

Silkworm Host Plant Diversity

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SUMMARY

Silkworm are the agents for commercial silk production. The rearing of silkworms to produce commercial silk are called sericulture. The most important factor affecting the silk production by silkworm is the quality of host plant. Mulberry silkworm is a monophagous insect that feed only on the mulberry plant. The vanya silkworms like tropical tasar silkworm, temperate tasar silkworm, muga silkworm and eri silkworm primarily feed on asan and arjun, oak plant, som and soalu and castor plant respectively. The quality of feed determines the quality of silk produce by the insects.

INTRODUCTION

Silk is an animal fibre of wonderful nature and known as an elegant textile in the world. It is known as a clothing material used by mankind from time immemorial. Commercial silk production is done through the cultivation of silkworms. Silkworms are lepidopterous insects that produce silk to protect their pupal stages from their enemy predators and adverse weather conditions. The commercial cultivation of silkworm is dependent on various biotic and abiotic factors; out of them the most important is the silkworm host plants. Host plants play a major role in combination with climatic and ecological factors for the production of good quality cocoons. The principal plant part used for feeding of silkworm is the leaf. Silkworms are mainly divided into 2 types viz., Mulberry silkworm and Non-mulberry or Vanya silkworm. Mulberry silkworm, *Bombyx mori* L. belongs to family Bombycidae of Lepidoptera order that feeds on Mulberry plant, *Morus* spp. The non-mulberry or vanya silkworm constitute Tropical tasar silkworm, *Antheraea mylitta* Drury, Temperate tasar silkworm, *Antheraea proylei* Jolly, Muga silkworm, *Antheraea assamensis* Westwood and Eri silkworm, *Samia cynthia ricini* Boisduval; all belonging to family Saturniidae of order Lepidoptera. All saturniid silkworms are polyphagous in nature whereas the mulberry silkworm is monophagous in nature (Ganga and Chetty, 2019).

Table-1: List of silkworm host plants

Silkworm Name	Primary host plants	Secondary host plants
Mulberry silkworm, <i>Bombyx mori</i> L.	Mulberry, <i>Morus</i> spp.	
Vanya Silkworms		
Tropical tasar silkworm, <i>Antheraea mylitta</i> Drury	Asan, <i>Terminalia tomentosa</i> ; Arjun, <i>Terminalia arjuna</i> ; Sal, <i>Shorea robusta</i>	Ber, <i>Zizyphus jujube</i> ; Amla, <i>Emblica officinalis</i> ; Pipal, <i>Ficus religiosa</i> ; Anjan, <i>Hardwickia binata</i>
Temperate tasar silkworm, <i>Antheraea proylei</i> Jolly	Oak, <i>Quercus</i> spp.	Hingori, <i>Castanopsis indica</i>
Muga silkworm, <i>Antheraea assamensis</i> Westwood	Som, <i>Persea bombycina</i> ; Soalu, <i>Litsea monopetala</i>	Dighloti, <i>Litsea salicifolia</i> ; Mejankori, <i>Litsea citrata</i> ; Gomari, <i>Gmelina arborea</i>
Eri silkworm, <i>Samia cynthia ricini</i> Boisduval	Castor, <i>Ricinus communis</i> ; Kasseru, <i>Heteropanax fragrans</i>	Borpat, <i>Ailanthus grandis</i> ; Borkasseru, <i>Ailanthus excelsa</i> ; Tapioca, <i>Manihot esculenta</i>

1. Mulberry Silkworm Host Plant

Mulberry silkworm feed on Mulberry plant, *Morus* spp. Mulberry plant belongs to family Moraceae. It is believed to be a native of India or China and have originated from the foothills of Himalaya. Under genus *Morus*, there are many species available out of which four are common viz., *Morus alba*, *Morus nigra*, *Morus latifolia* and *Morus laevigata*. Botanically, mulberry is a shrub bearing alternate leaves. Leaves may be toothed

anteriorly, lobed or unlobed and having 3-5 nerves. Trees may be monoecious or dioecious having unisexual flowers of catkin or spike type of inflorescence. After pollination and fertilization, the entire inflorescence changes to an aggregate fruit called as syncarp. Apart from usage as a food plant in mulberry silkworm rearing, the plant is having other beneficial effects. Its leaves are considered as diaphoretic and emollient. The aqueous infusion of mulberry leaves is also used as mulberry tea that help in blood sugar level management. The roots of mulberry possess anti-helminthic and astringent properties. Mulberry fruits are treated as a good supplement of vitamins as it contains carotene, thiamine and ascorbic acid.

2. Vanya silkworm host plants

2.1 Tropical tasar silkworm host plants

Tasar silkworm is polyphagous in nature that feeds on multiple number of plants. However, the commercial tasar silkworm rearing is done on 2 primary host plants namely, Arjun, *Terminalia arjuna* and Asan, *Terminalia tomentosa*. Recently, another plant – Sal, *Shorea robusta* is being treated as a primary plant of tasar silkworm. Both asan and arjun plant belong to family Combretaceae while sal belongs to family Dipterocarpaceae. These are mainly forest perennial plants grown in the wild. Hence, the tasar silkworm also require wild environment to complete its life cycle. It cannot be domesticated (Jena, 2016).

Among the secondary host plants, Ber, *Zizyphus jujube*, Amla, *Emblica officinalis*, Pipal, *Ficus religiosa*, Anjan, *Hardwickia binate* are important. They are mainly used where the primary host plants are scanty.

2.2 Temperate tasar silkworm host plants

The temperate tasar silkworm, *Antheraea proylei* Jolly is a hybrid developed by crossing the Chinese *Antheraea pernyi* and the Indian *Antheraea roylei*. It mainly feeds on the oak plants belongs to genus *Quercus*. There are many species available on which temperate tasar silkworm feeds on like *Quercus incana*, *Q. himalayana*, *Q. semicarpifolia*, *Q. grifithi*, and *Q. serrata*. These food plants are available in the entire sub-Himalayan region extending from Jammu & Kashmir in the North to Manipur in the North-east. The temperate tasar silkworm is reared as completely domesticated like mulberry in North region whereas it is reared outdoors like tropical tasar in North-east India. For commercial temperate tasar silkworm production, the host plant *Quercus serrata* is grown in the block plantation (Gupta *et al.*, 2016).

2.3 Muga silkworm host plants

India is enjoying the monopoly in producing the muga silk which is obtained from Muga silkworm, *Antheraea assamensis* Westwood. Muga silkworm is confined to the north-eastern region of India particularly in the Brahmaputra valley of Assam. The Muga silkworm primarily feeds on Som, *Persea bombycina* which is an aromatic non-deciduous tree with alternate leaves. Another plant Soalu, *Litsea monopetala* is also the primary host plants while Dighloti, *Litsea salicifolia*, Mejankori, *Litsea citrata* and Gomari, *Gmelina arborea* are the secondary host plants of this silkworm. These plants are abundantly distributed in Assam, Meghalaya, Arunachal Pradesh, Nagaland, Manipur, Mizoram and Tripura due to availability of favourable climate (Priyadharshini and Maria Joncy, 2016).

2.4 Eri silkworm host plants

Eri silkworm, *Samia cynthia ricini* Boisduval is a domesticated silkworm that primarily fed on Castor, *Ricinus communis* and Kasseru, *Heteropanax fragrans*. This polyphagous insect also feed on Borpat, *Ailanthus grandis*, Borkasseru, *Ailanthus excelsa*, Tapioca, *Manihot esculenta* in the absence of primary host plants (Tikader and Kamble, 2010).

CONCLUSION

Silk production is an inseparable part of mankind from the time immemorial. It is a part of textile industry which flourishes with advancement of technology. But the important natural silk production yet depends on the quality of feed obtained by the silkworms. Thus, the host plant management is a vital factor in sericulture. However, many loopholes need to be fulfilled in the sericultural host plant sector.

REFERENCES

- Ganga, G. and Chetty, J. S. 2019. An introduction to sericulture. 2nd edition. New Delhi: CBS publishers. pp. 1-5.
- Gupta, V. P., Das, S. and Sinha, S. K. 2016. Raising and maintenance of block plantation of *Quercus serrata*. In: *Tasar technology compendium*. Central tasar research and training institute. pp. 21
- Jena, L. K. 2016. Host plant specificity of Indian Tasar Silk insect, *Antheraea mylitta* Drury (Saturniidae) during different seasons. *Imperial journal of interdisciplinary research*. 2(6): 1414-1420.
- Priyadharshini, P. and Maria Joncy, A. 2016. Sericigenous insects. *Journal of international academic research for multidisciplinary*. 4(11): 59-68.
- Tikader, A. and Kamble, C. 2010. Seri-biodiversity with reference to host plants in India. *The Asian and Australian journal of plant science and biotechnology*. 4(1):1-11.