

Characteristics of Working Conditions in Wormwood While Fooding Tracks of White Silkwine by the Degree of Harmful and Danger

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Abstract: The results of the study of the working conditions of the breeders of silkworm caterpillars are presented. It was found that they are characterized by the presence of unfavorable production factors (dustiness, gas pollution, insufficient illumination, the severity and intensity of the labor process). According to the totality of production hygienic factors, the working conditions of the breeders of the silkworm caterpillars belong to the 3rd class of the 3rd degree of hazard.

Keywords: worm breeding, working conditions, harmful production factors.

In Uzbekistan, the production of natural silk is increasing from year to year, which is associated with the cultivation of breeding caterpillars of the silkworm. For the production of living cocoons, Uzbekistan ranks 4th in the world after China, Vietnam and India. Now in Uzbekistan there are 17 ditching factories and 3 breeding silk stations.

Breeding feeding of caterpillars to obtain high-quality cocoons is carried out on farms. Feeding is performed mainly by women. This work is carried out at the end of April and in May for 25-30 days. The terms can be reduced to 20-25 days due to frequent feeding with high-quality food, compliance with the meteorological regime. Feeding caterpillars is a laborious process, it consists of collecting and preparing mulberry leaves, feeding them with caterpillars, removing contaminated litter, cleaning the room, maintaining a certain temperature and humidity regime in it. Work is carried out around the clock and is associated with a violation of the normal daily work and rest. In addition, workers perform a number of laborious manual operations associated with static tension of the muscles of the trunk and limbs. Caterpillars are fed in adapted rooms.

During feeding, silkworm caterpillars go through five developmental cycles (the period between molts), each lasting from 3 to 7 days. The feeding of caterpillars of the first three cycles, which are very sensitive to changes in meteorological conditions in the worm waters, is very responsible. The most favorable temperatures for them are 28-29°C, relative humidity 65-70% and air speed 0.02 m / s. Caterpillars of the 3-4th cycle develop well at a temperature of 22-23 ° C and a relative humidity of 60-70%. Differences in microclimate parameters in different development cycles are explained by the intensity of metabolism in the silkworm's body. The most laborious feeding of caterpillars of the 3-4th cycle, since their need for food increases with age. The silkworm of the 4th cycle is fed 6-7 times a day, the 5th - 5-6, that is, every 3-4 hours, including 1-2 times at night. The main work, including the collection, preparation and layout of the mulberry leaf on the racks, the removal of contaminated litter, the

placement of caterpillars, takes up to 68% of the daily time of worm breeders, that is, more than 16 hours and 30 minutes.

The literature contains information about the factors of occupational risks in silk production. In the publications of Chinese scientists [7], the risk factors for silkworm rearing are described. This is carbon monoxide generated when heating premises where cocoons are grown, diseases caused by unhygienic growing conditions due to the accumulation of leaves and silkworm excrement, disinfectants (slaked lime and paraformalin), leading to sensitization, eye inflammation (redness, watery eyes and itching), formalin, which is highly irritating to the eyes and nasal mucosa.

A review of the regional research station of the city of Miransahib in India in publications of scientists from the Indian Agricultural University [8,9] provides evidence that silkworm workers are susceptible to risk factors such as dermatitis, respiratory diseases, dizziness, fatigue, nausea, headache, eye irritation, adverse reproductive risks, including an increased risk of miscarriage and endometrial cancer, vision problems, nervous disorders, and carcinogenic skin problems. The health hazards associated with the cultivation of silk worms are indicated in the publication of specialists from the Indian University of Jivanji [10]. The authors point out that the majority of workers suffer from health problems such as eye irritation, injury, back pain, allergies, and breathing problems. 42.99% of people engaged in growing silk caterpillars suffered from headaches, 31.77% from frequent colds, 12.14% from asthma, 27.1% from chest pain, 35.51% from dizziness, 14.95% from eye irritation, 37.38% from injuries, 11.21% from burns, 2.8% from shortness of breath and 4.5% from allergies.

The purpose of the research was to identify unfavorable production factors in worm waters when feeding silkworm caterpillars and to assess them according to the degree of harm and danger.

Research objects and methods. The studies were carried out in the Azat, Uzbekistan and Khankinsky farms of the Akkurgan district of the Tashkent region, where women are engaged in feeding silkworm caterpillars and obtaining cocoons.

Working conditions were studied by traditional methods using a psychrometer, anemometer, aspirator, luxmeter in accordance with the requirements of the Sanitary Rules, Norms and Hygienic Standards of the Republic of Uzbekistan No. 0294-11 [1], 0141-03 [2], 0324-16 [3], building codes 2.01.05-96 [6], as well as the methodology "Methodology for assessing working conditions and certification of workplaces for working conditions" [4].

Research results. It has been established that dustiness and the content of certain harmful substances in the air of the working area are important factors of the working environment when feeding silkworm caterpillars. The dust belongs to the aerosols of integration, its dispersion is from 2 to 10 microns, the content of silicon dioxide is from 2 to 10%. In the dust, in addition to mineral particles, various tiny particles of caterpillar vital activity are determined, including organic emissions (ammonia, hydrogen sulfide and carbon monoxide).

When feeding silkworm caterpillars, there is no mechanization of labor processes. Female workers do not use personal protective equipment.

The research results show (table 1) that the average level of dust content in the workplaces of silkworm caterpillars is 6.74 ± 0.06 mg / m³ with fluctuations from 5.8 to 7.4 mg / m³ (Maximum permissible concentration - 6 , 0 mg / m³), i.e. exceeds the maximum permissible concentration (MPC) by 1.12 times. Such a level of dustiness makes it possible to classify the working conditions of silkworm breeders by dust to the **3rd class of the 1st degree of hazard**.

Table 1. Indicators of the concentration of dust and chemicals in the air of the working area

Indicator, mg / m ³	Number of measurements	Min.-Max. indicator	M Wed	σ	$\pm m$
Dust	232	5,8-7,4	6,74	0,38	0,06
Ammonia	80	17,5-25,4	22,2	2,36	0,7
Dihydrosulfide	86	11,2-17,56	13,0	1,9	0,56
Carbon oxide	85	7,1-23,25	14,3	4,85	1,4

The ammonia content in the breathing zone of breeders also exceeds the MPC by 1.1 times. The average ammonia concentration is 22.2 ± 0.7 mg / m³, with fluctuations in this indicator from 17.5 to 25.4 mg / m³. According to the ammonia content, the working conditions of breeders belong to the **3rd class of the 1st degree of hazard**.

The content of hydrogen sulfide (a substance with an acutely directed effect) in the breathing zone of breeders exceeds the MPC by 1.3 times. The average concentration of hydrogen sulfide is 13.0 ± 0.56 mg / m³, with fluctuations in this indicator from 11.2 to 17.56 mg / m³. According to the content of hydrogen sulfide, the working conditions of the breeders belong to the 3rd class of the 1st degree of hazard. The content of carbon oxide in the breathing zone of worm breeders did not exceed, on average, the sanitary standards, it was equal to 14.3 ± 1.4 mg / m³, the fluctuations were equal to 7.1-23.25 mg / m³. Considering that in the air of the working area there are simultaneously two harmful substances with a highly directed effect, and summing up the ratio of the actual concentrations of each of them and their maximum permissible concentration, we can come to the conclusion that, due to the gas pollution, the working conditions of the breeders belong to **the 3rd class of the 2nd degree of hazard**. Working women are exposed to the heating, humid, convection microclimate while in the wormhole. The average daily air temperature in the worms during the feeding period ranges from 24 to 35.5 ° C, averaging 29.86 ± 0.23 ° C. The relative humidity level ranged from 26.2 to 55%, with an insignificant air velocity from 0.09 to 0.3 m / s. The calculation of the integral index of the WBGT-index (temperature index), which makes it possible to assess the external load on the body, taking into account the combined effect of the microclimate com-

ponents - temperature, air humidity, heat radiation intensity, as well as the metabolic rate, showed that on average the WBGT-index inside the wormwood is $31, 3 \pm 0.3^{\circ} \text{C}$.

Considering that work in worm-breeding grounds, in terms of the severity of the labor process, belongs to category 1b (work performed while standing, associated with walking and accompanied by some physical stress), the working conditions of the breeders in terms of the microclimate are related to the 3rd class of the 1st degree. The illumination of the working surfaces in the worms is natural, artificial light is turned on only in the dark, the illumination level is uneven, ranging from 5 to 418 lux, the average level is 90.6 ± 5.8 lux, the coefficient of natural light (KEO) ranges from 0.45 to 3, 79%, the average KEO is $0.9 \pm 0.3\%$.

Considering that, by the nature of visual work, the labor process of breeders belongs to the 6th category (rough, very low accuracy), according to hygienic standards, the illumination in the worms should be equal to 200 lux with a KEO equal to 2%, it can be concluded that according to the illumination, the working conditions of women, employed in feeding the silkworm, harmful - belong to the **3rd class of the 1st degree**.

The labor process of silkworm breeders (worm breeders) is not standardized, it is characterized by significant physical stress.

The duties of the worm breeders include the collection and preparation of mulberry leaves, laying them in worm breeders, and working with silkworm caterpillars. The severity of the labor process during this period is associated with the need to manually lift and transfer mulberry leaves into the worms at a distance of more than 5 meters (the weight of the transported load being lifted is up to 6-8 kg). Physical dynamic load during this labor operation (involving the muscles of the arms, body and legs) is up to 35,000 kgm. In addition, up to 2 hours daily, with the help of an ax, they chop off large branches of a mulberry tree into smaller ones (the weight of the ax is up to 2 kg), the static load in this case is 720 kgf. All production operations are performed in a standing position up to 80% of the working time. According to the severity of the labor process, the working conditions of silkworm breeders belong to the **3rd class of the 2nd degree of hazard**.

According to the intensity of the labor process, the work of silkworm breeders is characterized by the need to solve simple alternative tasks according to instructions. They carry out simple production operations according to the developed technology, in the course of work they independently adjust the need to add larch to the racks where the caterpillars are grown, the duration of attention is up to 60% of the work time, is responsible for the functional quality of feeding, the significance of the error is due to a violation of the feeding technology and a decrease in caterpillar productivity ... The monotony of loads is determined by the monotony of the production environment, since the time of passive observation is 80-90% of the work time. The duration of the working day is more than 12 hours with work at night. According to the intensity of the labor process, the working conditions of silkworm breeders belong to the **3rd class of the 2nd degree of hazard**.

In terms of the totality of production hygienic factors, the working conditions of the breeders of silkworm caterpillars belong to the 3rd class of the 3rd degree of hazard (Table 2), which, according to Guideline R 2.2.1766-03 [5], allows us to conclude that the occupational health risk category for workers is high (intolerable).

According to the "Hygienic classification of working conditions in terms of harmfulness and danger of factors of the working environment, the severity and intensity of the labor process" [2], such working conditions are harmful, difficult, characterized by such levels of production factors that lead to the development, as a rule, of occupational pathology in the lungs forms and moderate severity during the period of work, an increase in chronic general somatic pathology, including increased levels of morbidity with temporary disability.

Table 2. Assessment of the working conditions of the breeders of silkworm caterpillars according to the degree of harm and danger

Factors		Classes of working conditions						
		1 class	2 class	3 class - harmful				4 class
				power				
				I	II	III	IV	
Chemical					3.2			
Biological								
Physical	1.Aerosols - F			3.1				
	2.Noise							
	3.Vibration local							
	4.Vibration general							
	5.Infrasound, ultrasound, air ions							
	6.EMPI							
	7 ionizing radiation							
	8.Microclimate			3.1				
	9 illumination			3.1				
The severity of labor					3.2			
Labor tension					3.2			
General assessment of working conditions						3.3		

The data obtained indicate the need to develop and implement measures to improve the working conditions of worm breeders, including: mechanization of labor processes, regulation of work and rest regimes, provision of personal protective equipment.

CONCLUSIONS:

1. Working conditions of silkworm caterpillars breeders are characterized by the presence of unfavorable production factors (dustiness, gas pollution, insufficient illumination, severity and intensity of the labor process). According to the totality of production hygienic factors, the working conditions of the breeders of the silkworm caterpillars belong to the 3rd class of the 3rd degree of hazard.
2. To improve working conditions when feeding silkworm caterpillars, it is necessary to introduce hygienic recommendations.

REFERENCES.

- [1] Iskandarov T.I., Ibragimova G.Z., Iskandarova G.T., Feofanov V.N., Shamansurova Kh.Sh., Tazieva L.D. Sanitary rules, norms and hygienic standards of the Republic of Uzbekistan №0294-11 "Maximum permissible concentration (MPC) of harmful substances in the air of the working area." -Tashkent, 2004.-53 p.
- [2] Iskandarov T.I., Ibragimova G.Z., Shamansurova Kh.Sh., Slavinskaya N.V., Iskandarova M.S., Demidenko N.M., Iskandarova G.T., Parsegova L.G., Feofanov V.N. Sanitary rules, norms and hygienic standards of the Republic of Uzbekistan No. 0141-03 "Hygienic classification of working conditions by indicators of harmfulness and danger of factors of the working environment, the severity and intensity of the labor process." -Tashkent, 2004.-53 p.
- [3] Iskandarov T.I., Slavinskaya N.V. Sanitary rules, norms and hygienic standards of the Republic of Uzbekistan No. 0324-16 "Sanitary and hygienic standards of the microclimate of industrial premises. -Tashkent, 2016.-10 p.
- [4] 4.Nichkasov V.M., Iskandarov T.I., Ibragimova G.Z., Slavinskaya N.V., Iskandarova G.T. "Methodology for assessing working conditions and certification of workplaces for working conditions." -Tashkent, 1996. -21 p.
- [5] Guidance for the assessment of prof. health risks to workers. Organizational methodological foundations, principles and evaluation criteria. -Moscow, 2004. -24 p.
- [6] Building codes 2.01.05-98 "Natural and artificial lighting". -Tashkent, 1998. -48 p.
- [7] Shi J, Mehta A.J., Zhang H. X. He-lian Dai H.L., Su L., Eisen E.A., Christiani D.C. Long-term Effects of Work Cessation on Respiratory Health of Textile Workers A 25-Year Follow-up Study. Am J Respir Crit Care Med Vol 182. pp 200–206, 2010 Originally Published in Press as DOI: 10.1164 / rccm.200903-0329OC on March 25, 2010 Internet address: www.atsjournals.org.
- [8] Priyadharshini P., Maria Joncy A, Sivaranjani B, Mavilashaw V.P. Health risks in silk industry. Journal of international academic research for multidisciplinary Impact Factor 2.417, ISSN: 2320-5083, Volume 4, Issue 5, June 2016
- [9] Rakesh.K. Pandey. Occupational health problems in Silk production: A Review Saturday, 15 November 2014
- [10] Wani, K.A. and Y.K. Jaiswal (2011a) Health hazards of rearing silkworms and environmental impact assessment of rearing households of Kashmir, India. Nature Environment and Pollution Technology, 10, (1), 85-90.

- [11] Bekchanov D; Kawakita H; Mukhamediev M; Khushvaktov S; Juraev M. Sorption of cobalt (II) and chromium (III) ions to nitrogen- and sulfur-containing polyampholyte on the basis of polyvinylchloride /Polymers for Advanced Technologies 2021 <https://doi.org/10.1002/pat.5209>
- [12] Davron, B., Mukhtar, M., Nurbek, K., Suyun, X., Murod, J. Synthesis of a New Granulated Polyampholyte and its Sorption Properties. International Journal of Technology. Volume 11(4), pp. 794-803. ., (2020) <https://doi.org/10.14716/ijtech.v11i4.4024>
- [13] Mukhamediev, M.G., Bekchanov, D.Z. New Anion Exchanger Based on Polyvinyl Chloride and Its Application in Industrial Water Treatment. Russ J ApplChem 92, 1499–1505 (2019). <https://doi.org/10.1134/S1070427219110053>
- [14] Mukhamediev, M.G., Auelbekov, S.A., Sharipova, Z.T. et al. Polymer complexes of gossypol and their antiviral activity. Pharm Chem J 20, 276–278 (1986). <https://doi.org/10.1007/BF00758817>
- [15] Ikramova, M.E., Mukhamediev, M.G., Musaev, U.N. Complexation of hydrazine- and phenylhydrazine-modified nitron fibers with iodine/ Plasticheskie Massy: SintezSvoystvaPererabotkaPrimenenie, (12), стр. 41–45 (2004)
- [16] Gafurova, D.A., Khakimzhanov, B.S., Mukhamediev, M.G., Musaev, U.N. Sorption of Cr(VI) on the anion-exchange fibrous material based on nitron. Russian Journal of Applied Chemistry, 75(1), стр. 71–74, (2002)
- [17] Rustamov, M.K., Gafurova, D.A., Karimov, M.M. et al. Application of ion-exchange materials with high specific surface area for solving environmental problems. Russ J Gen Chem 84, 2545–2551 (2014). <https://doi.org/10.1134/S1070363214130106>
- [18] Bazarova D. Some problems of counteracting crimes related to laundering of illegal proceeds in Uzbekistan Journal of Advanced Research in Dynamical and Control Systems. Volume 11, Issue 7, 2019, Pages 873-885
- [19] Ismailova, Z., Choriev, R., Ibragimova, G., Abdurakhmanova, S., &Abdiev, N. (2020). Competent model of Practice-oriented education of students of the construction profile. Journal of Critical Reviews. Innovare Academics Sciences Pvt. Ltd. <https://doi.org/10.31838/jcr.07.04.85>
- [20] Ismailova, Z., Choriev, R., Musurmanova, A., &Aripjanova, M. (2020). Methods of training of teachers of university on advanced training courses. Journal of Critical Reviews. Innovare Academics Sciences Pvt. Ltd. <https://doi.org/10.31838/jcr.07.05.85>
- [21] Ismailova, Z., Choriev, R., Salomova, R., &Jumanazarova, Z. (2020). Use of economic and geographical methods of agricultural development. Journal of Critical Reviews. Innovare Academics Sciences Pvt. Ltd. <https://doi.org/10.31838/jcr.07.05.84>
- [22] Isakov, A., Tukhtamishev, B., &Choriev, R. (2020). Method for calculating and evaluating the total energy capacity of cotton fiber. IOP Conference Series: Earth and Environmental Science, 614(1), 012006
- [23] Davirov, A., Tursunov, O., Kodirov, D., Baratov, D., &Tursunov, A. (2020). Criteria for the existence of established modes of power systems. IOP Conference Series: Earth and Environmental Science, 2020, 614(1), 012039

- [24] Obidov, B., Choriev, R., Vokhidov, O., & Rajabov, M. (2020). Experimental studies of horizontal flow effects in the presence of cavitation on erosion-free dampers. IOP Conference Series: Materials Science and Engineering, 883(1), 012051
- [25] Khasanov, B., Choriev, R., Vatin, N., & Mirzaev, T. (2020). The extraction of the water-air phase through a single filtration hole. IOP Conference Series: Materials Science and Engineering, 2020, 883(1), 012206
- [26] Shokhrud F. Fayziev The problem of social stigma during a pandemic caused by COVID-19 International Journal of Advanced Science and Technology Vol. 29, No. 7, (2020), pp. 660-664 <http://sersc.org/journals/index.php/IJAST/article/view/13965/7188>
- [27] Fayziyev Shokhrud Farmonovich Medical law and features of legal relations arising in the provision of medical services. International journal of pharmaceutical research Volume 11, Issue 3, July - Sept, 2019 P. 1197-1200 doi:10.31838/ijpr/2019.11.03.088 <http://www.ijpronline.com/ViewArticleDetail.aspx?ID=11016>
- [28] Bryanskaya Elena, Fayziev Shokhrud, Altunina Anna, Matiukha Alena Topical Issues of an Expert Report in the Process of Proving in a Criminal Examination. International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-9 Issue-1, October 2019 5345-5349 DOI: 10.35940/ijeat.A2946.109119 <https://www.ijeat.org/wp-content/uploads/papers/v9i1/A2946109119.pdf>
- [29] Fayziev Shokhrud (2019) Legal Aspects of Transplantology in the Republic of Uzbekistan. Systematic Reviews in Pharmacy, ISSN: 0976-2779, Vol: 10, Issue: 2, Page: 44-47 doi:10.5530/srp.2019.2.08 <http://www.sysrevpharm.org/fulltext/196-1575419211.pdf?1586863081>
- [30] Tulaganova, G. Some issues of observance of international legal norms of fight against legalization of criminal incomes in the Republic of Uzbekistan Journal of Advanced Research in Dynamical and Control Systems 12(2 Special Issue), c. 143-155