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CREATION AND IMPLEMENTATION OF MULBER SILKWORM HYBRIDS FOR THE CHANGING ECOLOGICAL CONDITIONS OF UZBEKISTAN

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ABSTRACT

In the article, the revitalization and maintenance of mulberry silkworm breeds and hybrid seeds at different temperatures and humidity has been proven on a scientific basis, theoretically, data has been obtained and analyzed in depth. The goal is to prepare silkworm eggs, to improve the productivity and technological properties of cocoons based on the adaptation of silkworms to the rapidly changing natural climatic conditions of Uzbekistan. In the maintenance of mulberry silkworm breeds and hybrids adapted to the conditions of Uzbekistan, effective scientific solutions for the care of new breeds and hybrids in sharply changing temperature and humidity have been determined by basing the effective agrotechnology of silkworm feeding on the influence of the temperature of the mulberry silkworm, relative air humidity, the amount of food on the biological, cocoon productivity and technological properties of the silkworm.

Introduction Various breeds and hybrids of the mulberry silkworm Bombyx mori L. are cultivated and grown for cocoon raw material in Asian countries. Among these countries, the Republic of Uzbekistan is among the top three. Currently, "... there is a trend of development of sericulture in the countries of the Commonwealth of Nations, and Uzbekistan, as a major country producing advanced cocoons in the world, has achieved an average yield of 60.0 kg of cocoons from a box of silkworms, and the gross cocoon yield in 2022 will reach 26,000 tons." In Uzbekistan, almost 90% of silkworms are cared for individually, in households, and the geographical location and weather and climate conditions of cocoon-growing regions and districts are sharply different from each other, which requires the development of modern silkworm care technologies.

In a number of scientific centers of the world, the monovoltine breeds of mulberry silkworms are cared for in various hygrothermal methods, the cultivation of cocoon raw materials suitable for automatic cocooning processes and the development of new innovative

agrotechnologies in the directions of industrial scale spinning of raw silk, its deep processing and production of finished silk products. research is being conducted. In this regard, the development of intensive new technologies that allow realizing the biological potential of silkworm hybrid combinations, increase cocoon yield, raw silk output, and provide constant optimal temperature and relative humidity, which is most necessary for silkworms, is of significant scientific and practical importance.

Decree No. PF-4947 of the President of the Republic of Uzbekistan of February 7, 2017 "On the Strategy of Actions for Further Development of the Republic of Uzbekistan", No. PQ-2856 of March 29, 2017 "On Measures to Organize the Activities of the Association "Uzbekipaksanoat" and No. 20 of 2018 PQ-3616 dated March "On additional measures for the further development of the cocoon industry" and Resolution No. 616 of the Cabinet of Ministers of the Republic of Uzbekistan dated August 11, 2017 "On the program of measures for the comprehensive development of the cocoon industry in 2017-2021" taking into account the climatic conditions of the regions and the feed base, on the basis of the development of the most advanced scientific agrotechnical developments, measures to gradually increase the production of quality cocoons and improve quality indicators have been determined. This dissertation research serves to a certain extent in the implementation of the tasks defined in all regulatory and legal documents in this direction. Certain achievements have been made in the cultivation and processing of cocoons in our republic, the creation of high-yielding breeds and industrial hybrids adapted to our various regions, as well as high-nutrition mulberry varieties. However, not enough attention has been paid to the development and scientific justification of methods of proper maintenance of local and foreign silk belts in specific dry climatic conditions of Uzbekistan, providing them with constant temperature and relative humidity.

The level of study of the problem. E. Mikhaylov, N. Bakhovuddinov, B. Parpiev, N. A. Akhmedov, Sh. R. on the assessment of external environmental factors in the care of mulberry silkworm in Uzbekistan, feeding technology, quality of feed, research of the influence of the worm feeding area on the growth and development of silkworms. The Umarovs carried out extensive research and development works.

It should be noted that M. E. Braslavsky, G. Bekirov, Yu. Shukurlyu, N. Baramidze, S. Salimdjanov and Bharat B., V. Satish, F. Pescio, P. Marino, H. Enciso are among the scientists of the developed countries. by researching methods of raising silkworms in tropical, subtropical and regions with extremely high humidity and unfavorable conditions, ensuring the adaptability of silkworms to unfavorable conditions using monovoltine breeds, conducting research on the rational use of biologically active substances, and to a certain extent positive results have been achieved.

Research methods and materials. Experiments on the creation and introduction of mulberry silkworm hybrids for changing environmental conditions. In 2012-2022, experiments on mulberry silkworm hybrids brought from China were carried out by the laboratory of the Department of Silk and Mulberry of Tashkent State Agrarian University, the Scientific Research Institute of Silk. It was carried out in the "Silkworm Selection" laboratory, in Fergana silkworm breeding and seed enterprises.

All the research, observations and experiments conducted on the creation and introduction of mulberry silkworm hybrids for changing environmental conditions took into account the geographical location of the district, including the natural soil and climate conditions of the foothills and desert zones. The selection of regions of the republic with different climatic conditions ensured that scientific research would be more effective and reliable.

Since 50-60% of the seeds of mulberry silkworms raised in our country are brought from foreign countries, mainly from the People's Republic of China, industrial hybrids of this country and comparative local silkworm hybrids "Ipakchi-1 x Ipakchi-2" were used in our research. In the experiments, 15 variants of silkworm hybrids imported from the People's Republic of China were created.

Ipakchi-1 x Ipakchi-2 hybrid, which is cultivated in our Republic and is widely raised on farms, was used as a control-comparator to imported mulberry silkworm hybrids.

Research results and their discussion

The development of the silkworm is closely related to the external environment. The silkworm obtains energy from the external environment, through leaves, oxygen and sunlight. At the same time, the worm releases its life products: garbage, water, carbon dioxide and heat into the external environment. Physiological processes in the worm body and its condition depend on the state of the external environment. Without studying the effect of external environmental factors on silkworm breeds and hybrids, especially in breeds and hybrids imported from abroad, it is impossible to develop effective methods of rearing cocoons and obtaining seeds from butterflies in the future. Under the influence of external environmental factors, every organism changes. This situation is felt when more living organisms fall from one environment to another, at the same time, this organism changes the environment around it. Research in biology, as a result of a clear understanding of these interactions, has revealed ways to change the nature of organisms, and has shown ways to consciously and plannedly create new breeds and hybrids. The better we understand the relationship between the organism and the external environment, the better we can control the organism by using the opportunity to regulate and create the external environmental conditions. That is why the interaction between the organism and the environment is of special importance for agriculture, and good breeds of animals are created only as a result of using good agrotechnics and good zootechnics.

Since the mulberry silkworm is a pykilothermic insect, its life activity depends on the temperature and air humidity in the worm house. The relationship between the silkworm organism and environmental factors is reflected in the way the worms enter the cocoon and exit the cocoon. Normal air temperature ensures that at the end of the 5th year of the silkworm, the worms rise to the active cocoon and do not get stuck under the ganache. In addition, during the first stages of climbing the cocoon and wrapping the worm, the worm spends a lot of energy. The scientific significance of the research results is that foreign breeds are biologically (seed viability, worm viability, larval period, shedding, cocoon wrapping, etc.), cocoon productivity (cocoon yield and quality, silkiness properties) and technological (raw silk yield, cocoon spinning and metric number) and changes in the characteristics of pollination (laying a lot of eggs) of butterflies, interrelationship with the external

environment, food and feeding conditions are proved on a scientific basis and explained by theoretically obtained and summarized data. In order to obtain abundant and high-quality cocoons from silkworms, in addition to studying the factors of external conditions, it is of great scientific importance to study the effect of the agrotechnical rules performed in the conditions of their feeding on the productivity indicators of the breed or hybrid of silkworms.

Many factors affect the growth and development of the mulberry silkworm and the production of quality cocoons. These include the amount and quality of feed, hygrothermal conditions, and maintenance agrotechnics.

The breeds we are studying in our scientific research are the high-yielding silkworm breeds of the People's Republic of China, which are the main reared silkworms of this country. We revived high-yielding silkworm breeds, reared them in young and old, and achieved the following results.

These breeds have proven their superiority in biological indicators with their short larval period, high viability, high cocoon weight and quality.

Table 1

Results of simple rearing of mulberry silkworms with industrialized hybrid worms imported from China

The age of worms	Temperature, ^{0}C	Relative humidity, %	The number of leaves	100 worm weight, g $\overline{X} \pm S_{\overline{X}}$	Leaf consumption, g	Worm period, day
1 year old	26,0	75,5	18		60,1	2,5
2 year old	25,6	73,7	18		132,3	3,0
3 year old	25,3	72,5	20	2,51 ± 0,11	624,3	4,0
4 year old	25,0	70,9	26	14,47±0,06	1510,2	6,0
5 year old	25,0	70,1	28	68,34±0,27	7535,1	7,0
Total	**25,3**	**71,9**	**110**		**9862**	**22,5**

Table 2

Results of simple rearing of mulberry silkworm Silkworm 1 x Silkworm 2 industrial hybrid

The age of worms	Temperature, ^{0}C	Relative humidity, %	The number of leaves	100 worm weight, g $\overline{X} \pm S_{\overline{X}}$	Leaf consumption, g	Worm period, day
1 year old	26,0	75,5	21		74,1	3,0
2 year old	25,6	73,7	22		172,3	3,0
3 year old	25,3	72,5	22	3,38 ± 0,02	728,3	3,5
4 year old	25,0	70,9	30	16,89±0,01	1812,2	6

5 year old	25,0	70,1	35	75,09±0,27	8425,1	8,0
Total	**25,3**	**71,9**	**130**		**11212**	**24,0**

According to the table 1 above, we can observe that the temperature and humidity in the worm house affect the growth and development of the worm when the industrial hybrids imported from China are cared for in a simple way, and the amount of leaves given to them during their youth is less than that of the local hybrid.

All activities and methods are aimed at providing the worms with a sufficient quantity of high-quality, moist mulberry leaves. It is also important to maintain a constant air temperature and relative humidity level. Many scientists have conducted a number of scientific researches on the influence of temperature and humidity level and the amount and quality of food on silkworm. Scientifically based recommendations are given in the research results. However, in the theory and practice of sericulture, the development of methods for maintaining constant optimal hygrothermal conditions and its scientific justification is an urgent issue.

Until now, the experience of countries with developed cocoons, including the revival of mulberry silkworms, the care of worms in young and old, the agrotechnics of cocoons and the technology of picking and preliminary processing of cocoons, the high results achieved in the field of cocoons, have been little studied in the conditions of Uzbekistan. In addition, the characteristics of reviving and feeding silkworm seeds prepared in high agrotechnical conditions abroad in our agroclimatic conditions, including reviving foreign seeds in a simple way, the effect of agrotechnics used in worm feeding on the physiological state of silkworms, feeding on the activity of the silk gland, and the effect of temperature on silk productivity (biological parameters of cocoons, yield and quality and technological properties) have not been conducted studies that include issues such as determining the relationship between the effects. In our studies, using the experiences of developed countries in the field of cocooning, research and development activities aimed at adapting imported silkworms to the conditions of Uzbekistan and improving cocoon yield and fertility were carried out.

Conclusions, The presented scientific research on the creation and introduction of mulberry silkworm hybrids for changing environmental conditions is devoted to the study of natural factors affecting silkworms during the maintenance of mulberry silkworm. Experiments aimed at creating optimal hygrothermal conditions for the mulberry silkworm and compensating the effects of negative environmental factors are very few. A certain amount of research has also been done on the creation of handles used for cocooning. In particular, Indian scientists have managed to create several types of artificial and natural trees. Based on the analysis of the scientific works of foreign and local research scientists, it can be considered as one of the current directions of the science of sericulture to develop the technology of raising silkworms in high humidity for the conditions of Uzbekistan and its scientific justification.

Scientific research and observations on the agrotechnologies of imported mulberry silkworm hybrids in the conditions of Uzbekistan based on the characteristics of the hybrids, temperature, humidity, nutrients and other natural factors were analyzed in depth, and their effects were studied.

The soil and climate conditions of the regions where the experiments are conducted, depending on whether the foreign mulberry silkworm breeds and hybrids have high or low productivity signs in these regions serve as the basis for developing recommendations.

References:

1. Decision PD-2856 of the President of the Republic of Uzbekistan dated March 29, 2017 "On measures to organize the activities of the Uzbek Paksanoat Association". - Tashkent, 2017. p. 1-5.
2. Decision PD-3616 of the President of the Republic of Uzbekistan dated March 20, 2018 "On additional measures for the further development of the cocoon industry". - Tashkent, 2018. p. 1-4.
3. Resolution PD-4567 of the President of the Republic of Uzbekistan dated January 17, 2020 "On additional measures to develop the silkworm feed base in the cocoon industry". - Tashkent, 2020. p. 1-5.
4. Decision PD-4817 of the President of the Republic of Uzbekistan dated September 2, 2020 "On the organization of the activities of the Committee for the Development of Silk and Wool Industry of the Republic of Uzbekistan". - Tashkent, 2020. p. 1-4.
5. Akhmedov N.A. Feeding worms with fertile mulberry leaves is an effective way to increase productivity. // Silk. - Tashkent, 1999. -#4. p. 9-11
6. Ahmedov N., Muradov S. Silkworm Ecology and Feeding Agrotechnics. // Tutorial. - Tashkent, 2004. p. 95-98.
7. Ahmedov N., Muradov S. Silkworm Ecology and Feeding Agrotechnics. // Tutorial. - Tashkent, 2004. p. 100-101.
8. Ahmedov N., Muradov S. Silkworm Ecology and Feeding Agrotechnics. // Tutorial. - Tashkent, 2004. p. 54-55.
9. Umarov Sh.R., Nasirillaev B.U., Giyasova K.S., Bobomurodov M. Effect of selection of progeny cocoon compactness on silkworm cocoon productivity and technological performance. // Agroscience. -Tashkent, 2016. -#2.- p. 33-34.
10. Umarov Sh.R., Nasirillaev B.U., Giyasova K.S. Effect of selection of brood cocoon compactness on silkworm embryonic and postembryonic viability. // Agriculture of Uzbekistan. - Tashkent, 2016. - #8.- p. 41.
11. Umarov Sh.R., Nasirillaev B.U., Giyasova K.S. Comparative analysis of viability and productivity traits in a novel elite population of mulberry silkworm. // Zooveterinaria, 2017. - #5. p. 39-40.
12. Umarov Sh.R, Nasirillaev U.N, Lejenko S.S. Factors to improve the efficiency of repeated worm feeding. // Tashkent. Science. 2009, p.59-63.