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Scientific Basis For Improving The Productivity Of The Tut Silkworm

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Abstract. The article analyzes the scientific basis for improving silkworm productivity. Achieving high productivity begins with the cleanliness of the silkworm rearing room, where the amount of moisture, temperature, and nutrition play a key role. The embryonic development of eggs is primarily determined by the temperature and relative humidity of the air in the incubator.
Keywords: incubator, air temperature, productivity, nutrition, embryonic and postembryonic development

The management of the emergence of silkworms from eggs, the growth and development of larvae, physiological and productive processes in them, under the influence of environmental factors at the embryonic and postembryonic stages of silkworm development, is one of the urgent tasks of the modern silk industry.

The embryonic development of reproducing organisms occurs under the influence of the external environment. Because the temperature, humidity, light, and air necessary for the embryo to develop into a mature organism in the egg are important and effective factors of this environment.

The embryonic development of the silkworm occurs mainly during the spring incubation period of eggs. Therefore, the seed incubation process is a serious and responsible period. The formation and development of the embryo in the egg are strongly influenced by temperature, relative humidity, air exchange, and light [1].

The rate at which silkworms and other species hatch eggs is essentially the viability of each species at the embryonic stage. The viability of the silkworm at the embryonic stage can be influenced by its breeds, hybrids, egg fertility, and their incubation characteristics. However, the embryonic development of eggs, that is, their animation, is primarily determined by the temperature and relative humidity of the air in the incubator [6]. The egg incubation regime in India is similar to that used in other countries. However, frequent fluctuations in temperature and relative humidity during incubation negatively affect embryo development. In their experiments, the authors note that increasing the temperature to 280C reduces larval hatching from eggs by 82%, and at 320C it decreases to 78% [4].

Excessive increase or decrease in temperature during incubation disrupts embryonic development. In particular, when the temperature in the incubator drops to 180C and humidity drops to 60%, incubation can last 24 days, and at 200C - 16 days [7].

It has been substantiated that raising the temperature in the incubator to 20-300C leads to a disruption of the energy balance in the body, in particular, to the spread of the disease, a decrease in the yield and quality of cocoons [5].

Temporary cessation of egg development is carried out by lowering the temperature in the incubator to +12+140C and maintaining it for 15-18 days. With the formation of new leaves on the mulberry tree, the temperature in the incubator rises to 240°C. As a result, worms begin to hatch from the eggs after one or two days[2].

In spring, before incubation, the eggs are removed from the cold storage of the seed plant and incubated at +240C for 7-9 days. Then the eggs are placed again at +4+50°C. Subsequently, the larvae are put back into incubation 2-3 days before the start of feeding, and the larvae hatch from the eggs[1].

On days 6-10 of egg incubation, as a result of electrical ionization of the air in the incubator, even caterpillars hatched from them. As a result of treating eggs with electrically activated water, the viability and cocoon yield of the hatched caterpillars increased by 11-12%, and this biological trait occurred due to the energy transferred to the eggs[1].

Azerbaijani scientists have conducted research on the duration of the silkworm egg dormancy period in natural-climatic conditions, i.e., the duration of the estivation period and its reduction by reducing the temperature, and have achieved an improvement in egg quality [3].

According to the experience of Japan in the field of sericulture, silkworm eggs are hatched centrally in seed factories or in incubators of silkworm breeders. During the wintering period, eggs stored in refrigerators at +2.50C are transferred to the incubator and kept at a temperature of 15-160C and a relative humidity of 75-

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80% for 2 days. From the third day, the incubator temperature rises to 240C. When the eggs begin to whiten, the temperature is brought to 250C, and the relative humidity is 80-85%[4].

In Korea, a group of scientists has developed agrozootechnical rules for incubating silkworm eggs. Increasing the yield of cocoons includes: 1) Improving the technology of silkworm egg production; 2) development of a scientifically based regime for storing and incubating eggs; 3) Adjusting the hatching of caterpillars from eggs to the time of bud break on mulberry branches [2].

It is noted that during the incubation of eggs, when embryonic development is suspended for 10-15 days at +2+40C, the revival of caterpillars decreases by 3-4%, and viability - by 3.5-9.0%[1].

In China, egg storage is centralized, ensuring moderate temperature and relative humidity. The eggs are incubated in this place. 1-2 days before caterpillars hatch from eggs, the eggs are brought to the incubator of the caterpillar farms, revived, and distributed to the caterpillars [6.].

Researchers of the Research Institute of Sericulture have found that the incubation of eggs for 18 hours a day increases the productivity of caterpillars hatched from these eggs (7.0-9.5%) compared to the comparison [5].

It has been proven that exposure to ultraviolet rays in the final stages of silkworm egg development increases silkworm hatching (by 5.3% in absolute terms). Therefore, to effectively use ultraviolet rays, it is necessary to determine the stages of silkworm development. He concluded that ultraviolet rays do not always give positive results, that irradiating silkworm eggs in the early stages of embryonic development can disrupt blastomere division and cause the maturation of defective embryos. At the same time, it was noted that on days 6-10 of incubation of silkworm eggs, due to electrical ionization of the air in the incubator, uniform caterpillars emerge from the eggs [7].

Scientists created an electromagnetic device designed for processing silkworm eggs and recommended holding eggs in a magnetic field for 30 minutes on the second or third day of incubation using this device. Under the influence of the magnetic field, he witnessed the complete revival of caterpillars from eggs and an increase in cocoon yield of 9 kg per box [8,9].

Thus, the embryonic development of the silkworm occurs mainly during the spring incubation period of eggs. Therefore, the seed incubation process is a serious and responsible period. The formation and development of the embryo in the egg are strongly influenced by temperature, relative humidity, air exchange, and light. Exceeding or decreasing these factors negatively affects embryonic development and larval hatching.

The rate at which silkworms and other species hatch eggs is essentially the viability of each species at the embryonic stage. The viability of the silkworm at the embryonic stage can be influenced by its breeds, hybrids, egg fertility, and their incubation characteristics. However, the embryonic development of eggs, that is, their animation, is primarily determined by the temperature and relative humidity of the air in the incubator.

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