FACTORS AFFECTING COCOON SHELL SILK CONTENT IN DIFFERENT BREEDS OF THE MULBERRY SILKWORM

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Abstract. This abstract analyzes the main factors affecting cocoon shell silk content in different breeds of the mulberry silkworm (Bombyx mori). Cocoon shell silk content is one of the key selection and technological indicators that determine productivity in sericulture. The study theoretically and practically examines how the genotypic characteristics of the silkworm, feeding conditions, mulberry leaf quality, temperature and humidity regimes, rearing density, and cocoon reeling conditions influence cocoon shell silk content. The results show that different breeds, reared under identical agrotechnical conditions, differ in cocoon weight, cocoon shell weight, and silk content, which confirms the important role of genotype.

Keywords: mulberry silkworm, breed, cocoon, cocoon shell, silk content, cocoon weight, genotype, feeding, mulberry leaf, selection, environmental factors.

Sericulture is one of the important branches of agriculture, and its economic efficiency depends directly on both the quantity and the quality of the cocoons produced. The main technological value of a cocoon is determined by the amount of silk fiber it contains, that is, by its cocoon shell silk content. For this reason, the development of high-yielding, high-quality mulberry silkworm breeds and hybrids that are adaptable to environmental conditions, and their introduction into production, is an important task of modern sericulture. Cocoon shell silk content is closely related to the biological characteristics of the silkworm, the hereditary potential of breeds and hybrids, the level of feeding, mulberry leaf quality, temperature and relative humidity, rearing density, the duration of larval development, and the conditions of cocoon

reeling. In particular, when silkworms of different breeds are reared under identical conditions, certain differences are observed in cocoon weight, cocoon shell weight, and silk content indicators. This indicates that genotype plays an important role in the formation of these traits.

The hereditary characteristics of silkworm breeds and hybrids are the primary and decisive factor determining cocoon shell silk content.

Specificity of breeds and hybrids: Each breed or hybrid has a distinct genotype and differs in silk synthesis and in the functional activity of the silk glands. Modern high-yielding hybrids used in industry are distinguished by high cocoon shell silk content.

Heterosis effect: Hybrids obtained by crossing pure breeds exhibit heterosis (hybrid vigor), which ensures that the mass and silk content of the cocoon shell are higher than those of the parental forms.

Sexual dimorphism: Silk content indicators may also differ between the sexes of the silkworm. In many cases, although the cocoon mass of female larvae is larger, the relative silk content of the cocoon shell of male larvae is higher.

The quality of the mulberry leaves consumed by the silkworm during the larval stage directly affects the formation of the cocoon shell and its silk content.

Chemical composition of the leaf: A sufficient amount of proteins, carbohydrates, vitamins, and minerals in mulberry leaves provides the amino acids needed for the synthesis of fibroin and sericin proteins in the silkworm's body.

Leaf maturity and moisture: Feeding larvae, in accordance with their age (from the first to the fifth instar), with fresh, succulent, and high-quality mulberry leaves leads to the full development of the silk glands. Feed shortages or poor-quality leaves cause the cocoon shell to become thinner and reduce silk content.

Silkworms are highly sensitive to environmental changes, and the microclimatic conditions in rearing houses directly affect silk productivity.

Temperature regime: The optimal temperature corresponding to each age stage normalizes the metabolism of the larvae. Sharp temperature fluctuations or excessive heat reduce the larvae's appetite and suppress protein synthesis.

Relative humidity: Air that is excessively dry or humid disrupts physiological processes in the silkworm's body. Optimal humidity (65–75%) creates conditions for the dense and high-quality formation of the cocoon shell.

Strict adherence to the technology of rearing silkworms determines the technological indicators of the cocoon shell.

Density and placement: Excessively dense placement of larvae in rearing houses worsens air exchange, increases the likelihood of disease transmission, and hinders the efficient use of feed, thereby reducing silk content.

Sanitary and hygienic rules: Preventing infectious and vector-borne diseases and disinfecting premises in a timely manner ensure the healthy growth of the larvae, which directly yields a high-quality cocoon harvest.

The cocoon shell silk content of mulberry silkworm breeds is a complex, multifactorial process that depends primarily on hereditary potential. At the same time, full feeding with high-quality mulberry leaves, the creation of an appropriate microclimate (temperature and humidity) in rearing houses, and compliance with modern agrotechnical rules play a decisive role in increasing the silk content of the cocoon shell. The scientific analyses obtained serve to develop practical recommendations for producing high-quality raw materials in the sericulture sector.

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