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EFFECT OF STORAGE PERIOD AND WEIGHT OF TURKEY EGGS ON HATCHABILITY

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Sex is a set of genetically determined properties that determine its role in reproduction. Sex differentiation of embryos formed when fused is affected by sex determination factors during the ontogenesis of autosomal sex chromosomes and epigenetic factors of the environment.

Significant sex determination in poultry development actualizes the task on early detection of young birds of incubated young birds. Earlier differentiation of feeding and keeping of grown young by age-sex group allow it firstly to reduce the cost of feed per unit of production, which creates opportunities for reducing the cost and increasing the profitability of industry reference.

According to the classical theory of Fischer [1] on sexual determination of animals, the sex ratio in a large number of samples must be approach 1/1, but this ratio in small samples can move under the influence by both internal genotype and external paratypic factors. In particular, the lengthening of egg pre-incubation storage periods reduces the hatchability of young because of different life potential of embryos that increases the density of males [2].

Ferguson [3] suggested a hypothesis about the possibility of existence of allelic forms of enzyme aromatase or female factor in W-chromosome in different populations of birds that have negative impact on viability of female chromosomes with different sensitivity to external influences (temperature, long-term storage, and etc.), which leads to displacement of sex ratio.

The issue on early sex determination of incubated young birds has a great scientific and practical value that allow to differentiate the technology of its growing and specific feeding rate and diet, which is a determining factor of reduction of costs and feed per unit of production and increasing the economic efficiency of poultry production.

Brood of day old chicks was determined by their quantity and quality. To examine the relationship between hatchability and sexual differentiation with eggs parameters, eggs were placed in control trays setters, differing only by studied parameter: in the 1st experiment - on storage period, in the 2nd experiment - by weight. Storage periods of eggs was controlled by date of receipt in the hatching

house, weight –by weighing. Sex of day-old chicks was determined by Japanese method –differentiation of rudimentary hills in the mucous membrane of cloaca.

Study on evaluation of young hatchability and sex determination were carried out on poultry farms "Ordabasy Kus" of South Kazakhstan.

When collecting, storage and incubation of eggs the temperature and humidity conditions recommended for these hatcheries were reserved. At the initial stage of selection and sorting the eggs looked around topside and sorted according to storage period. The most dirty eggs and eggs with cracked or too thin shell, with calcareous nodules and marble shell, too small and too large, as well as irregular shapes were left.

In the pre-candling were determined the homogeneity of shell, volume and strength of air chamber, mobility of yolk, location of embryonic disc and reject eggs with wrong location or blurred boundaries of air chamber, double-yolk, blood or meat clots, with broken chalaza.

Selected eggs with a clearly distinguishable in candling germinal disc of 4 mm in diameter with a slightly flattened yolk, held on both sides chalaza in a tightly liquefied protein layer were placed in trays of setter.

The incubation of eggs of white broad-breed turkeys was carried out in setters "Petersime" with automatically save of optimal parameters of temperature and humidity of incubation.

The results of incubation allowed to observe the connection of hatchability and sex differentiation of turkeys with parameters of hatching eggs in the form of pre-incubation periods of storage, weight.

In the first study were monitored the hatchability and sex of young from eggs with equal weight, shape and density, but with different pre-incubation periods of storage (Table 1).

Table 1. Hatching and sex of young from eggs with different terms of pre-incubation storage

Control trays	Number of eggs, pieces	Period of storage, days	Fertilized egg		Hatched young		
			pieces	%	sex	among them	
						♀	♂
1-st	126	6	111	88,1	91	45	46
2-nd	126	8	108	85,7	89	44	45
3-rd	126	9	98	77,8	86	38	48

The results of incubation, represented in Table 1, have shown a connection of hatching and sex of day-old chicks with pre-incubation egg storage periods. Thus, the hatching of healthy turkey poults from set eggs in amount of 126 with a shelf life of less than 6 days was 72.2% at the same time from 91 chicks where 49.5% were females, 50.5% males; with a shelf life of 8 days the hatch was 70.6% and from 89 chicks where 49.4% were females, 51.6% males; with a shelf life of 9 days of the hatch was 68.2% and from 86 chicks 44.2% were females, 55.8% males.

In the second study were studied the hatching and sex of young from eggs with different weight, excluding shelf life, shape and density (Table 2).

Table 2. Hatching and sex of young from eggs with different weight

Control trays	Number of eggs, pieces	Egg weight, g	Fertilized egg		Hatched young		
			pieces	%	sex	among them	
						♀	♂
1-st	126	< 80	108	85,7	94	48	46
2-nd	126	80-90	107	84,9	95	45	50
3-rd	126	> 90	96	76,2	72	35	37

Hatching of turkey chicks from eggs with weight less than 80 g was 74.6% so from hatching 94 chicks where 51.1% were females, 48.9% males; weight 80-90 g hatching was 75.4% and from hatched 95 chicks females were 47.4%, 52.6% males; weight more than 150 g hatching was 57.1% and from hatched 72 chicks females were 48.6%, 51.4% males.

Embryogenesis and sex differentiation are related to both genetic and paratypic factors of hatching eggs parameters in the form of pre-incubation periods of storage, weight, shape and density.

Internal genetic factors and external epigenetic factors are influenced on the formation of sex of young bird. During the early embryogenesis at the genetic level there is a sex differentiation of zygote caused by homozygous or heterozygous gametes, which have affected also by paratypic factors.

Ismailov and others [4] in their researchs indicate the connection embryogenesis and sex differentiation with genetic and paratypic factors of hatching eggs and the establishment of parameters of a healthy young goslings with high growth. So, Tagirov found a significant shift of sex ratio towards males formation in hatching of eggs Rhode Island Red after their storage within 15-21 days. In his studies the number of males is almost twice higher than females.

Interconnection of hatchability and sex differentiation with parameters of eggs confirmed by studies of Francis and Barlow [5], Holmgren and Mosegaard [6] on the impact of sex determination in the early stages of embryogenesis temperature and acidity (pH), buffer and salinity of environments. Romanoff [7], Rolnik indicate the impact of paratypic factors of environmental on the formation of sex cells, concentration of estrogen, gas production rate and metabolic processes in different steps of embryogenesis.

Thus, the results of study of communication of parameters of hatching eggs of turkeys with hatchability and sex differentiation of young animals are agreed with the earlier results of study and indicate the possibility to influence on hatchability of young and sex differentiation paratypic factors.

Hormonal methods, giving the opportunity to determine sex of embryo in the early embryogenesis at 3.5-4.5 hours by biopotentials gonads and level of estrogen is acceptable poor in scale of production.

Extension of pre-incubation storage of egg has reduced biocapacity of embryo development. The dependence of hatchability and sex of embryos from egg weight

demonstrated by a higher hatching of a healthy day-old chicks from the average egg weight.

References

1. Fisher R. A. The genetical theory of natural selection. Oxford University Press. - 1930. Volume 3, p-47.
 2. Tagirov M.T. The shift of sex ratio in chickens after prolonged storage of eggs. Moscow. - 2010. Biotechnology, No. 3, p - 84-90.
 3. Ferguson M. W. J., 1994. Method of hatching avian eggss. Pat. WO 94/13132
 4. Ismailov R. A, TemirbekovaG.A and SharipovaR.I.,.Preserving and rational use of gene pool of geese of Northern Kazakhstan. Materials of the IV Kazakhstan International Forum of Poultry Farmers, Astana, 2015. - p - 28-30.
 5. Francis R. C. and Barlow G. W., 1993.Social control of primary sex differentiation in the Midas cichlid. Proceedings of the National Academy of Sciences, 90: 673-675.
 6. Holmgren K. and Mosegaard H., 1996. Implications of individual growth status on the future sex of the European eel. Journal of Fish Biology, 49:910–925.
 7. Romanoff A. L., .Chemical and physiological sex differences in newly hot shed chicks..Poultry Sci. , 2012. - 275:643.
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