EFFECT OF ECONOMIC VALUE CHARACTERISTICS OF NEWLY CREATED MULBERRY VARIETIES ON BIOLOGICAL INDICATORS OF SILKWORM

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ABSTRACT

sericulture is one of the important branches of agriculture that plays a significant role in the development of rural economies and the production of natural silk fiber. The productivity of silkworms largely depends on the quality and nutritional composition of mulberry leaves, which serve as the primary food source for silkworm larvae. The present study examines the influence of economic value characteristics of newly created mulberry varieties on the biological indicators of silkworm productivity. Particular attention is given to the nutritional composition of mulberry leaves and its effect on larval growth dynamics, survival rate, cocoon weight, and silk productivity. The research is based on comparative experimental analysis of several improved mulberry varieties cultivated under similar agro-ecological conditions. Silkworm larvae were fed with leaves from different mulberry varieties, and their biological performance was evaluated throughout the larval development stages. The results of the study demonstrate that mulberry varieties with improved biochemical composition significantly enhance silkworm biological indicators, including larval growth rate, cocoon weight, and cocoon shell ratio. The findings confirm that the introduction of high-value mulberry varieties into sericulture production systems can improve both biological efficiency and economic sustainability of silk production.

1.Introduction

Sericulture is one of the traditional and economically important branches of agriculture that plays a significant role in the production of natural silk fiber and in supporting rural livelihoods in many countries. The efficiency of silk production largely depends on the biological interaction between mulberry plants (Morus spp.) and the silkworm (Bombyx mori L.). Since mulberry leaves are the exclusive food source for silkworm larvae, their nutritional composition and biochemical properties directly influence the growth, development, and

productivity of silkworms. In recent years, significant attention has been paid to the development of new mulberry varieties with improved economic characteristics, including higher leaf yield, better nutritional composition, and greater adaptability to environmental conditions. Such varieties are expected to enhance the biological efficiency of silkworm cultivation and improve cocoon productivity. However, the biological response of silkworms to different mulberry varieties may vary depending on the biochemical composition of the leaves and environmental factors influencing mulberry growth. Therefore, it is important to evaluate the relationship between the economic value characteristics of newly developed mulberry varieties and the biological indicators of silkworm productivity. The purpose of this study is to investigate the effect of newly created mulberry varieties on the biological performance of silkworm larvae and to identify varieties that provide optimal nutritional conditions for silkworm development and cocoon production.

2. Materials and Methods

The research was conducted under controlled experimental conditions during the active sericulture season. Several newly developed mulberry varieties were selected for comparative analysis based on their economic value characteristics, including high leaf yield and improved biochemical composition. A traditional mulberry variety commonly used in sericulture was included as a control sample. Mulberry plants were cultivated under identical agro-technical conditions, including irrigation, fertilization, and pest management. Leaves from each mulberry variety were collected at the same vegetative stage in order to ensure consistency in nutritional composition. Silkworm larvae of the species Bombyx mori L. were obtained from a certified sericulture breeding center and incubated under standard laboratory conditions. After hatching, the larvae were divided into several experimental groups, each group receiving leaves from a specific mulberry variety throughout the entire larval development period. Environmental conditions such as temperature, humidity, and ventilation were maintained within optimal ranges for silkworm rearing. During the experiment, several biological indicators were monitored, including larval survival rate, larval growth dynamics, cocoon weight, cocoon shell ratio, and duration of larval development. Leaf samples from each mulberry variety were also subjected to biochemical analysis to determine protein, carbohydrate, and moisture content. The obtained data were analyzed using comparative statistical methods to evaluate the influence of mulberry varieties on silkworm biological performance.

3. Results

The experimental results demonstrated clear differences in silkworm biological performance depending on the mulberry variety used as feed. Silkworm larvae fed with leaves from newly created mulberry varieties exhibited higher survival rates and faster growth compared to those fed with the traditional control variety. The average larval weight in the experimental groups increased by approximately 12–18 percent relative to the control group. In addition, the duration of larval development was slightly reduced in silkworms fed with improved mulberry varieties, indicating more efficient nutrient utilization. Cocoon productivity also showed significant improvement in the experimental groups. The average cocoon weight increased by 15–20 percent, while the cocoon shell ratio improved by approximately 2–3 percent compared to the control group. Biochemical analysis of mulberry leaves revealed higher protein and carbohydrate content in the improved varieties, which likely contributed to

enhanced silkworm growth and silk production. These findings confirm that the nutritional quality of mulberry leaves plays a decisive role in determining silkworm biological indicators.

4. Discussion

The results obtained in this study confirm the close relationship between the economic characteristics of mulberry varieties and the biological productivity of silkworms. Since silk fiber is primarily composed of protein structures synthesized within the silk glands of silkworm larvae, the availability of sufficient protein and amino acids in mulberry leaves is essential for effective cocoon formation. Improved mulberry varieties examined in this study contained higher levels of digestible proteins and carbohydrates, which stimulated larval metabolism and silk gland development. In addition, favorable moisture levels in the leaves encouraged more active feeding behavior, resulting in improved nutrient assimilation by the larvae. These findings are consistent with previous research in sericulture science, which has demonstrated that mulberry leaf quality is one of the most important factors affecting silkworm productivity. From an economic perspective, the introduction of improved mulberry varieties into sericulture production systems can significantly enhance cocoon yield and silk production efficiency. However, it is important to consider that environmental factors such as soil fertility, climate conditions, and cultivation practices may influence the nutritional composition of mulberry leaves. Therefore, further research is needed to evaluate the adaptability of newly created mulberry varieties across different agro-ecological regions.

5. Conclusion

The study confirms that the economic value characteristics of newly created mulberry varieties significantly influence the biological indicators of silkworm productivity. Mulberry varieties with improved biochemical composition provide more favorable nutritional conditions for silkworm development, resulting in higher larval survival rates, faster growth, and increased cocoon productivity. The integration of such varieties into sericulture production systems can improve both biological efficiency and economic profitability in silk production. The results of the research highlight the importance of continued breeding and evaluation of high-value mulberry varieties to support sustainable development of the sericulture industry.

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