

Research Article

SERIOUS PEST TERMITE IN MULBERRY CULTIVATED UNDER SUB TROPICAL AREA OF PUNJAB

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ABSTRACT

Mulberry, *Morus Alba* L., is the sole food plant of the silkworm, *Bombyx Mori* L. For better growth, development and subsequent silk production, the quality of mulberry leaf plays an important role. However, the process of mulberry leaf production is often hampered due to interference by several pests. Out of which insect pest are major. Among insects, termites are the important, which cause severe qualitative and quantitative damage.

Most of the mulberry insect pests are season specific and generally appear with leaf sprouting to complete their life cycle with its maturation. Whereas, termites appear throughout the year. It damaged the nurseries, stem and roots of mulberry. In high bush, termite attack observed more or less in almost all the plants in the ground and move and damage continuously in upward direction up to crown with formation of earthen tubes on plant. It's attack in the ground on main root results in breakdown the system of food supply of the plants and thereby results in reduction in leaf yield, production of inferior leaf quality and the death of plants. In some plants leaves get early maturity and turn into yellowish color. After attack, the healthy mulberry plants die within two years, some become nonproductive and perish slowly. The pest is not found in association with any disease and the attack is observed primary in the nature. Termites do not have any specific choice for a particular mulberry variety. It prefers mulberry plants as compare to other trees. It is very serious pest of mulberry in sub-tropical areas of Punjab as well as North India and threat the Sericulture industry. The paper discusses, in detail, the problem of termites in mulberry farming.

Keywords: Termite, Mulberry, Mound and Silk Worm

INTRODUCTION

Mulberry, *Morus alba* L., is the sole food plant of the silkworm, *Bombyx mori* L. For better growth, development and subsequent silk production, the quality of mulberry leaf plays an important role. However, the process of mulberry leaf production is often hampered due to interference by several insect pests.

Among them, termites are the important, which cause severe qualitative and quantitative damage.

Mulberry leaf is a major economic component in sericulture since the quality and quantity of leaf produced per unit area have a direct bearing on cocoon harvest and quality of silk (Yogananda Murthy *et al.*, 2013).

In India, most states have taken up sericulture as an important agro-industry with excellent results. The production of appreciable quantity and quality mulberry leaf is often hampered by insect pests belonging to large number of insect orders.

Even though the primary responsibility of an agricultural entomologist is to eliminate insects designated crop pests and to protect those designated economically important (Bania and Khan, 2006). One of the major constraints in silk production is the susceptibility of the silkworms. Even mulberry silkworms which can be cultured in indoor condition is not free from such constraints.

Mulberry is attacked by 300 insect pests have been identified in the country. Most of the mulberry insect pest are season specific and generally appear with leaf sprouting to complete their life cycle with its maturation. Reported 11 major and 10 minor pests damaging the mulberry in Punjab state. Termite is a one of the very serious insect pest of mulberry in sub-tropical area of Punjab even serious pest in North India (Kanta, 2013). It is phytophagous pest appearing round the year and damaging root, stem and nurseries of mulberry.

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In mulberry, termite attack is reported from different parts of the country. It is reported in Jammu and Kashmir (Kanta, 2013) Termites from the Jammu and Kashmir state are Desenex, based on a general collection received by him from the High Altitude Field Station of Zoological Survey of India, Solan (HP) during the year 1977-79, total 23sp. of 9 general forms 3 families are exiting in J&K (Bania *et al.*, 2006).

Till date no systematic work of termites has been carried out in Punjab. Hence, considering the serious problem in mulberry cultivation the study was carried out.

MATERIALS AND METHODS

The experiment was carried out at a Regional Sericultural Research Station, Sujanpur, Punjab. The experiment was conducted on mulberry different verities such as S-146, Chinese white, Mandalay, MS-9404, S-13, S-146, TR-10 and V-1. The experiment was conducted two years. The plants were grown at distance old planted in 8'and 9' spacing (Bania *et al.*, 2006). The observations are taken from different parts of the plants. The observations were taken for termite infestation at ground level i.e. roots level, above Ground i.e. Stem level. Following records are taken from different parts for (Khan *et al.*, 2004)

1. Survivability of plants,
2. Changes in leaf quality
3. Nature of attack.

In addition more other observations were also taken for post effect on plant after termite infestation, variety choice, different termite attack and its presence, divergence of termites and nurseries as well as mound/nest (Roonwal and Chhotani, 1971).

RESULTS AND DISCUSSION

Pest infesting all the existing mulberry varieties of low bush, high bush and old mulberry trees. The high bush plants were studied at RSRS, sujanpur for two years. The observations recorded for four parts of plants on root, stem.

Mortality rate become less of the plants. Hundred percent termites attack is found on all plants externally and internally on stem and bark. Also found on the ground of roots (Sharma and Sharma, 1978). These all factors are studied and found that mortality was less than half, non-yielding more than mortality and perish percentage was 45.83%.

Thus, all plants were infested by termites. Heavy mortality and damage recorded in Tr-10 followed by S-13 and MS-9404 and less in Mandalay. The reason for the heavier loss in Tr-10 was due to thick population density of termites which spread from low bush mulberry garden which is highly infested by termites of mound builder as well as subterranean termites as shown in Table given below (Sidde Gowda *et al.*, 1995).

The severe attack and damage is noticed in the ground especially on primary root closure to stem which fully consumed and termites the hard wood of stem. No, any serious attack is found on secondary and others newly initiated roots in uprooted plants which seems to healthy as well as non productive (Singh *et al.*, 2000). The main root was completely eaten and termites observed to be moved and damage stem continuously in upward direction internally which hollowed it and reached top of the plant (Srivastava *et al.*, 1962).

It's attack in the ground primary root results in break down the system of food supply of the plant and thereby result in reduction in leaf yield, production of inferior leaf quality and the death of plant. In some plants leaves get early maturity which turn into yellowish color, leaf size reduce and produce less branches. Hundreds of termites were exist in the ground portion of uprooted plant the same record of attack was also taken externally on the stem bark and under the bark by making of earthen tubes/galleries (Verma, 1984).

In some cases they bore the stem from inner side on any portion of the stem and came out on the stem and from the earthen tubes and move in upward direction. 100% infestation mortality increasing, inferior quality & quantity of leaves, leaves turn into yellowish color (early maturity).

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Table 1: Infestation and Damage in Different Mulberry Varieties

S. No.	Mulberry Variety	Plant parts with				Leaf Yield Half
		Termite Infestation	After Infection	Ground	Stem	
1	SI 46	Yes	Yes	14.81	29.63	55.56
2	Chinese White	Yes	Yes	14.81	40.74	44.44
3	Mandalay	Yes	Yes	03.70	40.74	55.56
4	MS-9404	Yes	Yes	18.51	44.44	37.04
5	S-13	Yes	Yes	22.22	40.74	37.04
6	S- 146	Yes	Yes	11.11	22.22	66.67
Total /Avg.		All	All	18.98	35.19	45.83

100% infestation mortality increasing, inferior quality & quantity of leaves, leaves turn into yellowish color (early maturity).

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