THE GENETIC PRESERVATION OF HUNGARIAN SPECKLED HEN AND THE SPECKLED TRANSYLVANIAN NAKED NECK HEN IN HÓDMEZŐVÁSÁRHELY

BENK ÁKOS – VIDÁCS LAJOS

University of Szeged Faculty of Agriculture,
6800 Hódmezővásárhely, Andrássy út 15.
benkakos@mgk.u-szeged.hu

ABSTRACT – The genetic preservation of Hungarian Speckled Hen and the Speckled Transylvanian Naked Neck Hen in Hódmezővásárhely
University of Szeged Faculty of Agriculture has been dealing with the cross-breeding of Hungarian speckled hen to maintain the species since 1977. We keep two varieties of the Hungarian speckled hen, the feathered-neck variant and the bare-neck type on the pilot farm. The three colour variations of the domestic hen species were bred from the Hungarian lea-land bird by the middle of the 20th Century. Because of the spread of intensive poultry keeping the population of this species has become endangered. Beside the gene preservation, we endeavour to find the best way for the production-purpose utilisation of the speckled hen stock. On the basis of our experiments the laying hens can be used in small scale egg production. We examined the egg production, the eggshell colour and the hatching results

Keywords: Hungarian Speckled Hen, Speckled Transylvanian Naked Neck Hen, genetic reservation, egg production

INTRODUCTION

From the fifties years of the twentieth century the poultry hybrids fully transformed the structure of species. Due to the emergence of hybrids, the number of hen varieties, which play a role in the poultry-farming economy, greatly reduced. (HORN, 1981) To produces high-performance hybrids only 5-6 different types of lines are used, however the pure-bred varieties are increasingly relegated to the background. (SZABÓNÉ WILLIN, 1996).
The protected traditional species represent a great genetic value. In order to be maintained the complete genome of chicken is necessary to protect the species situated in the Carpathian Basin, which include the Hungarian Speckled Hen and the Speckled Transylvanian Naked Neck Hen to. The degradation of native (old traditional, local) varieties, their decline, and disappearance, says BÖGRE – DOHY (1991) is a drastic form of a process, when the total gene pool of a breed (genotype group) is wasted.
The conscious, persistent, very intense selection, the one-sided (specialized) recovery targets, the production near the "biological ceiling" and all economic requires and expectations all have serious effects on this process. BODÓ (1991) notes in his work, which he wrote in order to protect the genetic reserves, the evolution of various biotechnology techniques results the more productive domestic breeds displace the local varieties with less productivity throughout the world.
In this process, the risk of extinction of species and populations is growing faster. The traditional varieties have value even if they are currently undetectable. The Hungarian

Speckled Hen is a result of a cross-breeding system between the Hungarian domestic hen and many foreign species and after that were followed a pure-breeding. (MÁRTHA, 1962).
BÁLDY (1957) wrote the following about the economic value of the Hungarian chicken: the Hungarian backyard chicken is best suited for keeping as they are the most industrious food seekers, unpretentious, trained animals, well-adapted to our extreme climate.
The experiments and studies carried out in Hungarian Speckled Hen stock kept since 1977 on the Pilot Farm of the Szeged University Faculty of Agriculture also served the purpose of finding the place of Hungarian poultry in hen production of goods (SÓFALVY, 1990)

MATERIAL AND METHODS

The native speckled hen stock was founded in our pilot farm in 1977. The aim is to maintain and conserve the breed. We are breeding two species: the Hungarian Specled Hen (further: feathered neck) and Speckled Transylvanian Naked Neck Hen (further: naked neck). We maintain 4 lines from the feathered neck breed and 1 line from the naked neck breed.
The elite stock is placed in 35 compartments. In 7 compartments we establish strains per-lines. We register the feathered neck variety lines with 21, 22, 24, 28 codes, and the naked neck line with a 26 code. The lines are separated by age groups, so that two-year-old hens are placed in three pens, and one-year-old hens are putt in four pens. We put young, one-year-old cockerels in each pen. After the end of summer colonization the supernumerary pullets and cockerels will be sold.
In the laying period the egg production of each pen is recorded. Our trap-door nest technology is suitable for the measurement of individual egg production as well. In the statistical analysis the calculations have been made using the Microsoft Office Excel 2007 and the SPSS 15.0 for Windows program packs.

RESULTS AND DISCUSSION

Our breeding aim is to maintain indigenous Hungarian hens as separate species. The constant preservation requirement is to maintain the original external and internal features with the lowest gene loss and avoid the inbreeding. Our stock in the gene preservation program belongs to a classified elite stock.
According to the accepted rules of the gene preservation the most important aspect is the security of species, which we can provide with sufficient standard animal number. The reserve number should be determined so that the elite stock can be replaced at any time in unchanged number and unchanged genetic composition. The performance assessments of indigenous poultries are intended to maintain the species in constant form and to prevent the gene loss. The egg production examination in some cases might also mean the selection of birds which have extremely positive or negative production.
In our stock hatching takes place in spring every year preceded by a 7-10-days' egg collection period. The hatched chickens are marked with individual numbers wing bands, and they are taken to a nursery building". There are separate places for the feathered neck stock and the naked neck stock. The measurement of live weight will take place every 4 weeks.

The preselection is made at 10 weeks based on body development, feathering, health status and skin colour. Chicks which are not suitable for the breeding program will be selected. In 15 weeks of age cocks are separated from pullets. In cocks stock there is a greater selection pressure, we keep those cocks who have optimal body development level, optimal feathers and skin colour corresponding to the standard. The colonization of pullets will be held in 20 weeks of age.

After the colonization we monitor the egg production capability of each genotype according to lines. The laying period begins in September and lasts until June next year. Then the two-year-old hens are disposed of, and the one-year-old hens undergo a moulting period.

In the production of one yeard old hens the 22 line supplied the highest performance. However, its standard deviation was also the highest. There was no significant difference ($p<5\%$) between the feathered neck and naked neck breeds. The average egg production of two-year-old hens confirms that trends reported in the literature that there is a decline in the number of eggs compared with the first laying period production. We don't find significant difference ($p<5\%$) between the feathered neck and naked neck breeds production.

In the one- and two-year-old hens stocks we made a representative egg measurements. We can see in *Table 1.* that the one-year-old hens eggs show a homogeneous distribution, and there can not be detected statistical difference between the lines ($p<5\%$).

Table 1. The egg weights of one-year-old hens

Line	n	Egg weigh (g)	
		x±s	CV%
21.	75	55.82±4.21a	7.55
22.	75	56.33±5.08 a	9.02
24.	75	56.47±5.28 a	9.36
28.	75	56.21±4.67 a	8.31
26.	75	54.35±5.18 a	9.54
Average		**55.89±4.91**	**8.79**

The naked neck hens (26. line) produced smaller eggs, but the difference is not significant ($p<5\%$).

It is found in the two-year-old hens production, that near the decreasing of the number of eggs the egg weight was increased. The measured egg-weights comply with the Hungarian meal standard. The standard deviations are not significant.

Table 2. The egg weights of two-year-old hens

Line	n	Egg weigh (g)	
		x±s	CV%
21.	75	59.47±3.86 a	6.49
22.	75	58.77±4.68 a	7.97
24.	75	58.54±5.26 a	8.99
28.	75	59.22±3.57 a	6.04
26.	75	57.31±3.96 a	6.71
Average		**59.00±4.42**	**7.5**

The egg production of the stocks was studied from 20 weeks of age (colonization). The production level of 30% was reached after the 6th production week. Top production occured after the 21th production week.
In wintertime in December as a result of the outgoing system and the short and cold days the egg production of naked neck hens fell below the 10%. The observed fluctuations of persistence can be explained by climatic influences. Performances before the moulting were over 40%.
We examined the eggs shape index of the stock, which is the ratio of the egg length and width. The naked neck line producing significant ($p<5\%$) more longish eggs, than the feathered neck variant. The shape index values in both varieties correspond to the breeding eggs standard.
In *Table 3*. we can observe that the feathered neck hen's egg weight in each examined time (reaching the 30% production level, in top production level, and under 30% production level) are bigger. Single trend in both breeds that the highest measured weights are in top production time. This is not supported by the literature, because the performance tests have shown that the egg weights are the highest at the end of the egg production period.

Table 3. Quantitative properties of the eggs

Production level	n	Egg weight (g)	Height (cm)	Latitude (cm)	Shell strength (N)	Albumen weight (g)	Yolk weight (g)	Shell weight (g)
F-neck[1] 30%	80	55.10	5.59	4.28	25.80	31.01	16.61	7.09
N-neck[2] 30%	20	53.33	5.61	4.21	22.87	29.71	16.31	6.87
F-neck top production	80	61.49	5.81	4.47	24.80	33.84	19.75	7.62
N-neck top production	20	59.25	5.76	4.39	20.47	31.55	19.88	7.46
F-neck under 30%	80	60.64	5.82	4.43	28.13	30.64	20.27	7.35
N-neck under 30%	20	55.05	5.66	4.30	23.40	29.53	18.16	6.84

[1]Feathered-neck
[2]Naked-neck

The higher egg weights measured in top production period can be explained by the fact that the yolk weight for the top production period has increased significantly. In top production period the eggshell strength in both species are the weakest, which are in contrast to the other Hungarian bred hens (Yellow Hungarian Chicken, White Hungarian Chicken) eggshell strengths, which show lower values at the end of the laying periods. (GALLUS_05). The dried eggshell weight in both species was the biggest in top production period, which can be explained by the size of the eggs.

The eggshell colour is important to consumers opinion. The preliminary studies and publications have shown that the Hungarian speckled hen produces mixed eggshell colours. The four-scale colour distribution examination showed that he beige coloured eggs occur the largest percentage in the feathered neck breed, while we could register brown

shelled eggs in largest proportion in naked neck hens stock. The typical Leghorn-type, white egg-shell has not occurred during the laying period.

Hatching to replace the breeding stock happens once a year. The growing of the young animals begins in April. The hatchery eggs are candled on 10th day of incubation period. The results of incubation are presented in *Table 4*.

Table 4. The results of incubation

Line	Age (year)	Incubated egg (nr)	Infertile egg %	Bloody egg %	Suffocated egg %	Hatched egg %
21	1	315	7.6	4.4	6.0	81.9
	2	125	6.4	4.0	12.0	77.6
22	1	341	4.4	5.0	23.8	66.9
	2	148	2.7	6.1	14.2	77.0
24	1	339	7.1	7.1	12.7	73.2
	2	122	7.4	7.4	11.5	73.8
26	1	346	10.4	4.0	23.4	62.1
	2	98	11.2	3.1	14.3	71.4
28	1	359	10.0	3.6	9.5	76.9
	2	151	8.6	6.0	23.2	62.3
	Total	**2344**	**7.7**	**5.0**	**15.2**	**72.1**

The results show that the highest percentage of infertility occurs in naked neck stock. The highest percentage of bloody eggs was in the 24 line. The highest proportion of rotten (suffocated) eggs was in the 22 code. The hatching percent projected on inlaid eggs was 72.1 %, which can be considered a good result for this genotype.
Learning from the experience of previous years, where the hatching percentage was lower and the number of infertile eggs was higher, we put 3 cockerels on 20 hens in each compartment. The results draw attention to the fact that could be achieved narrower cock:hen sex ratio than 1:10 ratio, furthermore reserve cockerels should be ensured, especially if the candling results are disadvantageous.
Between the examined hatching parameters there was no significant difference (P <5%). The proportion of infertile eggs, there was significant difference (P <5%) between the one-year and two-year-old hens, as a consequence of the less favourable results of two-year-old hens. We investigated the differences between the lines, separately for the one-year and two-year-old hens. Significant difference (P <5%) was not observed.

CONCLUSIONS

• The Hungarian Speckled Hen and the Speckled Transylvanian Naked Neck Hen egg production can not be a competitor to the intensive varieties and hybrids.
• Species produce the greater quantity of eggs in the first egg production period.
• The average weight of eggs in the second year is greater than in the first laying period.
• Contrary to the published literature in our stock we can measure the largest eggs in top production period.
• After 6th week of the colonization the egg production level reaches 30%, and the top production is after the 21st laying week.
• The average shape index values correspond to the meal- and breeding eggs standard.

• The naked neck species produce longer eggs.
• The smallest shell strength can be found in top production period.
• The colour of the eggshell belongs to the colour category (light, beige, brown). There is a difference between the egg shells colour of two species, while the feather neck variety produced the largest amount of beige-coloured eggs, the naked neck variety mostly produced brown eggs.
• The incubation results showed that the two years old hens's hatching results are worse.
• The narrowed sex ratio increased better incubation results.

To summarize, the Hungarian Specled Hen and the Transylvanian Naked Neck Hen are suitable for households to produce meal-eggs as well as hatching and breeding-eggs. Our breeding program can be called a success breeding work because of our species production correspond with national breeding program's parameters and we was able to maintain our species with the lowest gene loss.

REFERENCES

BÁLDY B. (1957): A Baromfi tenyésztése. Mezőgazdasági Kiadó, Budapest. 370 p.
BODÓ I. (1991). A géntartalékok megőrzése az állattenyésztésben, Akadémiai doktori disszertáció. 11-34.; 149-155.
BÖGRE J.-DOHY J. (1991): Gondolatok a génerózió és az állatnemesítés néhány új aspektusáról, az „adekvát mutációk" tükrében, Állattenyésztés és Takarmányozás 40/3, 195-201.
HORN P. (1981): Tyúkfajták és hibridek (in. A baromfitenyésztők kézikönyve szerk.: Horn Péter). Mezőgazdasági Kiadó, Budapest 300-314. p.
MÁRTHA ZS. (1962): A magyar tyúk nemesítésének első időszaka. A Magyar Mezőgazdasági Múzeum Közleményei, Mezőgazdasági Múzeum, Budapest. 63-83.
SÓFALVY F. (1990): Őshonos kendermagos tyúkállomány génveszteség nélküli megőrzése. Tessedik Sámuel Tiszántúli Mezőgazdasági Tudományos Napok, Szarvas. 77-78.
SZABÓNÉ WILLIN E. (1996): A gazdasági állatok géntartalékainak megőrzése (in. Az állattenyésztés alapjai. Szerk.: Nagy Nándor). Mezőgazda Kiadó, Budapest. 276-278.