

Sericulture

Principles, Practices, Biotechnology
and Breeding Techniques

Wajid Hasan

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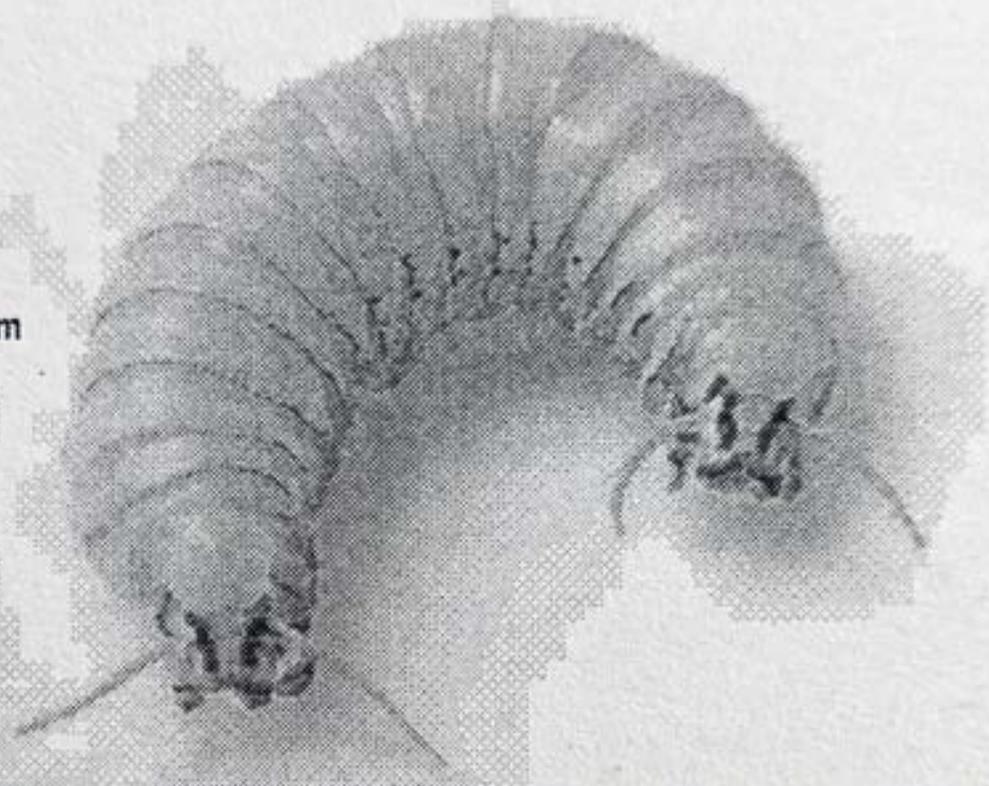
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Innovations in Sericulture Technology and Sustainable Sericulture Practices

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9.1 Advancements in Silkworm Breeding Techniques

Genetic Improvement and Hybridization

Genetic improvement and hybridization have been pivotal in enhancing the productivity and quality of silk. These techniques involve selecting and breeding silkworm strains with desirable traits to produce superior offspring. Hybridization, in particular, combines the genetic material of different silkworm strains to create hybrids that exhibit improved performance, such as higher silk yield, better disease resistance, and enhanced adaptability to varying environmental conditions.

Genetic improvement in silkworms has largely focused on increasing silk productivity and quality. Selective breeding programs aim to enhance traits such as cocoon size, filament length, and silk strength. These programs utilize traditional crossbreeding techniques and more advanced methods like marker-assisted selection. By identifying and selecting for specific genetic markers associated with desirable traits, breeders can more efficiently produce superior silkworm strains.

Hybridization plays a crucial role in sericulture by combining the strengths of different strains. For example, hybrid silkworms often exhibit heterosis, or hybrid vigor, resulting in increased vitality and productivity compared to their parent strains. This phenomenon is particularly evident in traits like growth rate, cocoon weight, and silk quality. By carefully selecting parent strains with complementary traits, breeders can create hybrids that outperform their predecessors in various aspects of silk production.

One notable success in hybridization is the development of the F1 hybrid silkworm. This hybrid, created by crossing two genetically distinct strains, exhibits significant improvements in silk yield and quality. The F1 hybrid silkworms are known for their uniformity in cocoon size and silk filament length, making them highly desirable for commercial silk production. Moreover, these hybrids often possess increased resistance to diseases and environmental stressors, further enhancing their suitability for large-scale sericulture (Reddy *et al.*, 2018). Recent advancements in genetic improvement and