Pest Management in Horticultural Ecosystems
Vol. 24, No.2 pp 274-276 (2019)

RESEARCH NOTE

Population dynamics of weaver ant, *Oecophylla smaragdina* Fabricius (Hymenoptera: Formicidae) in mango (*Mangifera indica*) and sapota (*Manilkara zapota*)

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ABSTRACT: Weaver ants are very aggressive and will prey on many of the arthropods entering their territory. A study was conducted to assess the population dynamics of *Oecophylla smaragdina* Fabricius on mango and sapota trees in the orchard of Faculty of Agriculture, Annamalai University, Annamalainagar, Tamil Nadu, india. From the study, it was evident that in highest number of green nests (13.10/tree) and dry nests (6.00) were found in mango during February and March. The number was minimum in December, May and June. Leaf pavilion was 0.10 in June and 0.00 in all other months. Total number of nests were more during February (17.70) and less in December (0.60). In *sapota,* highest number of green and dry nests were found in September and March as 19.75 and 17.75 respectively. Lowest number of green nest and dry nest were present in April and October as 1.00 and 0.50 respectively. Leaf pavilion was 0.00 in all the months. Total number of nests were highest during September (26.25) and lowest during November (1.25).

Keywords: *Oecophylla smaragdina*, population dynamics, *Mangifera indica*, *Manilkara zapota*

The arboreal ant, *Oecophylla smaragdina* (Fabricius) makes a silk-lined nest of living leaves, and is strongly territorial (Holldobler, 1983). Colonies of *O. smaragdina* (from Asia and Australia) have polydomous nest organization, with a large number of leaf nests scattered over canopies of several trees. Weaver ants get their name from their peculiar habit of binding leaves with larval silk to form communal nests in tree canopy. A single leaf or two may be used to form the simple-nests often called leaf- or ant-pavilions, where ants and trophobionts are sheltered, but no brood is raised (Way, 1963). They are the earliest known biological control agent (Huang and Yang, 1987) and is still used in China to manage citrus pests (Yang, 1982). The potential of ants in insect-control was very well explained by Rickson and Rickson (1998) and Peng and Christian (2005). However in India, little research has been carried out (Sreekumar *et al*., 2011; Mahapatro, 2008). Keeping in mind the importance of management of major pests of fruit crops and the successful use of *O. smaragdina* as a potential biocontrol agent worldwide, present investigation was initiated with the objective to study the population dynamics of *O. smaragdina* on mango (*Mangifera indica*) and sapota (*Manilkara zapota*).

Dynamics of *O. smaragdina* nests was recorded at fortnightly intervals from mango and sapota trees with ant nests from January 2017–December 2017 at Annamalai University, Annamalainagar, Tamil Nadu which is located at an altitude of + 5.79 m MSL, 11 ° 24' N latitude and 79 °44' E longitude. The ant nests were categorized as simple and composite nests and their numbers were recorded. Simple nests are composed of 1-2 leaves, termed as leaf or ant-pavilions. Composite nests are green (active) nests with a few dried leaves. Nest with all dried leaves are taken as abandoned ant-nests (dry nests) and their number too were noted as mentioned by Mahapatro and Mathew (2014).

In mango, highest number of green and dry nests were found in February and March (13.10 and 6.00 respectively) while in July and September were 2.80, 2.80; 3.70, 3.30 respectively. Lowest number of green nest and dry nest were found in December, May and June (0.60 and 0.80). Leaf pavilion was 0.10 in June and 0.00 in all other months. Total number of nests was high during February (17.70) and less in December (0.60) (Table 1). Authors found leaf-pavilions mostly harboured the trophobionts, mealybugs which were the aggregation sites. Active nests were green, and abandoned nests were dry. This is in line with the observations of Mahapatro and Mathew (2014) in cashew.

Table 1. Dynamics of *Oecophylla smaragdina* nests on *Mangifera indica* (Jan - Dec 2017)

Month #	No. green nest (G)*	No. dry nest(D)*	No. leaf pavilion(L)*	Green+Dry nests (G+D)*	Total nests (G+D+L)*
January	12.00	1.40	0.00	13.40	13.40
February	13.10	4.60	0.00	17.70	17.70
March	6.40	6.00	0.00	12.40	12.40
April	2.20	1.70	0.00	3.90	3.90
May	0.80	0.80	0.00	1.60	1.60
June	0.90	0.80	0.10	1.70	1.80
July	2.80	2.80	0.00	5.60	5.60
August	0.90	2.20	0.00	3.10	3.10
September	3.70	3.30	0.00	7.00	7.00
October	8.00	1.70	0.00	9.70	9.70
November	0.70	0.00	0.00	0.70	0.70
December	0.60	0.00	0.00	0.60	0.60

Values are mean of two counts on five trees

Table 2. Dynamics of *Oecophylla smaragdina* nests on *Manilkara sapota* (Jan – Dec 2017)

Month #	No. green nest (G)*	No. dry nest(D)*	No. leaf pavilion(L)*	Green+Dry nests (G+D)*	Total nests (G+D+L)*
January	8.50	11.50	0.00	20.00	20.00
February	6.00	13.25	0.00	19.25	19.25
March	3.25	17.75	0.00	21.00	21.00
April	1.00	11.50	0.00	12.50	12.50
May	0.00	2.75	0.00	2.75	2.75
June	0.00	0.00	0.00	0.00	0.00
July	3.00	0.75	0.00	3.75	3.75
August	14.50	2.75	0.00	17.25	17.25
September	19.75	6.50	0.00	26.25	26.25
October	10.00	0.50	0.00	10.50	10.50
November	1.25	0.00	0.00	1.25	1.25
December	0.00	0.00	0.00	0.00	0.00

Values are mean of two counts on five trees

In sapota, the highest number of green nest and dry nest was found in September and March as 19.75 and 17.75 respectively. Number of green nest; dry nest in January; February were 8.50, 11.50; 6.00, 13.25 respectively. Lowest number of green nest and dry nest were present in April and October as 1.00 and 0.50 respectively. Leaf pavilion was 0.00 in all the months. Total number of nests were highest during September (26.25) and lowest during November (1.25) (Table 2). Green nest were absent during May, June and December.

Coley and Barone (1996) indicated that the fluctuation of the dynamic nests also has an ecological value. In facultative associations, a plant offers nectar, food bodies and other rewards to lure ants that nest else, where to patrol its leaves and remove any herbivores they encounter. Similarly Altieri (1999) reported that the bigger the nest the more *O. smaragdina* populations that can help in the pest control of the palm. *Mangifera indica* and *Manilkara zapota* trees are continuously visited by *O. smaragdina* throughout the year which indirectly will take care of pest population is well understood from the present study results. From the present study results, it is obvious that green and dry nests were more during rainy and winter seasons. Green nest and ant pavilion were more during nectar rich and reproductive periods of both mango and sapota. Ant communities are shaped by the competition, when foraging for extra-floral and floral nectar sources, preys (arthropods like insect pests) and homopteran honeydew. The aggressive red ant (*O. smaragdina*) exhibited a significant preference for nectar source. During reproductive phenophase, the nectar richness explains the increased ant-activity, consequently more number of green/active nests. Conservation biological control with predatory ants such as *Oecophylla* in high-value tree crops has great potential (Van *et al*., 2007). The present study also has proven this for *O. smaragdina* in Tamil Nadu. Among the fruits in Tamil Nadu both *Mangifera indica* and *Manilkara zapota* are most important. As organic fruits are of great demand and *O. smaragdina* will guarantee this effectively.

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MS Received 18 August 2019
MS Accepted 7 October 2019