LIVE WEIGHT CHANGE EXAMINATIONS OF INDIGENOUS SPECKLED HENS ON A FARM IN HÓDMEZŐVÁSÁRHELY

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ABSTRACT
The aboriginal species are not compatible with the modern ones in general and cannot keep up with the industry-like economical production. For this reason we have to endeavour to preserve our old indigenous 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 in an unaltered form with minimal gene loss preserving their original variability. In the Pilot Farm of the University of Szeged Faculty of Agriculture we have been dealing with the genetic preservation of two breeds of the aboriginal speckled Hungarian hens – the Speckled Hungarian Hen and the Speckled Transylvanian Naked Neck Hen since 1977. We examined the quality parameters of the two species of speckled hens looking for answer to the questions whether it was possible to preserve the live weights after twenty generations, whether the original variability is preserved and whether we carried out successful gene preservation activity during the gene preservation work.

Keywords: Speckled Hungarian Hen, Speckled Transylvanian Naked Neck Hen, genetic variance, gene preservation, rare breeds

INTRODUCTION

Animal production has significantly increased during the last couple of decades. (WOELDERSE et al. 2006). 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. (SÓFALVY, 2002). BODÓ (1991 wrote in order to protect the genetic reserves: the evolution of various biotechnology techniques results displacement of more productive domestic breeds local varieties with less productivity throughout the world. The degradation of native (old traditional, local) varieties, their decline, and disappearance, -says BÖGRE and DOHY (1991)- is a drastic form of a process, when the total gene pool of a breed (genotype group) is wasted Original indigenous breeds are often replaced by globally used high productive breeds. The least popular breeds are often maintained only locally and in small populations. (WOELDERS ET. AL., 2006). The Food and Agriculture Organization of the United Nations has been mandated by its member nations to manage the global animal genetic resources, and major progress has been made.(BARKER, 1999) In Hungary there is an official programme for maintenance of domestic animal genetic resources which is supported financially by the government. (BODÓ, 1985). Conservation of local breeds (both plants and animals) through the development of different ecological types of production systems and products have real importance in maintaining agro-biodiversity and agro-ecosystems. (SZALAY - DONG XUAN, 2008). Preservation of genetic resources of domestic animals is a specific way to protect the gene reserve. (BODÓ, 2011) The in situ conservation of live populations requires no advanced technology. There are optimal sampling strategies and breeding strategies but the basic needs of an in situ programme are already available and affordable throghout the world. The farmers of every region and nation know how to manage and maintain their local strains. They already have the capability, all they require its direction. (HENSON, 1992).. The breeds thus conserved

will provide valuable resources for the future of agriculture, especially in the developing world. (HALL – BRADLEY, 1995)

MATERIAL AND METHODS

The native speckled hen stock was founded in our pilot farm in 1977. 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 (21., 22., 24., 28. lines) and 1 line from the naked neck breed (26 line). For the preparation of our work we use of the production data of the Speckled Hungarian Hen and the Speckled Transylvanian Naked Neck Hen stock of the Pilot Farm that is kept as elite stock.
We carry out our breeding program as a continuation of Dr. Ferenc SÓFALVY's work both in case of the Speckled Hungarian Hen and the Speckled Transylvanian Naked Neck Hen.
Till 1998 the naked neck stock was not homozygote. At the hatching of the naked neck line feathered neck chicks hatched. Homozygote examination was carried out with regard to the naked neck hens as a result of which the feathered-collar necked heterozygote specimens were rejected. Since then we have used the cocks which were absolutely naked on their neck and crop part of the body. They were considered like homozygote in sense of naked neck. To prevent the deterioration of inbreeding in the case of the feathered neck stock we have been applying the cocks according to a rotating mating system on the certain lines since 2001. The hens of the line stay in their place and the cocks are changed every year in rotation. We carried out out-crossing in our naked neck stock with roosters brought from Gödöllő in 2004.The standard of values of the speckled hen was measured consequently in certain periods. The weight of the one year old hens in the stock was weighed every year till the age of 20 weeks at colonization. The weight of the penned hens was measured on 5 g punctuality Berkel scales. At the end of the examination we calculated the average, deviation and relative deviation.
We carried out the data procession, analysis and graphic representation with the help of Microsoft Office Excel 2003 program. SPSS for Windows 15.0 program was used for the analysis. The data were analyzed by the method of variance. The results obtained during the tests are presented in tables or in graphical form. On the graphs we illustrated the average values, the standard deviations and the coefficient of variation. The formal establishment of the graphics was carried out using Microsoft Photo Editor 3.0.2.3 and GIMP 2.6.11 editing program.

RESULTS

Examine the body weight of the one years old hens of the 21st -line at the time of the colonization (Figure 1.) we concluded that the body weight through the initial eleven generation said to be stable. Because of the result of crosses between the lines -which was started in 2001- the body weight was significantly ($P<5\%$) reduced until the second generation period. This lower body weight has been preserved through four generations. The stabilization selection regarding to the body weight was successful as the body weight remained within the standard deviation values and at the end of the test period and the body weight was similar with twenty generations before.

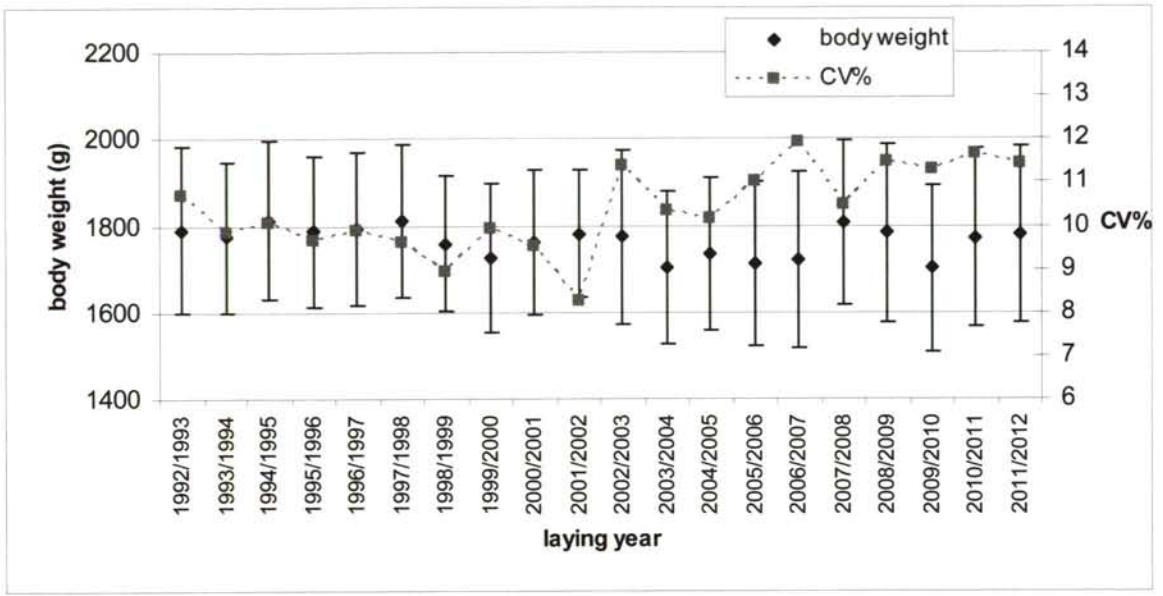

Figure 1. The body weights of one year old hens of 21st line at colonization

The initial downward trend of the standard deviation values were stopped by the rotation pairing with the cocks because the standard deviation values have increased significantly (P<5%) in 2002. Since then the deviation values of the 21st-line are similar to those of the initial period. From the beginning of the test the variance of the body weight at the colonization showed a downward trend. The variance has been increased to a moderate level by the breeding started in 2001.

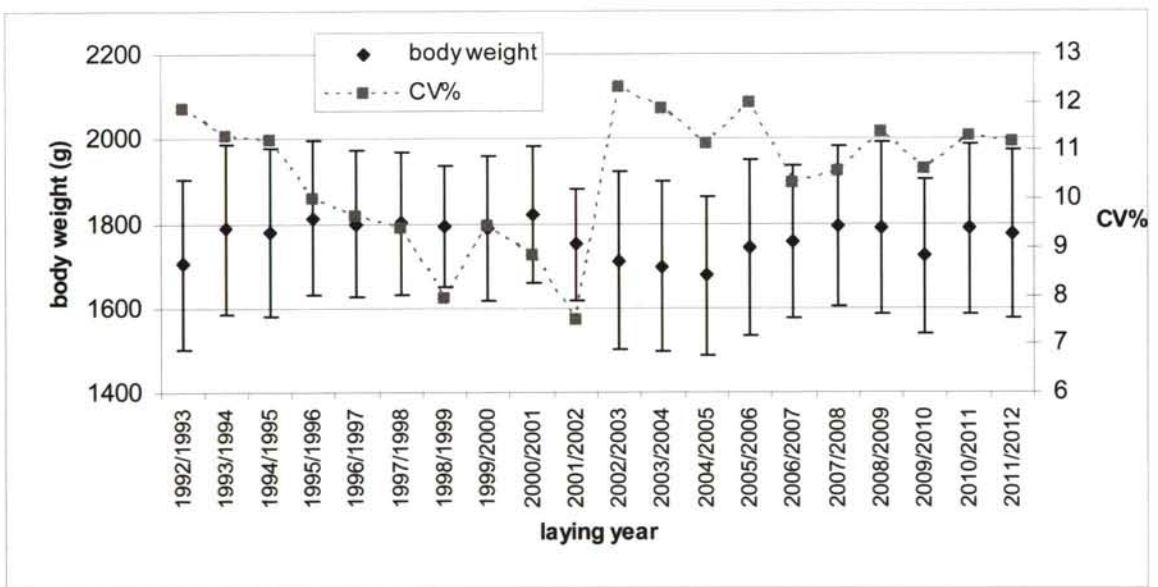

Figure 2. The body weights of one year old hens of 22nd line at colonization

Studying the live weights of the 22nd -line at the time of colonization (Figure 2.) we can say that the average body weight, comparing to the initial values, had increased during the second year of the study period, which was stabilized close to 1800 grams through eight generations. In the third generation after the crossing between the lines we can experience a significant

decrease (P<5%) with the pre-crossing values. Similarly to the previous line, the body weight of the recent period show almost the same values compared with the beginning of the test. The trend of the standard deviation of this line was influenced by the crosses between the lines. Similarly to the previous line the decreasing standard deviation values of the initial period have high value since the introducing of the breeding process till today. Examining the variance we can conclude that the decreasing low variance has been raised to a medium level by the crossing procedure. In case of the 22nd-line the race preservation proved suitable for the development of the weight and the values of the standard deviation because of the similar values measured at the end of the test than it was at the beginning of the test.

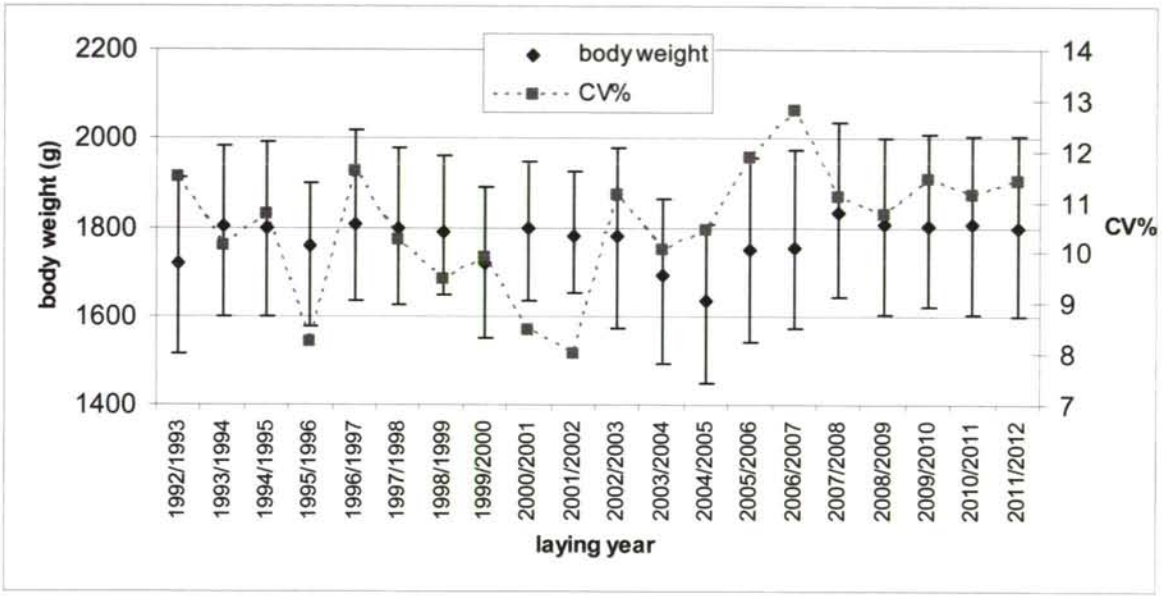

Figure 3. The body weights of one year old hens of 24th line at colonization

The body weight of the one-year old hens of the 24th-line at the time of colonization (Figure 3.) was stabilized from the initial value over 1700 grams to under 1800 grams by the early 2000s. After starting the crossing between the lines in the second generation a significant (P <5%) decrease can be observed in body weight, which increased in the fourth generation, and later on it was stabilized over the value of 1800 grams. The decreasing trend of the standard deviation values - similarly to the two previous lines – disappeared after the effects of the 2001 line-crossing. Since then, the stock has higher standard deviation values. The trend of the decreasing relative standard deviation also disappeared after the starting of the crossing procedure and since then it has been moving at a moderate level. The values of the body weight of the 24th-line were stabilized during the last four years and show similar values measured at the beginning of the test period, and therefore the stability of the selection at this code also proved successfully.

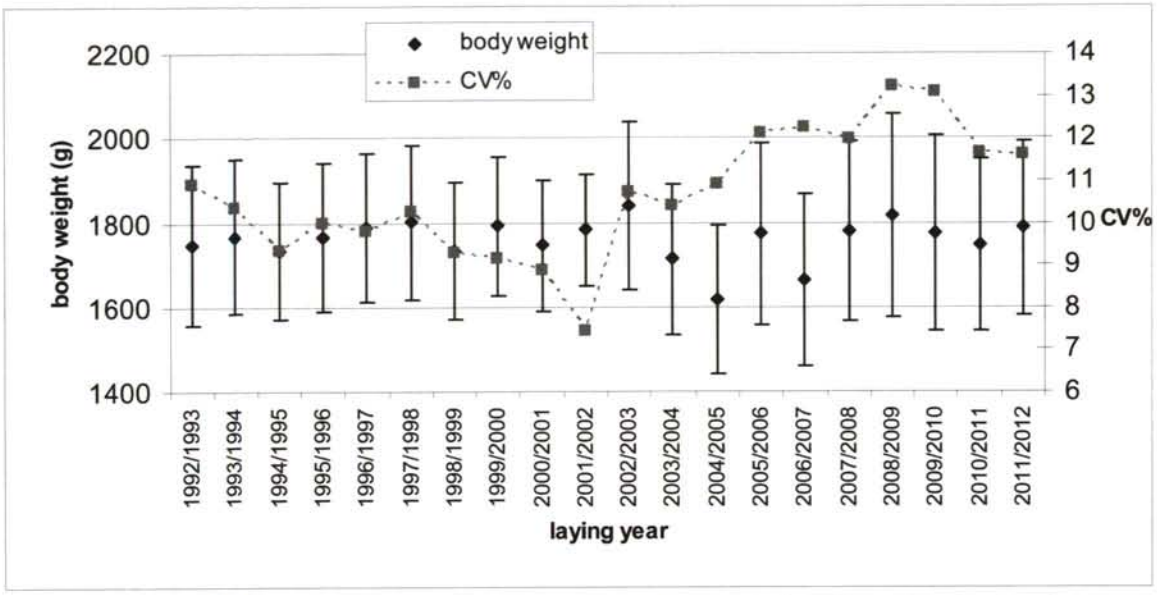

Figure 4. The body weights of one year old hens of 28th line at colonization

The trend of the body weight of the 28th-line is similar to the ones in the previous lines. The values of the body weight in the first half of the test period (Figure 4.) was close to 1800 grams. After starting the crossing process in the second generation we observed a significant ($P<5\%$) weight loss. The body weight of the subsequent generation decreased close to 1600 grams. We can observe significant ($P<5\%$) fluctuation among the values of weight of the subsequent third generation. The values of weight of the later three generation are similar to values measured during the initial time of the investigation, which proves the correctness of our breeding process.

The development of the standard deviation values was similar to the previous three lines. The downward trend of the initial values was stopped by the crossing programme introduced in 2001. Since then the 28th line has higher standard deviation than the initial values, which refers to the imperfection of the stabilizing selection. The initial medium variance during nine generations decreased to low level. (CV% below 8%), which increased to 10 % relative standard deviation value after introducing the crossing programme among the lines and currently it is still at a medium level.

The average weight of the nacked-necked breed signed with 26 number dropped to below-1600 grams through five generations (Figure 5.), which is significantly less ($P<5\%$) than the initial value. The hatching of the 1998th year was already carried out by using eggs coming from breeding with homozygous naked-necked cocks. At the colonization carried out in 1998 regarding to the body weights there was significant ($P<5\%$) growth compared to the previous year.

By the introduction of out-crossing with cocks from Gödöllő carried out in 2004 year significantly ($P<5\%$) lower weighed stock was colonized in the following year. After the growing trend of the body weight of the stock, the weight of the one year old naked- neck hens were stabilized. In 1998 the standard deviation values decreased at the beginning of the breeding by homozygous cocks. Probably because of the strong selection effects, then they increased and showed higher values compared to the previous period after the introduction of blood-freshing.

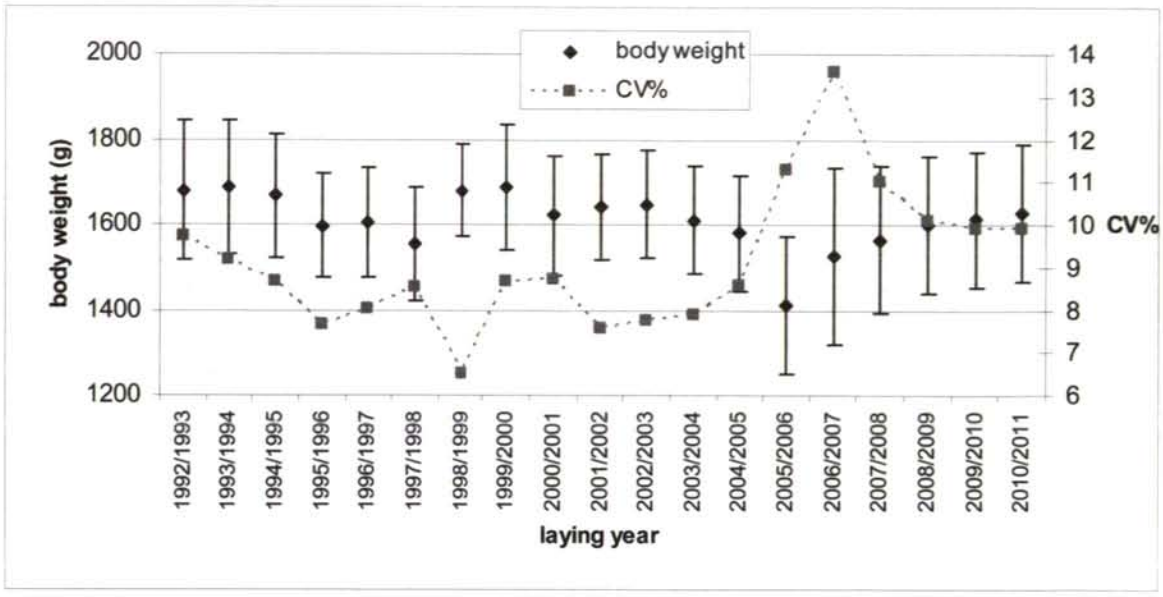

Figure 5. The body weights of one year old hens of 26th line at colonization

Less than 10% level of the relative standard deviation values were raised above 10 % by the blood-freshing, which has been stabilized around 10 % with decreasing tendency.
The failure of our race preserving breeding at the 26th line can be blamed for the fact that the value of the average body weight is below the initial ones; but the standard deviation are greater than their baseline values.
The weight of the naked necked stock showed significantly (P<5%) lower values compared to the lines with feathered necks. Significant differences can be found among the body weight of some lines with feathered necks in particular years of the test period, but unequivocal conclusions can be drawn only from the different body weights at the colonization in the year of 2002. There were no significant (P<5%) differences, between the body weights of the 21st and 24nd lines in this year. The body weights of the other lines were significantly (P<5%) different from each other.

CONCLUSIONS

The breeding process between lines applied in the feathered neck stock at present is suitable for maintaining the variability of live weight on a medium level. There was a significant decrease of the average body weight of the naked neck stock in comparison with body weight of 20 years before. Considering this, the breed maintenance breeding in case of the naked neck stock was not successful. With the species preservation selection applied in the stock of the Speckled Hungarian Hen it was possible to preserve the body weight value at colonization on a level near to the one recorded twenty years ago. In the perspective of these two plummets we can declare that our breeding programs are successful.

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