Lucrări ştiinţifice **Zootehnie şi Biotehnologii**, vol. **42 (2)** (**2009**), Timişoara

CONTRIBUTIONS TO KNOWING THE SEGMENTED MESODERM DEVELOPMENT IN *TRANSYLVANIAN NAKED NECK* BREED

CONTRIBUŢII LA CUNOAŞTEREA MODELULUI DE DEZVOLTARE A MEZODERMULUI SEGMENTAT LA RASA DE GĂINI *GÂT GOLAŞ DE TRANSILVANIA*

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In Romania, the Transylvanian Naked Neck hen breed is considered to be an "endangered" population, reason for which we consider that a special attention should have been given then until now. Plymouth Rock breed was imported for the first time to Romania from the Studler Company, France in 1969. The present work is aiming to study profoundly the development model for development at 26, 30, 40, 50 and 60 hours incubation age, in Transylvanian Naked Neck hen breed and compare it to Plymouth Rock breed. The observations are proving that in the first 60 incubation hours the segmented mesoderm morphogenesis in the two breed, is different, dictated by the two different genetic structures. It is noticeable that Transylvanian Naked Neck is characterized by a vigorous embryonic development, overcoming, the other breed tested by the age of 40 incubation hours. We estimate that the two breeds have a good combinative capacity, which recommend the utilization of these genetic materials to obtain hybrids for producing "peasant-type" chicken meat, very well-appreciated by the Europeans between the two World Wars.
Keywords: mesoderm segmentation, embryos, Transylvanian Naked Neck, Plymouth Rock

Introduction

Transylvanian Naked Neck breed also known as turkey hen or Turkish hen breed, it represents a national breed that presents a great interest for professional aviculture, for industrial and ecological production units. Culturally, it represents one of the few animal breeds that are related to the name of our country. The Transylvanian Naked Neck breed became known in 1875, when a Transylvanian peasant presented a homogenous group of naked-necked hens at an exhibition in

Vienna. After that, the breed was presented at several exhibitions such as Universal Exhibition in Paris in 1878, Poultry Exhibition in London in 1900 etc. Also, it is a fact that around 1875 the Transylvanian Naked Neck breed was found and well-appreciated in Transylvania, where some breeders started to breed it rationally performing an artificial selection of this breed. These are the breeders that tried to establish a race standard. Later, in year 1905, this standard was adopted and improved by the German Association of Transylvanian Naked Neck breeders from Silesia (Stefănescu, 1956). Transylvanian Naked Neck breed has a special importance for our country that is why we should give it a special attention within the management of animal genetic resources.

Plymouth Rock breed belongs to the American dual-purpose breeds, being formed in Massachusetts. In Europe, it was imported in 1880, in England, and in 1882, in the Netherlands. In 1969 Romania imported N and H lines from Studler Company, France, and S and F lines, from Shaver Company, Canada. Also, in 1984 some lines were imported from Ross Company, England.

Plymouth Rock is a genetic improver breed, the third breed in the world as importance and population number, in the industrial aviculture. It is almost exclusively used as broiler hens.

Transylvanian Naked Neck breed is spread thought the word inclusive South Africa were it is known as "Kaalnek". It is well adapted to extreme high or low temperatures. Presently, this hen breed is used by different firms from Europe in order to obtain hybrids used in ecological breeding but also industrial, mainly because of the breed resistance to extreme heat and the ease of feather remove. The German Pure Bird's Breeders Association has declared it breed in 2005.

The aim of this paper was to carry out development patterns of the mesoderm segmentation during the early embryogenesis in order to achieve a more profound knowledge of these populations. The subsequent objective is to obtain hybrids for producing "peasant-type" chicken meat that was very well-appreciated by the Europeans between the two World Wars.

Materials and Methods

The apparition of a new somites pear is the result of accumulation of cells in that part of the mesoderm after differentiation or apparition of segmentation. It is considered to be genetically determined by a specific genetic structure of the individual.

The measurements carried out in order to establish the standards of the mesoderm segmentation evolution during the early embryogenesis in the two hen breeds were carried out on 16-embryos groups at the age of 26, 30, 40, 50, and 60 hours of incubation. The method used was a special method developed in the Experimental Embryology Laboratory from the Timisoara Branch of the Romanian Academy.

Obtained data was statistically processed in order to quantify the influence of the genetic structure of each embryo category.

Results and Discussion

Time evolution of the mesoderm segmentation in the two embryo groups is presented in Table 1.

Table 1

Evolution of the mesoderm segmentation in embryos from the two chicken breeds [somite pairs/mm]

Embryo groups	Embryos age - hours of incubation				
	26	**30**	**40**	**50**	**60**
Transylvanian Naked Neck	0.33±0.45	0.725±0.40	1.76±0.25	2.31±0.35	5.26±0.65
Plymouth Rock (NH)	0.35±0.32	0.664±0.50	1.45±0.25	3.01±0.35	5.60±0.76
Differences	+0.02	+0.061	+0.31	-0.70	-0.34

Analyzing data in Table 1, it can be noticed that the time evolution of the mesoderm segmentation in the two embryo groups is carrying on using a different model. At the age of 26 hours into the incubation, the embryos from Transylvanian Naked Neck have 0.02 mm more, and at 30 hours the difference in tripled (0.061 mm). The pus in the development of the segmented mesoderm is noticed also at 40 hours, into the incubation. At 40 hours of incubation the length of the Plymouth Rock embryos is 1.45 mm compared to the Transylvanian Naked Neck embryos that have 1,76 mm in length.

After 40 hour of incubation the formation of the segmented mesoderm from the Plymouth Rock breed undergoes an intensification of the grow so that at 50 hour of incubation the measurements register a difference on 0.70 mm between the two breeds. The measurements were 2.31±0.35 mm for Transylvanian Naked Neck and 3.01±0.45 mm for the embryos belonging to the other population.

The superiority of the Plymouth Rock is obviously at 60 hours of incubation, when the difference between the two breeds is 0.34 mm even if the Transylvanian Naked Neck recover 0,36 mm from the difference registered at 50 hours.

In order to perform a more thoughtful analysis of the two embryo groups development models, we present the mean forming speed of the mesoderm segmentation during studied intervals, in Table 2.

Table 2

Average speed of the somite formation in the two breeds [mm/hour]

Embryo group	Age interval of embryos				
	26-30	30-40	40-50	50-60	26-60
Transylvanian Naked Neck	0.09375	0.1035	0.055	0.259	0.144
Plymouth-Rock (NH)	0.0035	0.0786	0.1560	0.259	0.155
Differences	+0.01025	+0.0249	-0.101	0.00	-0.011

Analyzing the data presented in Table 2 it can be noticed that in the first interval studied (26-30 hours) the Transylvanian Naked Neck embryos register a speed plus 0.01025 mm/hour. In the second interval studied the plus is doubled reaching 0.0249 mm.

It is noteworthy the grow speed of the Plymouth Rock embryos in the interval 40-50 hours of incubation (0.1560 mm/hour). The Plymouth Rock embryos have a grow speed greater with 0.101 mm/hour compared with the Transylvanian Naked Neck embryos. This speed allows the Plymouth Rock embryos to recover the handicap accumulated.

In the last interval studied (50-60 hours of incubation) the development speed of the segmented mesoderm of the two lots becomes equal. On all the period studied 26-60 hours, the embryos of the Plymouth Rock breed register a plus of speed 0.010 mm/hour comparative to the embryos of the Transylvanian Naked Neck.

Conclusions

After the experiments we can conclude with certitude that in the first 60 hours of incubation the segmented mesoderm of the two populations studied develops differently following different genetic models. It can be noticed that Transylvanian Naked Neck is characterized by a vigor embryo development exceeding the Plymouth Rock embryos until 40 hours of incubation. The superiority of the Plymouth Rock embryos is obviously at 40-50 incubation hours, after this period the growing speed becomes equal. On the entire studied period 26-60 hours the grow speeds of the two breeds are close in value.

If we add to these conclusions the other renowned qualities of the two breeds, as well as the estimation that both have a good specific combinative capacity, we could recommend utilization of these genetic materials to obtain hybrids for producing the “peasant-type” chicken meat, very well-appreciated by Europeans between the two World Wars.

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