Review on Agriculture and Rural Development 2015 vol. 4 (1-2) ISSN 2063-4803

THE HATCHING RESULTS OF HUNGARIAN SPECKLED HENS IN A GENETIC PRESERVED STOCK IN HUNGARY

ÁKOS BENK

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

ABSTRACT
In the pilot farm of Szeged University Faculty of Agriculture we keep two varieties of the Hungarian speckled hen, the feathered-neck variant and the bare-neck type since 1977. 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. Programs supporting ecological-biological farming that began in the last two decades placed the domestically bred birds in the forefront both as purebreds and as candidates in projects for developing merchandisable bio-poultry. 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 hatching results of both type of speckled hens, during more than 20 generations.

Keywords: Hungarian Speckled Hen, Speckled Transylvanian Naked Neck Hen, genetic preservation, hatching results, infertile eggs.

INTRODUCTION

Humanity is constantly forming and shaping its environment, including the values created by its own in the animal kingdom. Owing to the changing human need we are creating newer and newer species with better and better qualities, sometimes leaving our older species to be lost. Our old species are not compatible with the modern ones and cannot keep up with the industry-like economical production. For this reason we have to endeavor to preserve our old species and to keep their important characteristics that can be utilized for breeding later on. One of the criteria of the gene preservation of our aboriginal species is to keep our species in an unaltered form with minimal gene loss preserving their original variability. 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. As a result of the chicken domestication, more than 200 varieties developed (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. During the animal breeding, the result of selection for economically advantageous characteristics, some important features like the body strength, the resistance, the adaptability and the variation, etc. disappear (KISS, 1994).
Nowadays keeping traditional species is more and more preferred both in plant production (JAKAB ET. AL., 2014) and animal production (BENK, 2014). Indigenous species require less manual care than species kept with intensive methods, however adequate keeping tenchnology and animal welfare must be provided for all them (PINNYEY, 2002). 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 Association of Hungarian Small Animal Breeders for Gene Conservation serve the purpose of gene preservation of the old poultry farms that carry out the breed conservation duties and represent the breeders to the state organizations and breeder authorities. The aim of the Association furthermore is to represent and hold together the institutions, enterprises and private breeders as a breeding organization.
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 METHOD

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 Speckled 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.
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.
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 put 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.
At the end of March we carry out a 7-10 day breeding egg gathering before the hatching. In this period we weigh the weight, length, width of the breeding eggs and record the shell color of the eggs. The egg weigh is weighed on 1 g punctuality scales and the measurement of the length and with is carried out by vernier. The egg shell color is classified in one of the four classes we defined (white, light, beige, brown).
The eggs are stored in an air-conditioned chamber during the breeding egg collection period. The pedigree hatching according to the lines is carried out at private entrepreneurs. On the tenth day of the hatching candling is done as a result of which the proportion of the infertile eggs can be calculated. We calculate hatching percent after the hatching of chicks.
There are detailed and evaluable statistical data since 1992, thus I could assess the results of more than 20 generations.

RESULTS

The examination of hatching results

The data of the hatching in the feathered-necked stock (*Table 1*) show results in the case of the four lines. The hatching percentage of our stock in the fourth year after the initial years increased to 70%, then after eleven generation this value following a slow downward trend dropped below 70%.

The crossing between the lines did not cause any change having regard to the hatching results of the feathered-necked stock after this period. Hatching results could have been expected to improve. The change of incubators in 2008 caused outstanding improvement in the hatching results. Over 80% hatching percentages were produced by the feathered-necked stock during the last six years.

Table 1. The hatching results of speckled feathered-neck stock and naked-necked stock

Years	Hatching results (%)				
	Feathered-neck lines				Naked-neck line
	Line 21	Line 22	Line 24	Line 28	Line 26
1992	74.32	50.00	46.50	81.95	51.80
1993	71.04	65.00	71.08	70.00	61.41
1994	61.15	59.41	65.28	61.57	54.72
1995	66.72	68.71	64.59	64.83	62.95
1996	77.33	77.04	77.89	76.67	68.28
1997	78.03	76.11	74.67	78.18	68.19
1998	73.57	73.75	69.66	75.44	62.93
1999	72.44	69.84	66.67	63.25	58.59
2000	83.19	71.06	76.44	77.31	64.41
2001	73.65	75.48	67.70	73.10	57.11
2002	57.32	53.37	57.53	54.69	51.47
2003	74.09	74.92	72.73	72.59	61.66
2004	70.58	68.79	68.06	67.64	56.71
2005	71.87	63.45	65.06	69.40	50.80
2006	71.84	65.75	66.84	68.56	52.36
2007	63.47	67.94	63.88	67.00	56.10
2008	80.68	69.94	73.32	72.55	64.19
2009	86.00	84.69	87.25	82.46	66.81
2010	80.77	80.77	84.23	83.33	59.50
2011	79.15	83.15	80.20	87.80	65.77
2012	86.71	85.69	80.60	83.92	56.30
2013	84.22	86.76	82.84	85.23	68.41
2014	85.31	84.34	83.63	86.72	70.35

During the last twenty-three years, the naked-necked stock produced lower hatching results than the feathered one supposedly because of a high degree of inbreeding. During the first five years of the study period, the hatching percentage showed an improving tendency, but in the year of 2005, the naked-necked stock produced only around 50% hatching results. From the second year after the blood-freshing through four generation we can experience a growing trend having regard to the hatching results. During the latter three years decrease can be seen in the hatching results of the naked-necked stock.

By examining the hatching results of twenty-three generations, we can see (*Table 2*) that the infertile egg ratio of around 10% initial values decreased to under 10% of values. The annual rate of the infertile eggs in 2002 is so high due to the failures of the hatching technology. During that year a lot of eggs became addled at the first candling because of the malfunction of the hatchery, which increased the percentage of the infertile eggs.
The „improvement" of the infertile egg rate may be the result of the crossing between the lines.
By examining the proportion of infertile eggs, it can be seen that the 26th line can be characterized by greater degree of infertility, than the others (only one generation is an exeptional from the tested 20 generation).
The infertility among the naked-necked stock, compared to the stable results of the mid90s (12%), significantly decreased by the early 2000s (15%). During the period following this, the infertility of the Transylvanian naked-necked hens shows a rather fluctuating status. Not taking into consideration the initial year, between 2006 and 2007 was the difference the maximum (some 10.1%) measuring it by the percentage of the infertile eggs.

Table 2. The infertile egg ratio of feathered-neck stock and naked-neck stock

Years	The infertile egg ratio (%)				
	Feathered-neck lines				Naked-neck line
	Line 21	Line 22	Line 24	Line 28	Line 26
1992	9.38	17.32	16.00	8.78	21.60
1993	9.25	11.32	9.85	8.94	12.34
1994	11.54	11.18	12.26	8.43	13.19
1995	9.51	10.00	11.48	11.17	12.46
1996	7.50	8.31	10.07	9.47	12.59
1997	9.31	7.96	10.24	9.49	13.49
1998	9.11	7.68	9.83	7.54	10.52
1999	8.84	8.35	9.46	8.76	12.47
2000	7.65	13.83	11.54	9.76	15.92
2001	7.60	8.69	13.71	11.67	14.33
2002	15.00	17.35	13.46	16.30	19.07
2003	8.39	7.24	7.81	8.67	14.92
2004	7.44	6.26	8.59	7.94	13.16
2005	8.60	8.33	11.11	9.29	16.79
2006	6.53	7.40	7.43	6.90	9.43
2007	11.70	6.62	10.25	9.39	15.08
2008	7.27	3.89	7.16	9.61	10.59
2009	7.56	7.55	7.84	8.77	11.30
2010	9.23	9.04	7.12	7.75	19.53
2011	5.42	5.35	14.33	5.42	10.25
2012	5.35	7.43	4.68	10.78	12.61
2013	4.34	5.23	8.32	3.44	10.21
2014	6.32	4.04	7.49	7.33	8.45

After the year when the blood-freshing was applied to the naked-necked lines in 2004, the proportion of the infertile eggs declined by 3.63%. Since it can be seen by examining the results of the other lines in this particular year that the proportion of infertile eggs declined, it is presumable that the lower hatching proportion can be the result of some kinds of technological problems.

CONCLUSIONS

By examining the hatching outcomes of twenty-three years, we can conclude that the race preserving breeding can be considered successful in the feather-necked stock, since the major changes occured in the hatching results can be attributed to technological malfunctions and changes. The major fluctuations, experienced in the hatching results of the naked-necked stock, are supposedly due to hatching technological faults, changes, and of course because of a greater degree of inbreeding.

REFERENCES

BENK, Á. (2014): A magyar nemesített tyúk génmegőrzésének eredményei. Doktori Disszertáció. Állattudományok Doktori Iskola. Debreceni Egyetem. 153 p.

HORN, P. (1981): Tyúkfajták és hibridek. In: Horn, P. (ed.): A baromfitenyésztők kézikönyve. Mezőgazdasági Kiadó, Budapest. Pp. 300-314.

JAKAB, P., NAGY, P., KRISTÓ, I. (2014): Environmentally friendly nutrient supply of maize. Review on Agriculture and Rural Development 3(1): 320-323.

KISS, I. (1994): A kendermagos magyar tyúk tojástermelése. Szakdolgozat. Hódmezővásárhely.

PINNYEY, SZ. (2002): Bánásmód az állatokkal. In: Várnagy, L. (ed.): Állategészségvédelem. Mezőgazda Kiadó, Budapest. Pp. 314-322.

SÓFALVY, F. (1990): Őshonos kendermagos tyúkállomány génveszteség nélküli megőrzése. Tessedik Sámuel Tiszántúli Mezőgazdasági Tudományos Napok, Szarvas. Pp. 77-78.