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Research Paper

Nutritional status of Muga and Erisilkworm host plants- A review

Sericulture

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Th. Aruna Singha — Asstt. Professor, Department ofSericulture, Assam Agricultural University, Jorhat-785013Assam.

L.C. Dutta — Professor, Department ofSericulture, Assam Agricultural University, Jorhat-785013Assam.

Aparupa Borgahain — Ph. D. Scholar, Department ofEntomology, Assam Agricultural University, Jorhat-785013Assam.

ABSTRACT

It is a well acknowledged fact that plant nutrients provide instant nourishment to the silkworm which not only enhance the growth rate but also boost their productivity. Present review focuses on bringing in a nutshell, diverse information about nutritional composition of Muga and Eri host plant which can play a significant role in sustainable improvement in Sericulture. Furthermore, it reveals that biochemical analysis of host plants enhance silkworm growth as well as cocoon parameters. Thus, nutritional value of the host plant has a wider impact on sericulture productivity.

INTRODUCTION

Sericulture is one of the major labour intensive sectors of Indian economy in combination of both Agriculture and Industry. North-eastern region of India is rich in flora and fauna including the various sericigenous insects and their host plants. Sericulture is a traditional avocation of this region. Ericulture and Mugaculture have been adopted by the rural people of Northeastern region from time immemorial. Muga silk is the monopoly of this region, produced by *Antheraea assama* Westwood (Lepidoptera; Saturniidae). It is a polyphagous insect and thrives on various endemic plants mostly of the family Lauraceae. Eri silk is produced by *Samia ricini* Boisduval (Lepidoptera; Saturniidae) is a domesticated multivoltine and polyphagous silkworm (Khanikor *et al.* 1997). The major factor for healthy growth and development of silkworm is the nutritious and nutrient balanced foods, as it provides the ultimate source of energy to the insects (Purohit and Pavankumar, 1996). The quality and quantity of the product is dependent on the quality of the leaves, the sole food of silkworm. The great importance for improvement of diet of the silkworm is the quantitative and qualitative aspects of insect nutrition is much essential for better understanding of insect plant relationship (Waldbauer, 1968; Bhattacharya and Pant, 1976). Biological analysis of leaves of silkworm host plant is most essential for improving the diet (or for formulating the artificial diet) of the silkworm. Several works have been done on nutritional values of Muga and Eri host plants through biochemical analysis for improving the diet of the silkworm.

NUTRITIONAL VALUE OF MUGA HOST PLANTS

The primary food plants of Muga silkworm, *Antheraea assama* Westwood is Som (*Persea bombycina*) and Sualu (*Litsea polyantha*) where as Mezankari (*Litsea citrata*) and Digloti (*Litsea salicifolia*) being the secondary food plants. The nutritional composition of Som plant is the best among the four food plants for rearing of Muga silkworm which is varies according to season. The leaves in autumn are more nutritious than that of spring (Kalita, 1992). The leaves of secondary food plant Mezankari constitutes significantly low percentage of crude fiber and high amount of total nitrogen, protein, starch and calcium contents. This leaves are best in nutritive value followed by som and soalu leaves (Dutta *et al.* 1997). However according to some study the percentage of crude protein, ash, and water content of som plant is varies in different location of Assam. Among the different locations, per cent of water content is highest in Titabar, per cent of ash content in Dhakuakhana and per cent of crude protein is highest in Boko district of Assam (Chowdhury, 2005). Som plant has different morphovariants and morphotypes. Som morphovariants $S_{6,}$ $S_{4,}$ S_{3} and S_{5} were palatable and superior for sustainable yield and cocoon production whereas 3 morphovariants viz., $A_{2,}$ $R_{1,}$ T_{1} were found non-palatable as they are less preferred by the silkworm and are also associated with lignin and less moisture content (Siddiqui *et al.* 2000). *Ampatia*, *Naharpatia,* etc. are the morphotyopes of som plant. Out of these the tender leaves of *Ampatia* have more moisture than mature leaves. But the protein and sugar content is more in tender to mature leaves *Naharpatia* along with highest mineral contents in the mature leaves (Barua and Baruah, 2007). Infestation of some insect decreases the nutritional components of plants. The nutritive value of som as regard moisture, total soluble sugar, total mineral and chlorophyll content is decreases due to infestation by gall insect as compared to un-infested healthy leaves (Basumatary *et al.* 2013).

Nutritional value of Eri host plants

Castor (*Ricinus communis*) and Kesseru (*Heteropanax fragrans*) is the primary host plant of eri silkworm *Samia ricini,* whereas Borpat (*Ailanthus grandis*), Borkesseru (*Ailanthus excelsa*), Tapioca (*Manihot utilissima*), Payam (*Evodia flexinifolia*) and Gulanch (*Plumeria ruba*) are the secondary host plants (Pathak, 1988). Castor is one of the major oil producing as well as silkworm host plant, has many high yielding and improved varieties such as: TNV-5, CO-1, RC-8, GCM-2, GCM-4 and Aruna. These high yielding varieties are nutritionally better-quality to the indigenous variety *i.e.,* Red, Red petiole, Green and Powdery (Hazarika, 1989). The moisture and starch content of castor is gradually decreased from tender to mature leaves while total nitrogen, crude protein, total mineral, crude fibre, and total soluble sugar content increased steadily with the maturity of leaves. The spring rearing of eri silkworm accounted better in respect of silk production while autumn rearing accounted better in larval growth and fecundity of the silkworm. The Red Petiole variety is superior to other castor varieties (Dutta, 2000). The nutritional composition also varies according to the climatic condition and season. The leaf acidity and water percentage of Tapioca and Castor found highest in the month of June. Ash (%) of Castor and Nitrogen found highest in the December. Castor of crude protein (%) got highest in the June and Tapioca in January. Ash (%) of Tapioca got highest in January and N (%) (Chowdhury, 2005) The performance of castor varieties NBR-1 and Damalgiri Red is better in Gangetic alluvial soil of West Bengal in both qualitative parameters and water status; hence these two nutritively superior varieties can be commercially exploited in Eastern India (Sengupta *et al.* 2008). *Ailanthus grandis* is one of the most efficient food plants for rearing of eri silkworm (Shaw, 1998). Out of the two *Ailanthus* species, Borpat giving better result in comparison to Barkesseru. But both the *Ailanthus* species can be utilized as a

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substitute of Castor leaves. The eri pupae obtained by feeding on two Ailanthus host plant leaves also can be easily utilized as a source of proteinaceous food as good as the pupae obtained by feeding on Castor leaves (Deori, 2006). Leaf preservation have significant effect on nutrient content of the host plant but castor leaf preservation did not have much effect on moisture content up to 12 hours. Crude protein, total soluble sugar, crude fiber and total mineral content increased. Except moisture, the nutrient content s increased significantly with the advancement of leaf age from tender to mature. The leaves of spring season were better in respect of moisture and sugar content while autumn season leaves were better in chlorophyll, crude protein, crude fiber and total mineral content (Singha *et al.* 2013).

CONCLUSION

Thus in short, research during the last few decades, on various aspects of nutritional composition of host plants of muga and eri have revealed many mechanisms responsible for the enhancement in productivity. The quality of leaf has got a direct influence on the health, growth and survival of silkworm. In all the host plants there was a study declining and inclining trend in their nutrient constituents with the advancement of leaf age and also vary significantly in different seasons, varieties of host plants and the locations. The variation in nutrient constituents in host plant may be due to the types of the leaves and the effect of environmental factors. Thus it inferred that there is an interrelation between the nutritional constituents of the host plant leaves and economic characters of silkworm depends on climatic factors.

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