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# SUCKING PESTS AND THEIR NATURAL ENEMIES IN MULBERRY

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**ABSTRACT**

**During 2018-2019, a study was conducted to study the sucking pests and their natural enemies in mulberry at the Regional Sericulture Research Station, Central Silk Board, Jamuguri, Jorhat, Govt. Sericulture Farm, Titabar and Assam Agricultural University, Jorhat. Five species of sucking pests were prevalent in various mulberry growing areas of the Jorhat district of Assam. *Paracoccus marginatus* was the most common of these; others include- *Maconellicoccus hirsutus, Pseudodendothrips mori, P. marginatus, Aleurodicus dispersus, Clovia puncta.* Three coccinellid predators *Coccinella septempunctata, Coccinella transversalis* and *Micraspis discolor*, as well as one species of lepidopteran predator *Spalgis epius* were found to associated with *P. marginatus.* and of these *S. epius* was the most abundant.**

**Key words:** sucking pest, mulberry, predators, coccinellid, spalgis epius, jorhat, plant, insect, species, weather, parameters

Moriculture is the cultivation of mulberry, which serves as the basement of Sericulture. The silkworm, *Bombyx mori* L, feeds on mulberry leaves. Mulberry is an evergreen perennial plant with luxuriant foliage that provides an unlimited source of shelter and food for a diversity of insects. Mulberry cultivation in the entire Assam covered around 223926 ha (Anonymous, 2017). In India, several insect pests have been associated with the mulberry crop. Papaya mealybug (*Paracoccus marginatus*), pink mealybug (*Maconellicoccus hirsutus*), whitefly (*Aleurodicus disperses*), thrips (*Psedodendrothrips mori*) and spittlebug (*Clovia puncta*) are among them. Among the 300 insect pests documented to cause harm to the mulberry, the tukra mealybug, (*M. hirsutus*) is the most damaging (Rajadurai and Thiagarajan, 2003). The mealybug infestation of mulberry plants causes tukra symptoms such as leaf crinkling curling and crowding at the shoot terminals (Reddy and Kotikal, 1988). This study investigated the sucking pests and their natural enemies in mulberry in Jorhat district of Assam.

## MATERIALS AND METHODS

This study was done in the Jorhat district of Assam covering 1) Department of Sericulture, Assam Agricultural University, Jorhat (26°43'N, 94°11'E); 2) Regional Sericulture Research Station, Central Silk Board, Jamuguri, Jorhat (26°43'N, 94°10'E); and 3) Govt. Sericulture Farm, Titabar (26°35'N, 94°10'E) from December 2018 to November 2019. The observations were done on the randomly selected plants at 15 days intervals. Regular inspections were carried out and various stages of sucking pests were collected in a plastic bag (7x 5cm) and brought to the laboratory for identification. The predacious insects (larvae and adults) were collected in a plastic container and brought to laboratory for identification and confirmation of their predacious behaviour. Adult predators were dry preserved and identified at the Department of Entomology, AAU, Jorhat. *Paracoccus marginatus* occurrence was assessed using the plant inspection method, with samples taken at 15 days intervals with 25 plants selected randomly by taking 5 plants from each of the four corners and centre. The population was estimated by counting the number of *P. marginatus*/ shoots (Mani et al., 2008). To determine the intensity of attack at a weekly interval the number of insects/ leaf (from the top, middle and bottom) was calculated (Chikkaswamy and Paramanik, 2014). For the thrips, similar methodology was followed, and the counts were averaged/ leaf ($4^{th}$, $5^{th}$ and $7^{th}$ leaves) at weekly interval. For spittlebug, similar plant inspection method was applied, and population in average number/ leaf at weekly intervals computed. While sampling sucking pests, their natural enemies were also counted in situ on 25 randomly selected plants. The number of predators/ plant was recorded for the predacious coccinellid adult, and the parasitized insects were also counted directly by inspecting the plants and brought to the laboratory for adult emergence. Lepidopteran larvae on the plants

were counted by examining the plants thoroughly (Singh and Rai, 2000).

## RESULTS AND DISCUSSION

The results obtained reveal that during the 2018-19 field visit, five species of sucking pests were observed; these include papaya mealybug (*Paracoccus marginatus* Williams and Granara de Willink) (Hemiptera: Pseudococcidae), pink mealybug (*Maconellicoccus hirsutus* Green) (Hemiptera: Pseudococcidae), thrips (*Pseudodendrothrips mori* (Niwa) (Thysanoptera: Thripidae), whitefly (*Aleurodicus dispersus* Russel) (Hemiptera: Aleyrodidae) and spittlebug (*Clovia puncta* Walker) (Hemiptera: Cercopidae). The natural enemies of these viz., *Spalgis epius*, *Coccinella septempunctata, Coccinella transversalis, Micraspis discolor* and *Illeis indica* were also observed. Table 1 shows data on the relative abundance of these, maximum being of *P. marginatus* (83.52%) followed by *M. hirsutus* (7.33%), *P. mori* (6.98%), *A. dispersus* (1.35%) and *C. puncta* (0.80%). As regards natural enemies, maximum was of *S. epius* (50.88%) followed by *C. septempunctata* (22.32%), *C. transversalis* (13.78%), *M. discolor* (9.18%) and *I. indica* (2.82%). These observations were found to corroborate with those obtained from Jorhat district. The sucking pest includes mealy bug, thrips, spiralling whitefly, leafhoppers, jassids and scale insects which cause damage to the mulberry (Hosamani et al., 2020). The most dominant predator was *S. epius, C. septempunctata, C. transversalis, M. discolor* and *I. indica.* Several predators, mainly Coccinellidae (Coleoptera), have been reported to feed on *M. hirsutus* on mulberry (Janakiraman and Natarajan, 2018).

Table 1. Relative abundance of sucking pests of mulberry and their natural enemies (2018-2019)

| Date of sampling | *P. marginatus* (no./ shoot) | *M. hirustus* (no./ shoot) | *A. dispersus* (no./ plant) | *P. mori* (no./ plant) | *C. puncta* (no./ plant) | *S. epius* (no./ plant) | *C. septempunctata* (no./ plant) | *C. transversalis* (no./ plant) | *M. discolor* (no./ plant) | *I. indica* (no./ plant) |
|---|---|---|---|---|---|---|---|---|---|---|
| 15 Dec, 2018 | 42.02 | 1.31 | 0.00 | 3.31 | 0.00 | 1.05 | 0.02 | 0.12 | 0.17 | 0.01 |
| 31-Dec | 38.13 | 1.03 | 0.00 | 3.03 | 0.00 | 0.00 | 0.02 | 0.10 | 0.00 | 0.01 |
| 15 Jan, 2019 | 35.44 | 4.44 | 0.00 | 4.44 | 0.00 | 0.00 | 0.00 | 0.15 | 0.00 | 0.00 |
| 31-Jan | 48.21 | 3.43 | 0.00 | 4.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| 15-Feb | 62.29 | 10.48 | 0.61 | 7.48 | 0.41 | 0.46 | 0.05 | 0.04 | 0.02 | 0.00 |
| 28-Feb | 74.36 | 10.47 | 0.06 | 7.47 | 0.04 | 1.01 | 1.00 | 0.07 | 0.45 | 0.00 |
| 15-Mar | 92.09 | 12.56 | 3.00 | 11.55 | 2.00 | 1.41 | 1.00 | 0.56 | 0.22 | 0.00 |
| 31-Mar | 75.33 | 12.55 | 3.02 | 11.54 | 2.02 | 1.49 | 0.02 | 0.42 | 0.16 | 0.01 |
| 15-Apr | 92.05 | 16.34 | 2.59 | 8.34 | 1.59 | 0.92 | 1.02 | 0.30 | 0.33 | 0.00 |
| 30-Apr | 104.76 | 16.33 | 2.58 | 8.33 | 1.58 | 1.35 | 1.02 | 0.95 | 0.40 | 0.01 |
| 15-May | 75.54 | 17.06 | 3.44 | 11.06 | 2.44 | 1.22 | 0.65 | 0.18 | 0.34 | 0.02 |
| 31-May | 65.06 | 17.05 | 3.43 | 11.59 | 2.42 | 0.75 | 0.62 | 0.22 | 0.22 | 0.00 |
| 15-Jun | 54.37 | 5.06 | 2.04 | 7.06 | 1.04 | 1.66 | 0.15 | 0.00 | 0.23 | 0.00 |
| 30-Jun | 42.31 | 5.05 | 2.05 | 7.05 | 1.05 | 0.72 | 0.30 | 0.35 | 0.12 | 0.03 |
| 15-Jul | 63.55 | 4.11 | 2.37 | 5.11 | 1.32 | 1.42 | 0.20 | 0.39 | 0.22 | 0.02 |
| 31-Jul | 33.12 | 4.12 | 2.38 | 5.12 | 0.31 | 0.62 | 0.00 | 0.20 | 0.12 | 0.01 |
| 15-Aug | 65.09 | 3.67 | 0.00 | 4.67 | 0.00 | 1.17 | 0.50 | 0.04 | 0.02 | 0.03 |
| 31-Aug | 35.41 | 3.66 | 0.00 | 4.66 | 0.00 | 1.55 | 0.32 | 0.20 | 0.01 | 0.02 |
| 15-Sep | 90.11 | 1.02 | 0.00 | 3.06 | 0.00 | 1.35 | 0.03 | 0.47 | 0.02 | 0.02 |
| 30-Sep | 85.19 | 1.01 | 0.00 | 3.05 | 0.00 | 1.43 | 0.07 | 0.27 | 0.56 | 0.01 |
| 15-Oct | 125.07 | 0.21 | 0.00 | 2.54 | 0.00 | 4.35 | 1.34 | 0.80 | 0.53 | 0.00 |
| 31-Oct | 100.09 | 0.24 | 0.00 | 2.53 | 0.00 | 2.85 | 1.25 | 0.76 | 0.43 | 0.00 |
| 15-Nov | 120.41 | 0.00 | 0.00 | 3.00 | 0.00 | 4.00 | 1.05 | 0.89 | 0.44 | 0.00 |
| 30- Nov | 105.04 | 0.00 | 0.00 | 3.01 | 0.00 | 3.40 | 3.20 | 0.76 | 0.60 | 0.00 |
| Mean | 71.87 | 6.31 | 1.17 | 6.01 | 0.69 | 1.44 | 0.66 | 0.39 | 0.26 | 0.08 |
| Relative abundance (%) | 83.52 | 7.33 | 1.35 | 6.98 | 0.80 | 50.88 | 23.32 | 13.78 | 9.18 | 2.82 |

Mean of 25 samples

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**AUTHOR CONTRIBUTION STATEMENT**

N Saikia and R B Dutta conceived and design the research. N Saikia wrote the manuscript and conducted the experiments.

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