Available online at www.rajournals.in

RA JOURNAL OF APPLIED RESEARCH
ISSN: 2394-6709
DOI:10.47191/rajar/v7i12.19
Volume: 07 Issue: 12 December-2021

International Open Access

Impact Factor- 7.036

Page no.- 2792-2796

Unstable Indicators of Temperature and Humidity in Large-Scale Special Worm Rearing Houses and the Negative Consequences of Feeding Worms in Them

Rakhmanova Kh.E.[1], Jumagulov K.A.[2]

[1]Independent researcher, Tashkent State Agrarian University
[2]Docent of Agri.Scie. (PhD), Tashkent State Agrarian University

ARTICLE INFO

Published Online:
29 December 2021

Corresponding Author:
Rakhmanova Kh.E.

ABSTRACT

This article reveals the information on rearing houses for silkworms. It has been observed that the larger the size of silkworm rearing houses, the more difficult it is to maintain a comfortable temperature, relative humidity and other environmental factors, and as a result, the development of silkworms, cocoon spinning processes vary, and the process implementation of agro-technical measures is disrupted. As consequently, scientifically based data show that the viability of industrial cocoons was 14.5-24.5%, and the duration of the larval period was 2-8 days.

KEYWORDS: silkworm, special worm rearing house, cocoon, silk, stalk, mulberry, mulberry leaf, container, feed, temperature, humidity, feeding area, shelf productivity, vitality.

INTRODUCTION

At present time, the demand for quality of silk materials and ready –made silk fabrics in the world market is growing day by day.

At present, "more than 60 developed countries industrial enterprises operate for the processing of silk and the production of ready –made silk fabrics. Asian countries account for 90% of silk production, including 1 million people in the People's Republic of China, 7.9 million in India and over 20,000 in Thailand are involved in these processes".

Work that significant organizational is being carried out in Uzbekistan in this direction to increase the financial interests of the rural population, to provide permanent employment. The effective work is being carried out on the development and scientific substantiation of new intensive technologies and methods of care for mulberry silkworms in small and adult silkworms in special rearing houses of the scientific institutions of the leading countries in the field of silkworm breeding.

In this regard, in the process of caring for mulberry silkworms in special rearing houses, certain results have been achieved on the feeding area and the extent to which the quality and quantity of feed given to silkworms affect their biological cocoon productivity and technological properties.

In the Republic of Uzbekistan, too, comprehensive reforms are being carried out to develop the silk industry, and silkworms are being harvested several times a year.

As a result, it is necessary to introduce scientific research and new innovations as well as to ensure the adequacy of the area of the rooms selected for worm feeding by home-based workers and farms involved in worm breeding, and to increase the efficiency of work on reducing the number of worms from age to age and provide them with adequate nutrition.

The Action Strategy for the further development of the Republic of Uzbekistan for 2017-2021 "Pays special attention to the development of agriculture, including the silk industry, increasing its export potential."

The full implementation of this decree is of great scientific and practical importance, including the further improvement of the quality of raw cocoons, the care of mulberry silkworms in special rearing houses, the development and introduction of new effective agricultural techniques and methods to provide a normal area and food.

It is being achieved to produce silkworms several times a year in the country.

However, the process of feeding silkworms is carried out in households and unused buildings without the organization of special rearing houses. It is difficult to adjust the agro-technological requirements in the process of feeding silkworms in such different sizes of rearing houses.

As a result, it is more difficult to meet the agro-technical requirements in the process of feeding silkworms, and as a consequence, the cocoon yield from one box of silkworms

decreases sharply. In turn, this process has a negative impact on the quality and technological indicators of cocoons. Of course, in order to achieve high and quality yields from mulberry silkworms, it is necessary to create a favorable ecological environment for them in the rearing houses. The normal development of the mulberry silkworm depends directly on the external environment. The external environment is defined as factors such as the light and temperature of the sun falling on the earth, the humidity of the air in nature, the feeding area, the composition of the air, and the amount of nutrients

The external environment affects all living organisms. Mulberry silkworm receives energy from the external environment: leaves, oxygen and light.

At the same time, the worm releases its living products: waste, water, carbon dioxide and heat into the environment. The normal course of physiological processes in the body of mulberry silkworm depends on the state of the external environment.

Without studying the external environment, it is impossible to develop rational methods of feeding silkworms in the future.

As a result of scientific research conducted in recent years, great practical results have been achieved in accelerating the feeding of mulberry silkworms. For this reason, the worm feeding period was reduced from 30-32 days to 21-23 days [1], [2], [3], [4], [5], [6]. Every organism changes under the influence of the external environment, at the same time this organism also changes the environment around it. In consequence of a clear understanding of these interactions, research in the biological sciences has revealed ways to change the nature of organisms, and has developed new methods in a conscious and planned manner.

It should be noted that the better we understand the relationship between the organism and the external environment, the better we can manage the organism, using the opportunity to regulate and create the external environment.

Therefore, the interaction between the organism and the environment is of particular importance for agriculture, and good breeds of animals are formed only as a result of the application of good agronomics and good zootechnics.

Living beings, in accordance with their nature, select different conditions from the external environment, assimilate them and form their own bodies in accordance with the laws of their individual development, that is, heredity.

By external conditions we mean processes that are assimilated, and by internal conditions we understand the processes that dissimilate.

The life of an organism is very complex and undergoes countless legal processes and changes. Because of this, food entering the body from the external environment is assimilated by the living body after various changes, from external to internal conditions. It is this internal condition that becomes living matter and nourishes other cells and particles of the body, and becomes an external condition for them. All the environmental conditions in a unit, regardless of how important each of them is to that organism, are called environmental conditions [7], [8], [9], [10], [11], [12].

RESEARCH METHODS AND MATERIALS

It is known that in order to get an abundant and high-quality cocoon from silkworms, it is necessary to have rearing houses with all the conditions. According to the recommendations of scientists and advanced sericulture specialists, a box of silkworms with a volume of 80-85 m3 will be needed to feed a box of silkworms and get quality cocoons from them [1]. A group of scientists from the Silk Science Ratori recommended the development and implementation of design projects for 3-5 boxes of fully equipped special rearing houses.

This conclusion was made by scientists and recommended for different types of rooms of different sizes, taking the average ratio of the different sizes of dwellings, warehouses and unused buildings.

In accordance with the resolution adopted in 2012 in Uzbekistan, the building and cocoon farms were built for 50-75 boxes of silkworm rearing at the cotton mills and their 196 cotton-receiving facilities of the Uzpakhtasanoat Association launched in 2013 and the cocoon was grown.

The height of such rearing houses was 5 meters; the special containers were installed in 5 layers.

The building also has an incubator, a leaf storage room and a worm house, as well as rest and other necessary rooms. However, in these special rearing houses, the worm feeding rooms are designed for general feeding without being divided into sections. Commissioned without taking into account all the features (temperature, humidity, air exchange and light emission) required to feed the silkworm and get a quality yield from it. The inability to control temperature and humidity, especially in such large-scale rearing houses, leads to the disease and death of silkworms.

In addition, the rapid spread of the disease is observed as a result of the care of such a large number (50-75 boxes) of silkworms in one place.

As a result, cocoon yields fall sharply, and their quality does not meet demand.

In order to compare our observations, a special worm rearing houses of cotton-receiving facilities and for comparison, silkworms were observed in 5 boxes of "Gulonmjon Amirbek Fayz" farm and 4.5 boxes of "Erkinmirzo Azimjon" farms where were built in Boka, Akkurgan and Piskent districts of Tashkent region.

Silkworms, both local and imported, were examined in these worm rearing houses and significant results were obtained.

The influence of variable temperature and air humidity in special worm rearing houses on the survival of silkworms.

The temperatures below or above the norm during the feeding period (24-270C) have a negative impact on their viability and biological performance, leading to a prolongation of the feeding season and a decrease in productivity.

The experiments of N.G. Bogautdinov (1955, 1966), Kh.R. Rasulov (1956), L.F. Rozhdestvenskaya (1951) are important in this regard.

According to the author, as the temperature in the worm rearing houses exceeds the norm during the rearing period, the worm life period is shortened and the survival rate decreases.

In particular, the worm period is 23 days at a temperature of 27-28^{0}C, the survival period is 85-87%, the worm period is 20-21 days at 29-30^{0}C, and the survival period is 71-86%.

Although a number of scientific studies have been conducted on the effect of temperature on silkworms, insufficient data have been collected on the characteristics of silkworms when they are fed at varying degrees in relation to air humidity, and with the participation of current breeds and hybrids.

Therefore, it is important to know the effect of sharply different temperatures and humidity on the viability and biological parameters of silkworms.

The data on this are given in table 10 below:

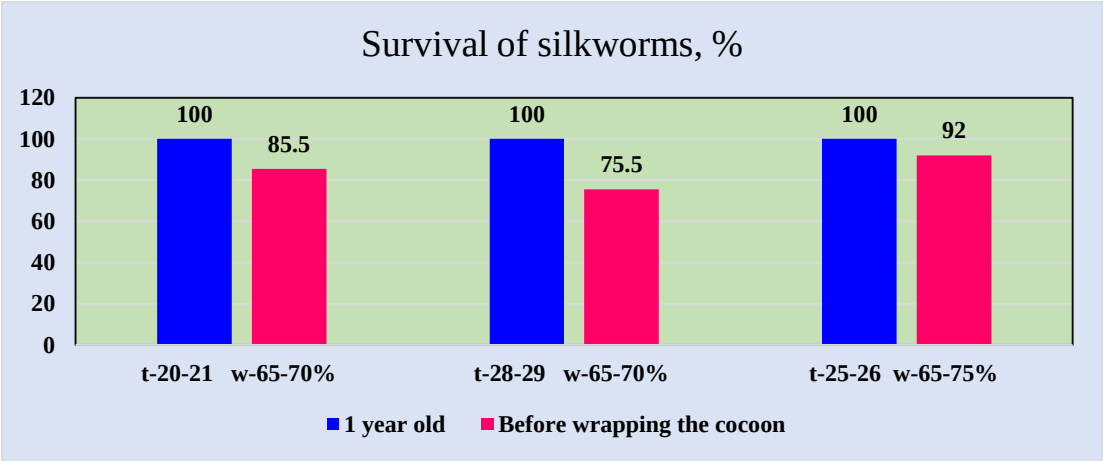

Figure 1. Influence of sharply different temperature and air humidity on the survival of silkworms in large-volume special worm rearing houses

The figures shown in Figure 1 show that sharply different temperatures and humidity adversely affect not only the embryonic development of the silkworm, but also its vital activity in the postembryonic period. For example, when worms were kept alive at a temperature of 20-21^{0}C and 65-70% humidity, the survival rate of worms fed in the first year of care was 85.5% by the end of the fifth year.

It can be seen that 75.5% of the worms obtained at the age of 1 year for experimentation reached the fifth year when the worms were fed under conditions of sudden rise in temperature in the worm rearing house (28-29^{0}S and 65-70% humidity). In our comparative variant, when silkworms were fed at 25-26^{0}C, the survival rate of the worms was found to be 92.0%.

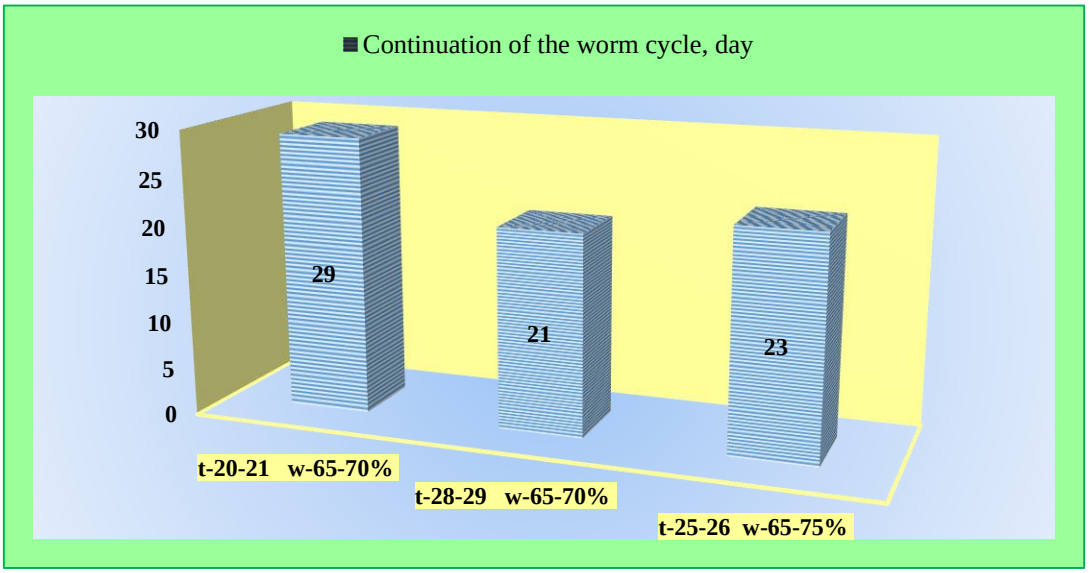

Figure 2. The effect of sharply different temperature and air humidity on the duration of the worm period in large-volume special worm rearing houses

It also increased to 29 days when the temperature was below the norm (20-21^{0}C) and decreased to 21 days when it was above the norm (28-29^{0}C).

However, it was found that the worm viability decreases to 75.5% as the worm period is shortened (Fig. 2)

One of our main tasks in our research is to study the effect of variable temperature and air humidity on the body of worms in large-scale special worm rearing houses.

It is known that abrupt changes in environmental factors during the life of any living organism lead to changes in their development, physiological, biochemical and other processes occurring in the body.

This law is more relevant and important for the silkworm, because it is a cold-blooded organism; all processes in the body take place in the presence of external environmental factors.

Examples include prolongation of the worm cycle, shedding the skin, food intake and digestion, and finally body growth, aging, and weight change.

The changes in body weight of silkworms by age in the 1900-1930s in older breeds studied by T.V. Robertson, E. Girattsuka, E.F. Poyarkov, et al.emphasize that there is no correlation between worm weight and body growth and silk gland weight gain. However, in the current breed and hybrids, this issue has almost not been studied. From the above data, it is clear that silkworm body weight gain has not been studied in relation to the influence of external conditions.

With this in mind, the author studied the effect of sharply different temperatures and humidity on the growth and mass of worms with age.

This information is described in Tables 1-2

Table 1. In large-scale specialized worm rearing houses, the weight of worms revived and fed at sharply different temperatures increases with age

Options	In the worm period		Mass of one worm, mg		How much larger relatively to revived an egg
	Temperature ^{0}C	Humidity %	Revived from an egg	Before cocoon spinning	
Option 1	20-21	65-75	0,42	4392,70	10459
Option 2	24-25	65-75	0,42	4473,60	10651
Option 3	28-29	65-75	0,42	4012,40	9553
Option 4 (comparator)	25-26	65-75	0,42	4474,40	10653

The figures in Table 1 show that the temperature during the incubation and egg-feeding periods was below normal (20-21^{0}C) the weight of the worms was 0.42 mg when revived from the egg and 4392.70 mg before the cocoon spinning, and we can see that the silkworms were 10,459mg times larger than when they were revived from the egg. This figure is 10653 times in the comparative variant, which is 1.3-1.9% heavier than in the experimental variant.

This means that a sharp difference in temperature, in turn, has a negative effect on the weight gain of worms at a young age. As a result, the organs in the worm's body become smaller to a certain extent, and therefore, its productivity is also lower. Continuing this experiment, live worms were observed under moderate conditions at sharply different temperatures in large-scale special worm rearing houses.

As a result, significantly different data were obtained than usual (Table 2).

Table 2. The changes in the weight of live worms when fed under moderate conditions at sharply different temperatures and humidity

Options	In the incubation period		Worm feeding		Mass of 1 worm, mg		How much larger relatively to revived an egg
	Temperature C^0	humidity %	Temperature C^0	humidity %	Revived from an egg	Before spinning cocoon	
1	20-21	65-70	-26	65-75	42	4422,20	529
2	28-29	65-70	-26	65-75	42	4344,80	345
3	24-25	65-70	-26	65-75	42	4473,60	651

The data in Table 2 show that although worms incubated at temperatures below or above normal are close to the comparative variant of weight gain for age when fed in moderate conditions; there is certain lightness in the body.

This figure is especially noticeable in worms whose eggs are revived at a temperature of 28-29^0 C and humidity of 65-70%. For example, in this variant, the pre-cocoon weight of the worm body was 10529 mg, which is 1.14% lighter than in the comparative variant (10651mg).

This means that when silkworm eggs are incubated at temperatures below or above normal, and live worms are fed under moderate conditions, they weigh close to their age-comparable variant, however, the weight of live worms (albeit in moderate conditions) is 1.14% lighter than that of other worms at high temperatures.

In other words, adverse effects on embryonic development in worms incubated under unfavorable conditions have some effect on other processes such as viability, body growth, and weight, despite moderate conditions during the worm period. It has also been shown that there is a correlation between worm body growth and weight.

CONCLUSION

Our observations and research have shown that the larger the silkworm rearing houses, the more difficult it is to maintain a comfortable temperature, relative humidity and other environmental factors, and as a result, the development of silkworms and the process of cocoon spinning varies. , the process of implementing agro-technical measures is disrupted. For this reason, it was reflected in our studies the survival rate of industrial cocoons was 14.5-24.5%, and the duration of the worm period lasts 2-8 days.

REFERENCE

1. Akhmedov N.A- Silkworm ecology and feeding agotechics. "Voris".-Tashkent, 2014. 21-52-p.
2. Akhmedov N.A., Daniyarov U. – New technologies in the development of silkworm breeding. "Davr".-Tashkent. 2014. 57-72-p.
3. Akhmedov N.A., Bekkamov Ch., Valiyev S., Jumanova U., Rakhmanova Kh. The effect of temperature on physiological processes in the silkworm body. // Zooveterinary.- Tashkent, 2010.-№9. 36-37-p.
4. Mirzaxodjaev A., Aripov S. Chamber unit for marinating cocoons. /Shelk:PK/ UzHHИНТИ-1987 №4 p.14.
5. Akhmedov N.A., Bekkamov Ch. Effect of variable temperature and humidity on silkworm body parameters// Scientific collection of materials of Master's degree students in the field of Agriculture. Tashkent, 2004. P.
6. Rakhmanova Kh., Akhmedov N.A. The influence of feeding area on silkworm //Зооветеринария.-Tashkent, 2011. №5.37-38.
7. Rakhmanova Kh., Akhmedov N.A.,. – Determining the amount of feed depending on the feeding area according to the age of the silkworm. "Proceedings of the Republican scientific-practical conference "Actual problems of the silk industry and their scientific solutions based on new technologies" Tashkent, 2012, p.87-89.
8. Rakhmanova Kh., Ахмедов H. – The influence of feeding area and amount of nutrients on the duration silkworm feeding. Journal "Zooveterinary". Tashkent , 2013, №3.
9. Umarov Sh.R., Nasirillaev B.U., Rajabov N.O., Jumaniyozov M.Sh., Batirova A.N., Khudzhamatov S.Kh. // Embryonic And Post-Embryonic Viability Of Second Generation (F2) Of Silkworm Breeds And Lines Obtained Under Unfavorable Stressful Conditions. International journal of scientific & technology research volume 9, issue 03, march 2020 2277-8616. India. pp-863-866
10. Navruzov S.N., Rajabov N.O., Khudayberdiyeva U.S. Selection of female silkworm moths conducive for. increasing silk productivity. International Journal of Research Culture Society, (2020). Volume 4, Issue 2, pp. 9-11.
11. K Jumagulov., N Rajabov., KH Rakhmanova1., O. Karimov., Z Sharapova., SH.Khalikova Influence of external environmental factors on the productivity of mulberry silkworm (*Bombyx mori L*) in different sizes of silk breeding organizations. E3S Web of Conferences 258, 04047 (2021) UESF-2021 https://doi.org/10.1051/e3sconf/202125804047
12. Narzulla Orolovich Rajabov, Shavkat Ramazanovich Umarov, Bakhtiyor Ubaydullaevich Nasirillaev, Khurshida Pardaevna Fozilova //The importance of the new selection system and varieties of mulberry in the development of the silk industry of Uzbekistan. Solid State Technology, volume: 63, issue: 4, usa, publication year: 2020. p-150-159.