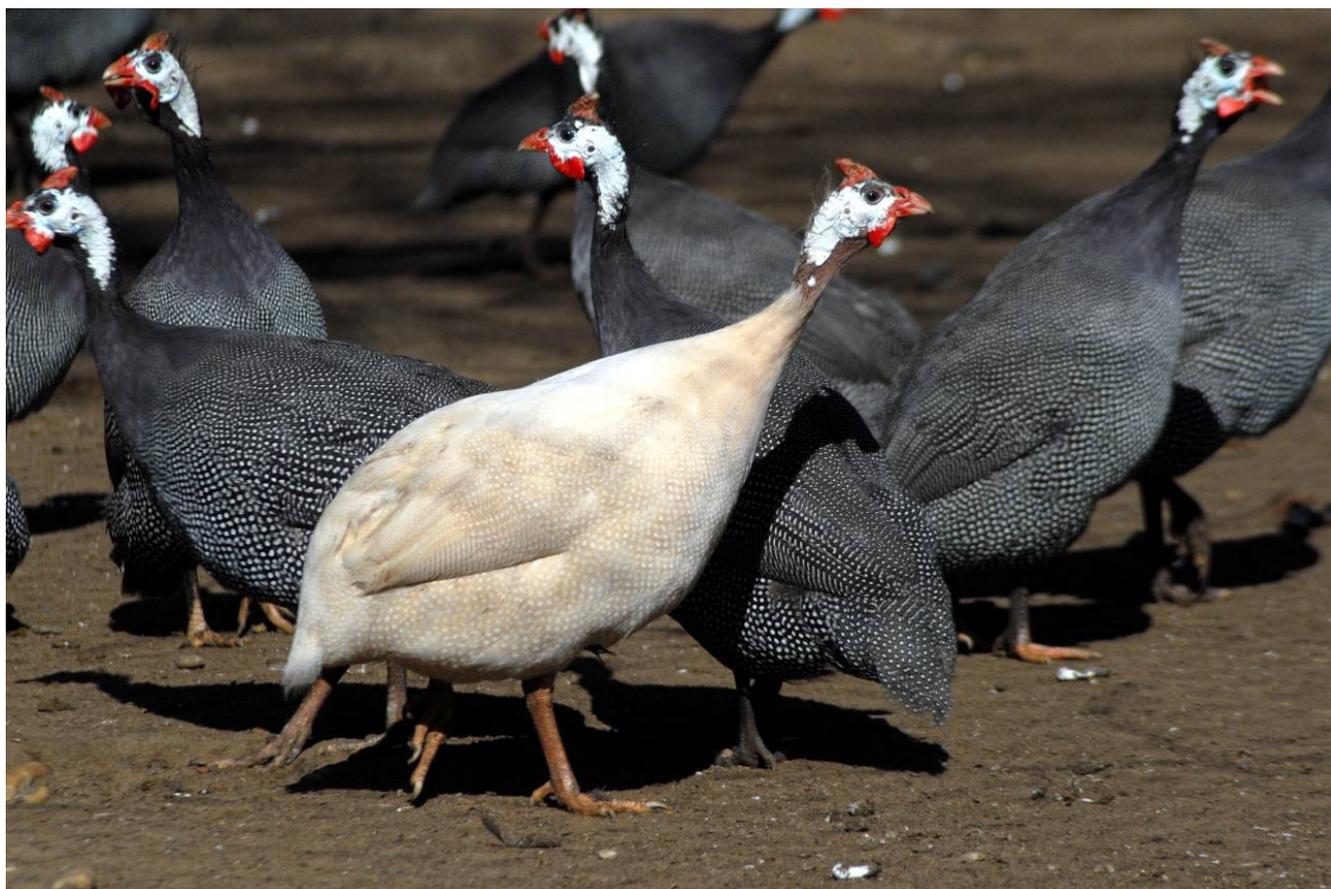


**Picture 10: Bronze and Copper Turkey stock (Hungarian Poultry Gene Bank, ÁTK, Gödöllő). Photo: Kisné, Do thi Dong Xuan)**

*10. kép: Bronz- és rézpulyka-tenyészállomány (Magyar Baromfi Génbank, ÁTK, Gödöllő). Fotó: Kisné, Do thi Dong Xuan*

### **Guinea-fowl**

Landrace varieties of guinea-fowl include bluish-grey (the most popular colour variety), white, grey, bronze or black and spotted. First reports about guinea-fowl breeding in Hungary were published at the beginning of the 20<sup>th</sup> century, though it must have been introduced to the Carpathian basin much earlier and was kept as a game bird or a semi-domesticated animal around manor-houses. Meat quality, high adaptability to different conditions, disease resistance, wild nature, seeking habit and low keeping costs made guinea-fowl an excellent poultry species for ecological type production (*Picture 11*).



**Picture 11: Hungarian Landrace Guinea-fowl (Hungarian Poultry Gene Bank, ÁTK, Gödöllő). Photo: Somfai Sándor**

*11. kép: Magyar parlagi gyöngytyúk (Magyar Baromfi Génbank, ÁTK, Gödöllő). Fotó: Somfai Sándor*

### ***Hungarian goose and its frizzled variant***

Hungarian goose is indigenous in the Carpathian basin. During the centuries it has got used to the special climatic conditions and farming systems of the region, which made it very precious in this part of Europe. These local goose breeds of different colours (white, greyish or spotted) produced high quality fatty liver, meat and feather approved by all markets. A unique variety of Hungarian goose – the Frizzled Hungarian goose – is considered now as a typical poultry breed for the Carpathian basin. Frizzling (F) is a mutant gene which causes the contour feathers to curve outward away from the body. Colour variants are white, grey or white-grey spotted (*Pictures 12-13*).



**Picture 12: Hungarian goose, breed varieties (Hungarian Poultry Gene Bank, ÁTK, Gödöllő). Photo: Kisné, Do thi Dong Xuan)**

*12. kép: Magyar lúd, fajtaváltozatok (Magyar Baromfi Génbank, ÁTK, Gödöllő. Fotó: Kisné, Do thi Dong Xuan)*



**Picture 13: Frizzled Hungarian Goose (Hungarian Poultry Gene Bank, ÁTK, Gödöllő). Photo: Szalay István)**

*13. kép: Fodros tollú magyar lúd (Magyar Baromfi Génbank, ÁTK, Gödöllő). Fotó: Szalay István*

### ***Hungarian duck***

The original Hungarian duck is also considered as an indigenous breed in the Carpathian basin used to be found mostly in white and wild, rarely in spotted, brown or black colour varieties. Because of its juicy, delicious meat, Hungarian duck was bred all over the country being more important for domestic consumption than goose. Nevertheless, starting with the early 1960s, Hungarian duck gradually disappeared as the result of crossing with imported duck breeds. Conservation programme of local duck varieties (white and wild-colour) started in the late 1990s with the populations originated from South-east Hungary and Transylvania, while gene bank stock of black and white variety of the Hungarian Duck, characteristic for some eastern regions of the Carpathian Basin is under development (*Picture 14*).



**Picture 14: Hungarian duck colour varieties (Hungarian Poultry Gene Bank, ÁTK, Gödöllő. Photo: Kisné, Do thi Dong Xuan)**

*14. kép: Magyar kacsaszínváltozatok (Magyar Baromfi Génbank, ÁTK, Gödöllő). Fotó: Kisné, Do thi Dong Xuan*

More details about the history, breeding principles and standard characteristics of the breeds are found in a book on old Hungarian poultry (Szalay, 2002) and on the MGE website (MGE, 2009).

List of breeds by species, number of birds in registered flocks in the years 2005-2008 and effective size of populations ( $N_e$ ) in 2008 of traditional Hungarian poultry breeds (MGE data, 2009) are presented in Table 1.



**Table 1: Number of birds in registered flocks of traditional Hungarian poultry breeds (females and males) in 2005-2008 and effective numbers of populations ( $N_e$ ) in 2008 (MGE data, 2009)**

Species (1)	Breed (2)	Year of registration (3)	Number of registered flocks (4)	Sex (5)	Total number of birds in registered flocks/Year (6)				$N_e^{**}$ 2008
					2005	2006	2007	2008	
Chicken (7)	Yellow Hungarian (8)	1973	3	♀	1569	1525	1447	2027	<b>1057.4</b>
				♂	177	168	176	304	
	White Hungarian (9)	1973	2	♀	299	262	172	248	<b>177.4</b>
				♂	47	40	50	54	
	Speckled Hungarian (10)	1973	3	♀	1331	750	654	836	<b>616.6</b>
				♂	233	192	153	189	
	Partridge-colour Hungarian (11)	2004	3	♀	322	161	237	228	<b>204.7</b>
				♂	60	34	70	66	
	White Transylvanian Naked-neck (12)	1973 as colour variety* (26)	2	♀	273	222	161	203	<b>170.6</b>
				♂	49	43	49	54	
Black Transylvanian Naked-neck (13)	1973 as colour variety* (26)	2	♀	189	110	148	249	<b>177.5</b>	
			♂	54	43	50	54		
Speckled Transylvanian Naked-neck (14)	1973 as colour variety* (26)	3	♀	597	430	290	361	<b>277.8</b>	
			♂	97	85	73	86		
Turkey (15)	Copper (16)	1973	3	♀	167	148	268	220	<b>217.0</b>
				♂	45	47	77	72	
	Bronze (17)	1973	3	♀	340	286	298	212	<b>238.6</b>
				♂	78	97	90	83	
Guinea-fowl (18)	Hungarian landrace (19)	2004	2	♀	227	215	401	285	<b>273.6</b>
				♂	93	85	112	90	
Goose (20)	Frizzled Hungarian (21)	1973	3	♀	518	487	152	184	<b>221.1</b>
				♂	139	166	68	79	
	Hungarian colour varieties: white, grey and spotted (22)	2004	1	♀	-	246	180	144	<b>148.5</b>
				♂	-	121	81	50	
Duck (23)	White Hungarian (24)	2004 as colour variety* (26)	2	♀	148	106	115	79	<b>106.2</b>
				♂	79	43	47	40	
	Wild-colour Hungarian (25)	2004 as colour variety* (26)	3	♀	393	317	335	333	<b>305.3</b>
				♂	131	77	97	99	

\*Procedures to register colour varieties as individual breeds are in progress. (27)

\*\* $N_e$  was calculated according to the equation (after Wright, 1931): 
$$N_e = \frac{4N_f N_m}{N_f + N_m},$$

where  $N_e$  is the effective population size;  $N_f$  is the number of dams;  $N_m$  is the number of sires. (28)

*1. táblázat: A régi magyar baromfifajták nyilvántartott elitállományainak létszáma (hím- és nőivar) 2005 és 2008 között, és az effektív populációméret 2008-ban (MGE adatok, 2009)*

Faj(1), Fajta(2), Nyilvántartásba vétel éve(3), Nyilvántartott elitállományok száma(4), Ivar(5), Az elitállományok létszáma/év(6), Tyúk(7), Sárga magyar(8), Fehér magyar(9), Kendermagos magyar(10), Fogolyszínű magyar(11), Fehér erdélyi kopasznakú(12), Fekete erdélyi kopasznakú(13), Kendermagos erdélyi kopasznakú(14), Pulyka(15), Réz(16), Bronz(17), Gyöngytyúk(18), Magyar parlagi(19), Lúd(20), Fodros tollú magyar(21), Magyar színváltozatok: fehér, szürke és tarka(22), Kacsa(23), Fehér magyar(24), Tarka magyar(25), Színváltozatként(26)\*



\*A színváltozatok bejelentése önálló fajtaként folyamatban van.(27)

\*\* $N_e$  becslésére Wright (1931) egyenletét használtuk: 
$$N_e = \frac{4N_f N_m}{N_f + N_m},$$

ahol  $N_e$  az effektív populációlétszám;  $N_f$  a nőivarú tenyészállatok száma,  $N_m$  a hímivarú tenyészállatok száma.(28)

## Official conservation programme for the traditional Hungarian poultry breeds

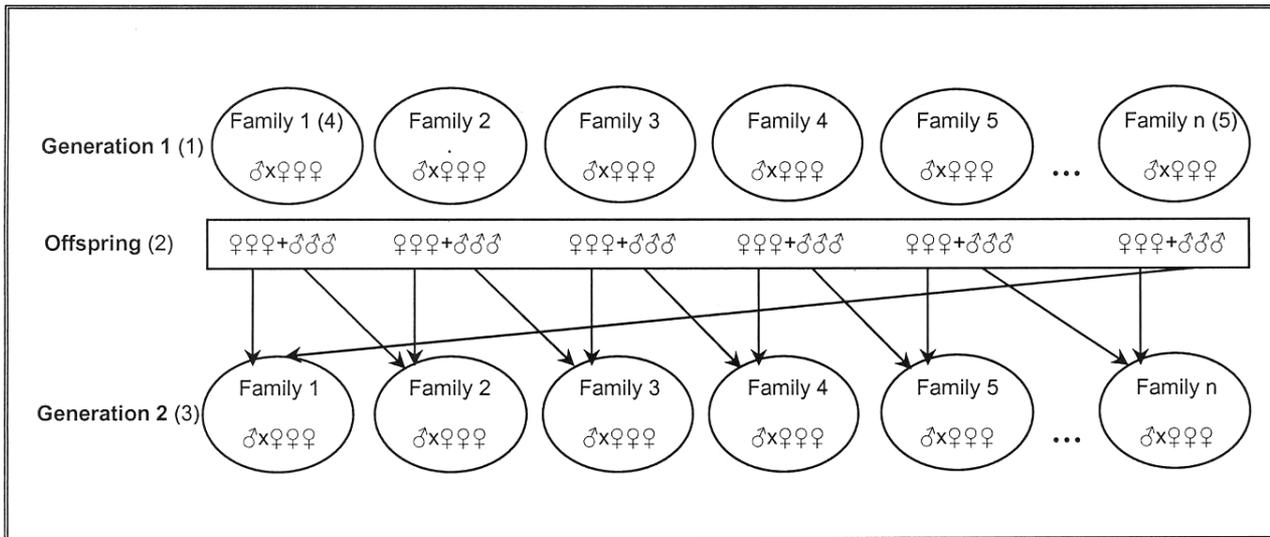
Poultry conservation programmes are implemented for several indigenous, native or adapted poultry breeds in Hungary, including local chicken breeds and varieties, colour varieties of landrace turkey and guinea-fowl, local varieties of domestic goose and duck. AnGR conservation is supervised and partly financed by the Ministry of Agriculture and Rural Development and the Animal Breeding Directorate of the Central Agricultural Office (MGSZH). Hungarian poultry conservation is coordinated and organized by the Association of Hungarian Small Animal Breeders for Gene Conservation (MGE) as a non-governmental organization, founded in 1997. Conservation programmes of elite stocks are carried out by breeding institutions having several decades of experience, including: Debrecen University (Copper and Bronze Turkey; Mihók, 2004), West-Hungarian University, Mosonmagyaróvár (Yellow Hungarian Chicken; Kovácsné Gaál, 2004), Szeged University of Science, Hódmezővásárhely (Speckled Hungarian and Speckled Transylvanian Naked-neck Chicken; Sófaly, 2005), and last but not least the Research Institute for Animal Breeding and Nutrition, Division of Small Animal Research, Gödöllő. (Hungarian Poultry Gene Bank in Gödöllő includes all registered traditional poultry breeds: 7 chicken, 2 turkey, 2 goose 1 guinea-fowl and 1 duck breeds with some colour varieties; Szalay, 2004). During the 10 year history of MGE, the conservation basis has been expanded, as several farmers and breeders joined the group of Hungarian poultry conservation network. The main result of the growing conservation network in the recent years is the stabilized number of breeders in poultry elite stocks, conserved as officially registered breeds. In all breeds effective population size exceeds the critical level ( $N_e \geq 100$ ) proposed for conservation of animal genetic resources (Foose, 1983).

Main regulations of MGE conservation programmes of elite stocks of traditional Hungarian poultry breeds are as follows:

- Egg collection, made around peak production from at least 10 half-sib female families with rotation of the males in the next generation (Figure 1). Trap-nests used if available.
- Changing the set of males (reserve males) in the mid of egg collection.
- Maintaining low sire/dam ratio: 1/7 for chicken and guinea fowl, 1/4 for duck and turkey and 1/3 for goose.



- Pedigree hatching and wing-banding are done by families;
- Rearing and egg production in free range conditions, according to the rules of organic farming.
- One-year-old birds kept for the following year as registered reserve flocks.
- Limited phenotypic selection allowed among males.



**Figure 1: Half-sib female family conservation scheme with rotation of males in the next generation ( $n \geq 10$ ), applied in the conservation stocks of traditional Hungarian poultry breeds**

1. ábra: A régi magyar baromfifajták fenntartásában alkalmazott, nőivarú féltestvér családokra ( $n \geq 10$ ) alapozott génmegőrzési eljárás a hímivar rotációjával a következő generációban

1. generáció(1), Utódok(2), 2. generáció(3), 1. család(4), n. család(5)

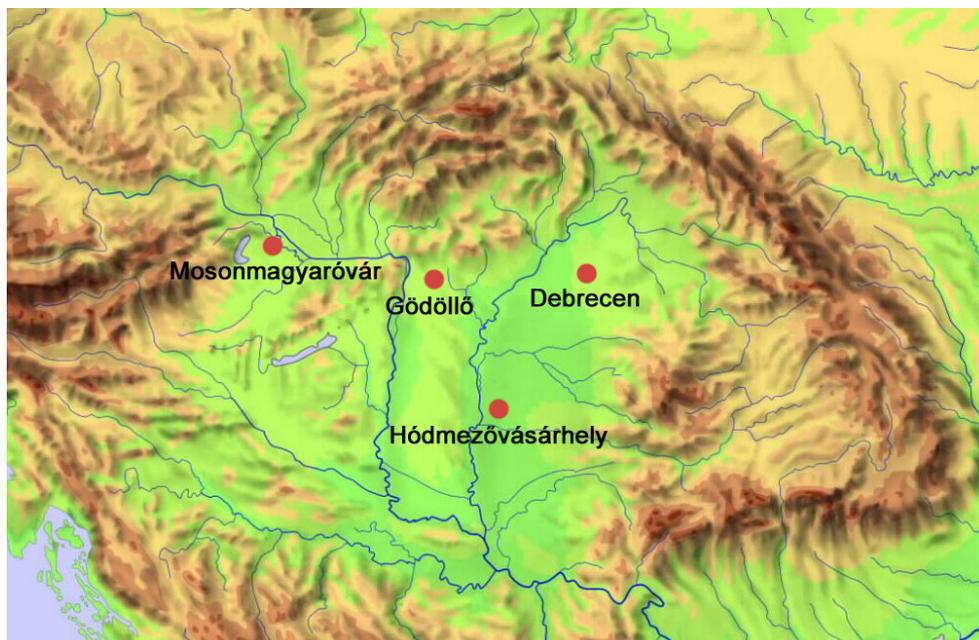
## New conservation strategies

### *Breeding prospects: maintaining functional in situ gene banks*

Expansion of commercial poultry breeding and production was followed by the dramatic decrease in poultry diversity. By the beginning of 1970ies, the role of landrace types of poultry were taken over by commercial breeds even in the rural households, and breeding programmes for local breeds ceased in a short term. In Hungary government managed conservation programmes for certain poultry breeds and varieties had been started in 1973, which enabled to preserve certain breeding stocks of chicken. Official list of conserved breeds included Yellow, Speckled and White Hungarian Chicken, colour varieties of Transylvanian Naked Neck Chicken, Bronze and Copper Turkey and Frizzled Hungarian Goose.



Based on these stocks, the breeds have survived in functional gene banks serving as primary breeding centres, providing hatching eggs and day old chicks mainly for family farms. Lately, functional gene bank stocks of additional local breeds have been developed and registered, for which starting populations were collected in different rural regions of the Carpathian Basin where traditional family farming still exists (Hungarian goose and duck varieties, Partridge-colour Hungarian chicken). *Functional in situ gene banks* of old Hungarian poultry breeds (see *Picture 15*) allow the primary breeders to offer grandparent and parent stocks for sale, providing the chance to elaborate breeding and production systems analogous to commercial ones.



**Picture 15: Functional *in situ* gene banks of the traditional Hungarian poultry breeds in the Carpathian Basin**

15. kép: A régi magyar baromfifajták funkcionális *in situ* génbankjai a Kárpát-medencében

#### ***Research prospects: assessment of production traits of the breeds***

Serving as primary breeding stocks, production and reproduction traits of traditional Hungarian poultry breeds are assessed regularly. Records on body weight at different ages, egg production, hatchability and liveability are up to date in every stock, while the possibilities of crossings of local breeds with each other or with different commercial breeds are also used to evaluate their production potential. Moreover, they are excellent subjects for other types of applied research in poultry breeding and genetics including DNA typing, reproduction biology, population genetics, nutrition, and veterinary studies.



Most of institutions pay special attention to the evaluation of product quality of old breeds in low input, organic and/or ecological type mixed production, in the frameworks of recent national R&D projects (e.g. GAK OKO-TERM and GAK GALLUS06) (Szőke *et al.*, 2004, Szalay 2006; Bódi *et al.*, 2007; Spalona *et al.*, 2007; Szalay *et al.*, 2007; Konrád *et al.*, 2007; Konrád *et al.*, 2008).

### ***Adaptation studies of traditional Hungarian poultry in Southeast Asia***

Collaboration of the National Institute of Animal Husbandry (NIAH) Poultry Research Centre (POREC) Hanoi, Vietnam and the Institute for Small Animal Research (KÁTKI, Gödöllő, Hungary) started in the late 1990. Since then, a series of adaptation experiments have been completed to study the potential use of traditional Hungarian poultry breeds under Vietnamese conditions. Studies of growth and reproduction of several species (chicken, duck, guinea-fowl and turkey) revealed that hatchability, body weight gain and viability may be somewhat better in Vietnam than in Hungary. Hungarian poultry breeds start egg production earlier in Vietnam, and produce more but in some cases – due to early start of lay and longer production period – slightly smaller eggs (Dong Xuan *et al.*, 2007). Adaptation studies demonstrate that traditional Hungarian poultry breeds can be propagated and reared with real success in Vietnam, providing premium quality and therefore highly marketable products for both their breeders and consumers. To develop high quality poultry meat production in the countries of Southeast Asia, organization of breeding centres, and propagation of the breeds in the underprivileged rural areas are needed. This type of development, however, should consider traditional farming systems and conservation approaches of local breeds (Dong Xuan and Szalay, 2003; Dong Xuan *et al.*, 2006) as well as the protection of sustainable ways of production (Szalay and Dong Xuan, 2007). Based on the results of adaptation experiments, further development of breeding old Hungarian poultry in South-East Asia is a reality in the near future (Dong Xuan *et al.*, 2007). This activity may also serve as additional conservation approach for some traditional Hungarian poultry breeds, as discussed in a different paper (Dong Xuan *et al.*, 2008) (Pictures 16 and 17).

### ***Prospects for education and demonstration***

Established mainly by higher educational units and research institutions, gene bank stocks of old Hungarian poultry breeds serve as units of on farm training at different levels of education from schoolchildren to university students in poultry management, conservation and alternative technologies.



**Picture 16: Adaptation studies of Hungarian Guinea-fowl in Vietnam (KÁTKI-POREC project, 2003, Thuy Phuong Poultry Farm, North Vietnam). Photo: Kisné Do thi Dong Xuan**

*16. kép: Magyar gyöngytyúk adaptációs vizsgálata Vietnamban (KÁTKI-POREC Projekt, 2003, Thuy Phuong Baromfitelep, Észak-Vietnam). Fotó: Kisné, Do thi Dong Xuan*



**Picture 17: Adaptation studies of old Hungarian turkey breeds in Vietnam (MGE-NEFE project, 2006-2007, Cam Binh Poultry Farm, North Vietnam). Photo: Szalay István**

*17. kép: Régi magyar pulykafajták adaptációs vizsgálata Észak-Vietnamban (MGE-NEFE projekt, 2006-2007, Cam Binh Baromfitelep, Észak-Vietnam). Fotó: Szalay István*



Hungarian national parks are responsible to some extent for the conservation of animal genetic resources. As a part of that activity, farm parks have been set up by national parks to exhibit the different local breeds, including poultry, to acquaint visitors with traditional animal breeding and local breeds. Primary breeders of local poultry breeds have started a programme, by which they supply these farm parks with pedigreed individuals of gene bank origin.

Four major agricultural shows held every year in Hungary are also used to popularize the old breeds. Moreover, some gene bank stocks are also open to public as farm parks for demonstrational and educational purposes.

### ***Sustainable production prospects***

Parallel with the agricultural policy of EU and related national programmes intended to develop agriculture in a multifunctional and sustainable way, poultry conservationists seem to have good chance for the use of poultry genetic resources in alternative production systems. Proving the advantages of old breeds, showing their role in returning to sustainable agriculture and completing appropriate research with traditional poultry breeds and alternative production systems are of major importance.

*Organic* (in Hungarian use: *ecological*) *farming* should offer a considerable background for the use of local domestic animal breeds in certain countries, where the functionality of conservation stocks has been sustained, as revealed by a recent survey in the CHANNEL project for Slovenia and Hungary (Radics et al, 2006). For their short return period, poultry breeds can be an important share of organic production both in poultry production specialized and in mixed farms. Functional gene banks are the main sources to supply organic farms with animals needed for low input organic production. The low production level of organic poultry certainly will rise in the Carpathian basin, as many of the family farms with good facilities for poultry keeping will extend over their production to the market.

As part of the conservation programme, MGE and its institutional partners have been working on the elaboration of the genetic bases, management and quality control of production of the *Hungarikum* type quality poultry products. Production of specialty poultry food needs old Hungarian type poultry breeds, natural or ecological production and a comprehensive controlling system, by which the typical Hungarian product, called *HU-BA* will be produced.

Further important aspects of *HU-BA* production are conservation of old Hungarian poultry breeds and breeding traditions, as well as rural family farming.



Making HU-BA products more marketable, inclusion of ecological type mixed farming in production is very promising, if incorporation of poultry production into ecological plant cultures or horticultures is solved. This type of production can provide a model for the development of ecological type mixed farming systems including poultry, for other countries too.

### ***Family poultry prospects: Reintroduction of traditional poultry breeds to the villages***

Family poultry production has got a long history in all over the world; however, urbanization and lifestyle changes together with the “poultry boom” resulted in a significant decline in the number of families keeping poultry for self consumption. This decline started much later in transitional countries, while in rural regions of developing countries the most important source of meat and egg are still the household units. Family poultry production in the Carpathian Basin is still important in rural sites, representing about 20% of all production (Horn et al., 2002), depending on the level of urbanization and industrialization of the region. Village poultry is also the source of genetic resources in many cases, as some traditional landrace goose and duck varieties have been collected in marginal rural areas and maintained in gene banks by MGE breeders. The majority of villages, however, have lost their characteristic local poultry breeds, and mostly the intensive hybrids are kept by households. As a new programme launched by MGE, voluntary model villages are provided with hatching eggs or day old chicks from the gene banks of old Hungarian poultry free of charge. The only obligation of the households of model villages involved in the programme is to keep and reproduce the birds the following year, and possibly supply families of another village with the offspring under the coordination of the breeding association and primary breeders. Goals of the reintroduction programme are not only the widened background of gene conservation of old breeds and the use local breeds in suitable conditions, but also supplying the possible breeding basis for production of village poultry, organic or HU-BA system. Providing additional incentives and culinary choices, model villages of local poultry can play a considerable role in rural tourism development as well.

### ***Fancy breeders***

A group of more than 30 small-animal breeders set up an MGE section of old Hungarian poultry fancy breeders in 2006 to develop their stocks based on the existing poultry gene banks. Fancy breeders should become an important component of gene conservation – as they are in developed countries for old breeds – in spite of their quite different breeding practices. Several small stocks kept by fancy breeders can ensure the maintenance of genetic diversity as the whole.

Moreover, the poultry shows, both local and international, organized by them, will introduce the breeds to wide range of human population not acquainted with the variety of traditional poultry.

### ***Field studies and surveys of local breeds***

Field studies and surveys done by MGE breeders revealed that many types of local poultry still exist in different regions of the Carpathian Basin in households, which however may disappear rapidly with the dramatic change of lifestyle even in the countryside. Based on field studies, gene bank stocks of Transylvanian feather and colour varieties of Hungarian chicken (partridge-colour), goose (frizzled and spotted) and duck (white, wild-colour and white-black spotted) were set up in the Gödöllő Gene Bank to start conservation of the breeds. Collection of some other varieties of landrace poultry, characteristic for special regions of the Carpathian Basin – e.g. different colour types of turkey, guinea fowl and duck – is still remaining the task for the future (*Pictures 18-19*).



***Picture 18: Field studies of local poultry in the Carpathian basin, MGE, 2004; Hungarian goose, local varieties (Székelysárd, Transylvania). Photo: Szalay István***

*18. kép: A helyi baromfifélék terepi vizsgálata, MGE, 2004; Magyar lúd változatok (Székelysárd, Erdély). Fotó: Szalay István*



**Picture 19: Field studies of local poultry in the Carpathian basin, MGE, 2007; Hungarian turkey, colour varieties (Magyarkanizsa, Voivodina). Photo: Kisné Do thi Dong Xuan**

*19. kép: A helyi baromfifélék terepi vizsgálata, MGE, 2007; magyar pulyka színváltozatok (Magyarkanizsa, Vajdaság).  
Fotó: Kisné Do thi Dong Xuan*

## Conclusions

Conservation of local breeds (both plants and animals) through the development of different ecological type of production systems and products have real importance in maintaining agro-biodiversity and agro-ecosystems. In this process, local poultry breeds should play a significant role, even in the near future. First step in saving the breeds should be the proper execution of an official conservation programme.

On the other hand, additional, new approaches to conserving traditional, local breeds are needed for multifunctional use of poultry genetic resources, including: the maintenance of functional in situ gene banks, research including the assessment of production, education at different levels, elaboration of sustainable production methods and marketable products, development of family poultry, making use of the capabilities of fancy breeders, carrying out field studies and surveys of local breeds in marginal regions and reintroduction of the breeds to villages, seeking for demonstration and popularization potentials, and adaptation of breeds in diverse environments.



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