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INFLUENCE OF FEEDING NORMS ON BIOLOGICAL INDICATORS AND ON THE PHENOTYPIC VARIABILITY OF MULBERRY SILKWORM UNDER THE CONDITIONS OF THE REPUBLIC OF AZERBAIJAN

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ABSTRACT

In comparison with the normal conditions of feeding, in the conditions of abundant feeding, the mean values of the studied biological indicators (except for the silkiness of wet cocoons) are exaggerated, and phenotypic variability decreases. With poor feeding, the average values of the indicators decrease, and the phenotypic variability increases. During the study, the minimum increase and decrease of the average value of all symptoms and the coefficient of variation in the Mayak-3 breed were revealed; the greatest increase and decrease of indicators were marked in the Yashar breed; and in the Ganja-6 breed, growth and deposition of indicators were at an average level. Thus, the hereditary tolerance to the environmental impact of the feeding factor is strong in the Mayak-3 breed, moderate in the Ganja-6 breed, and weak in the Yashar breed.

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Introduction. In connection with the transition to a market economy in the Republic of Azerbaijan, as well as in many countries of the world, varieties of silkworms, as well as breeds of animals, which are best adapted to individual conditions, i.e. have the ability to more stably in different environments to realize the high genetic potential of productivity, which is better appreciated by agricultural producers.

This is due to the fact that varieties, hybrids and breeds, resistant to external factors, allow agricultural producers to produce products on the rising line, even in unpredictable agricultural

production. In silkworm breeding, the adaptive potential of the breed and hybrids of the mulberry silkworm is one of the factors that stimulate the economic activity of producers of wet cocoons and silkworms.

Therefore, different studies of the breed and hybrids of mulberry silkworm [1,3,8] were conducted, and the scientific-theoretical basis of adaptive selection [2,4] and methods [2,7] was developed. [1,3,5], hybrids created [1,3], distinguished by their ecological sustainability in silkworm breeding, and this process continues.

In order to constantly update the theoretical, methodological, and practical foundations of adaptive selection of the silkworm according to the criteria of need, breeding research in this direction should be continued, first of all, ecological analysis of the reaction of silkworm genotypes (species and hybrids) to different environmental conditions, genetic patterns should be studied in a comprehensive manner.

Purpose of the study. Despite the above, the purpose of our study was to identify one of the most influential environmental factors, i.e. the influence of changes in the feeding rate on a number of parameters characterizing the phenotypic and genetic structure of silkworm breeds, as well as the study of the influence of biological properties on the arithmetic mean (M + m), standard deviation (σ) and the coefficient of variation (CV).

Material. The material of the study was the silkworm breeds Ganja-6, Yashar and Mayak-3, bred in the Republic of Azerbaijan.

Methodology. The studies were carried out in three variants, each of which consisted of 3 repetitions of mixed grain, revived by incubation. Until the end of the 3rd age, all caterpillars, on the basis of the agrozootechnical rules adopted for our republic [2], were fattened under the same conditions. Accounting for caterpillars was carried out at the age of 3 in each variant, in a repetition of 150 caterpillars, 3 main and 1 spare repetition were compiled. From the 1st day of the 4th year until the end of fattening, all variants of the caterpillars were fattened and kept in the same conditions of heat and humidity, only the feed rates were different. So, in the first variant, caterpillars were fed at the rate of 27.84 g per 1 box (abundantly), in the second variant at the rate of 23.94 g per 1 box (norm), and in III, per 1 box they were fed at the rate of 20.70 g (poorly).

To determine the parameters of phenotypic variability of biological traits of the 3 studied breeds, 30 female and male cocoons were taken from each variant (with abundant, normal and poor feeding). The cut cocoons were numbered, weighed one by one on a square and torsion balance, the variant number, cocoon number, and gender was written, and then placed in insulating bags. After some time, the females and males of the butterflies that emerged from the cocoons were mated. From the laying of females of each studied breed of each variant, 30 pieces of grains were taken, normal grains were counted and weighed, and this determined the weight of the setting of grain. The biometric indicators obtained as a result of the study and the calculation of statistical indicators of phenotypic variability were carried out according to the method of N.A. Plokhinsky [6].

The discussion of the results. The results of the average value (M + m) and the parameters of phenotypic variability (σ, CV) of the productive and reproductive traits we studied by breed and form are given in Table. 1. In the course of the study, we planned in advance to analyze each trait separately in order to find out the mechanism of the influence of different feeding norms on the traits we studied and their phenotypic variability. Thus, based on the average value of the analyzed trait obtained in the normal feeding variant and the indicators of phenotypic variability, we compared them with the corresponding indicators obtained in the abundant and poor feeding variants.

As can be seen from Table. 1, the average weight of wet cocoons in all 3 species according to the variants increases against the background of abundant feeding compared to the background of normal feeding and decreases against the background of poor feeding. However, this increase, as well as the decrease, does not occur in the same way for different breeds.

So, against the background of abundant feeding, the average weight of wet cocoons increased by 0.14 g in the Ganja-6 breed and by 0.13 g in the Yashar breed, and by 0.07 g in the Mayak-3 breed, i.e. about 2 times less than the previous 2 breeds.

Apparently, the biological need for a feed of the Ganja-6 and Yashar breeds was higher than that of the Mayak-3 breeds. That is why they are more sensitive to increased feed intake.

Against the background of poor feeding, the average weight of wet cocoons decreases by 0.21 g in Ganja-6, by 0.26 g in Yashar, and by 0.11 g in Mayak-3. As can be seen, the Ganja-6 and Yashar

breeds are very sensitive to an increase in the feed rate, and also react strongly to its deficiency. Mayak-3 is less sensitive to both increases and decreases in feed. Thus, the resistance to the food factor in the Ganja-6 and Yashar breeds is relatively weak, and in Mayak-3 it is relatively strong. It can be concluded that, depending on the purpose, changing the feeding rate reduces the phenotypic variability in the mass of wet cocoons of all three breeds, i.e., the standard deviation, and the coefficient of variation decrease. And against the background of poor feeding increases. In this process, there are significant differences between breeds. The phenotypic variability of the Ganja-6 breed, especially in the Yashar breed, varies over a wider range due to an increase and decrease in the food allowance, while in the Mayak-3 breed it varies within relatively limited limits.

Table 1. The mechanism of influence of the feeding rate on productive and reproductive traits, and on the phenotypic variability of silkworm breeds

Option / **breed**	**I Option**			**II Option**			**III Option**		
	Abundant feeding			**Normal feeding**			**Poor feeding**		
	M+m	σ	CV	M+m	σ	CV	M+m	σ	CV
Wet cocoon weight (g)									
Ganja-6	1,93±0,040	0,220	11,4	2,28±0,032	0,174	7,6	2,14±0,040	0,218	0,218
Yashar	1,73±0,042	0,231	13,4	2,12±0,034	0,185	8,6	1,99±0,041	0,223	11,2
Mayak-3	1,94±0,035	0,194	10,0	2,12±0,030	0,165	7,8	2,05±0,034	0,184	9,0
Weight of cocoon silk shell (mg)									
Ganja-6	416±7,8	42,6	10,2	484±6,9	37,7	7,8	456±7,5	40,9	9,0
Yashar	390±8,4	46,3	11,8	472±7,0	38,4	8,1	440±8,0	43,8	10,0
Mayak-3	450±7,1	38,7	8,6	485±5,7	31,2	6,4	468±6,2	33,7	7,2
Wet cocoon silkiness (%)									
Ganja-6	21,7±0,29	1,59	7,4	21,5±0,27	1,48	6,9	21,4±0,24	1,34	6,3
Yashar	22,7±0,34	1,86	8,2	22,4±0,27	1,50	6,7	22,3±0,29	1,60	7,2
Mayak-3	23,4±0,29	1,54	6,6	23,1±0,24	1,34	5,8	23,2±0,24	1,34	5,8
The amount of grain from one setting									
Ganja-6	575±19,4	106,2	18,5	734±11,8	64,6	8,8	659±14,6	79,7	12,1
Yashar	524±22,5	123,1	23,5	704±13,6	74,7	10,6	665±17,2	94,4	14,2
Mayak-3	623±16,2	88,6	14,2	752±10,8	59,0	7,8	713±13,3	72,9	10,2
Grain mass from one setting									
Ganja-6	365±13,0	71,3	19,5	482±9,0	49,6	10,3	455±11,1	60,8	13,4
Yashar	345±15,3	83,9	24,3	474±9,5	52,0	11,0	450±12,4	67,9	15,1
Mayak-3	397±11,0	60,1	15,1	481±7,0	38,6	8,0	466±9,4	51,3	11,0

The signs we studied: the weight of the silk shell of the cocoon, the amount of grain from one butterfly setting, the weight of grain from one setting, the average significance, and phenotypic variability also change under the influence of different food norms based on the above pattern.

Thus, compared with the background of normal feeding, against the background of abundant feeding, the average significance of all three signs increases, and phenotypic variability decreases. Against the background of poor feeding, on the contrary, the average significance of traits decreases, and phenotypic variability increases. Because of these signs, the difference between the breeds is revealed.

Thus, due to the influence of changes in the feeding rate, all three signs are very different in the Ganja-6 and Yashar breeds compared to the Mayak-3 breeds. This confirms the above. In general, the food factor in the Ganja-6 and Yashar breeds is relatively weak, and the hereditary resistance in the Mayak-3 breed is relatively high.

Despite table 1, the analysis shows that changes in feed norms do not have a natural effect on the silkiness of wet cocoons and their phenotypic variability.

This can be explained by the fact that the silkiness of a wet cocoon is a sign of the ratio of two other signs - the mass of a living cocoon and the mass of the silk shell of a living cocoon. It can be seen that the silkiness of the cocoon in relation to the last two features remains relatively stable.

Conclusions.

Based on the analysis of materials, the following results were obtained:

- The studied biological traits (except for the silkiness of wet cocoons) under conditions of abundant feeding compared with normal feeding conditions were different, i.e. mean indicators of signs increase, phenotypic variability decreases. With poor feeding, the average indicators of signs decrease, and phenotypic variability increases.

- Breeds of the silkworm, according to all biological characteristics, react differently to changes in feed norms.

- There was a minimal increase and decrease in the average value and coefficient of variation of all signs in the Mayak-3 breed; the largest increase and decrease were in the Yashar breed; and in the Ganja-6 breed, growth and decrease were found at an average level. So, hereditary resistance to the environmental impact of the food factor is strong in the Mayak-3 breed, moderate in Ganja-6, and weak in the Yashar breed:

- regardless of the breed of the silkworm, within each specific feed norm, the silkiness of the wet cocoon is the least variable, the weight of the wet cocoon and the weight of the silk shell of the cocoon are moderately variable, and the amount and weight of normal grain in the setting are very variable:

- An increase in the phenotypic variability of biological traits under conditions of poor feeding allows for more intensive selection in the selection process and higher selection differentiation. Therefore, when creating new breeds of silkworms and improving existing breeds, it is advisable to feed the breeding material in unfavourable, including poor feeding conditions.

REFERENCES

1. Аббасов Б.Г., Гасанов Н.М., Гусейнова Е.А. и др. « Устойчивость к различным условиям среды. новых пород тутового шелкопряда Карабах и Зафар», Вестник Гянджинского Регионального Научного Центра НАНА, 2009, №36, с.55-59.
2. Сеидов А.К., Аббасов В.Н.- Основы шелководства (учебник). Бакинское издательство «Муаллим», 2012 г. - 164 с.
3. Гаджиева З.А., Аббасов Б.Х., Гасанов Н.М. Новые гибриды Galaba x Namazli-1 и Namazli-1 x Galaba тутового шелкопряда, способные лучше адаптироваться к широким колебаниям условий внешней среды // Аграрная наука Азербайджана, 2006, №3-4, с.37-38.
4. Браславский М.Е. Теоретическое обоснование и экспериментальная разработка основных программ селекции тутового шелкопряда в Украине: Автореф. дисс.. докт. с/х наук, Харьков, 1997, 48 с.
5. Каталог генетических ресурсов тугового шелкопряда: Альбом (под ред. Сейидов А.К.) – Баку, «Муаллим» - 2014, - 114 с.
6. Плохинский Н.А. Биометрия. М: Изд. Москв.Ун.-та, 1970, 367 с.
7. Щукин А.Р., Акименко Л.М. Оценка пластичности пород тутового шелкопряда. //Шелк., 1988, №2, с.12-13.
8. Abbasov B.H. Theoretical and practical bases of adaptive selection of the silkworm in Azerbaijan / Proc.of İnternational Conference: Sericulture Challenges in the 21 st Century.Vratza, 2007, p.150-158