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Incidence of Insect Pest of *Morinda* sp.

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Abstract *Morinda citrifolia* L. (F-Rubiaceae.) has been newly introduced in this region but information on the pest problems is very limited and practically wanting in some cases. Abiotic factors play defining roles in population development of the insect species and their subsequent damage on crop plants and hence, the incidence and intensity of infestation of the important insect pests was studied. The results of the study showed that a number of insect pests attacked by *Morinda* sp. and cause considerable damage in palm -based ecosystem.

Keywords *Morinda,* Insect, Pest.

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Introduction

Many people have heard about mysterious and miraculous Noni, but a few of them know exactly what it is. Originally this tropical fruit was only found in the South Pacific, but now has become, more popular due to its unique medicinal properties and easy cultivation [1]. Noni growing in natural ecosystem did not have much pest problems, but became susceptible to a wide spectrum of insect pests, pathogens and nematodes when domesticated in a monoculture as experienced in Hawaii and other Pacific Island. Considering the importance and strong potential and medicinal importance of this crop, the present investigation was undertaken in a palm-based agroecosystem that included study on the important insect their subsequent damage on crop plants.

Materials and Methods

The experiment was carried out at Horticultural Research Station, Bidhan Chandra Krishi Vishwavidyalaya, Manduri, Nadia, West Bengal during November, 2010 to October, 2011. Data were collected from randomly selected plants at an interval of seven days. The observations were taken from samples as mentioned against specific insect. Observation for aphid and jassid/10leaves/10plant, for defoliating caterpillar (total and infested) shoots/plants×10 plants for shoot damage; total and infested leaves from 5 shoots/plant×10 plants were examined for leaf damage. For leaf minor 5 young leave/shoot @ 5 shoots/plant × 5 plants were observed

and the percentage of infested leaves was worked out. Scale insect observations were recorded from total and infested stems/10 plants and the percent infestation was worked out. For trips 5 leaves/shoot @ 10 shoots/plant × 10 plants in case of leaf infestation.

Results and Discussion

Infestation of defoliating caterpillar on *Morinda* sp.

During the entire observation period from November 2010 to October 2011, the damage caused by defoliating caterpillars noticed. It recorded the least shoot infestation (9.2%) in November which gradually increase and reached a peak in August (49.6%) . In other months the damages varied between (13.6—45.3%). It found that damages were comparatively lower during cooler conditions and humid conditions with comfortable temperature regimes favoring the insect species. Data on the mean leaf damages also showed the same pattern, recording the highest damage (49.2%) during August, July (42.1%), September (41.1%) and October (35.2%) also recorded quite high leaf damages. In other months, the mean leaf damages ranged between (10.4—29.2%). Revealed that the infestation was severe, with 55.80% plants in the experimental orchard being infested (48 out of 86 plants) with an average defoliation of 37.5% per tree. Up to 15 larvae were observed feeding voraciously on pomegranate plants [2].

Infestation of jassid on *Morinda* sp.

This hemipteran was found in quite high numbers in the tender leaves throughout the growing season excepting the peak monsoon (July—August). Only a mean of (5.6/top5leaves/10plant) and (6.8/top5leaves/10plant) numbers of jassids were recorded respectively during the two months of July and August. The population started to build up during the post monsoon period, recording a mean of (24.3jassids/5leaves/10plant) during September and (40.2jassids/5 leaves/10plant) during October. From November, the insect species showed a more or less steady population growth and February recorded the highest numbers (80.4jassids/5 leaves/10 plant). Jassid appeared to be a serious potential threat to this newly introduced crop in this region on *Morinda* sp. Dahatonde et al. [3] observed that the incidence of jassid (*Amrasca biguttula biguttula* Ishida) started from November (3.20jassids/three leaves) and reached to a peak level (22.46jassids/three leaves) during December.

Infestation of thrips on *Morinda* sp.

This tiny thysanopteran was recorded in quite high numbers during the entire observation period excepting peak monsoon months (June, July and August) when they were in smaller numbers, (6.5-12.5 thrips/5 top leaves/10 plant). September recorded a mean number of (40.2thrips/5 leaves/10 plant) and there after the population steadily increased reaching the peak in February (72.2thrips/5 leaves/10plants). The mean population of the thrips species in other months varied between (48.6-70.4/5 leaves/10plant). Patel et al. [4] found the incidence of *S. dorsalis* on chilli crop commenced from first week of September and continued up to harvest of the crops being peak activity was recorded in November (4.99-5.54thrips/leaf) and February—March (5.29—7.38thrips/leaf).

Infestation of aphids on *Morinda* sp.

Aphids were recorded during most part of the study period. However, peak monsoon did not favor the insect species, during June—September no aphids or their damages were visible in the plantation. The population started to build up in October, showed a steady increase during winter months and produced peak in March (54.1% infested shoots and 21.2 aphids/shoot/10 plant). Seasonal incidence of aphid, *Amphorophora ampullata* on *Hypolepis polypodioides* was recorded throughout the year. Peak incidence of aphid was recorded during third week of November [5].

Table 1. Incidence and infestation of some insect on *Morinda* sp. in palm-based agroecosystem. * Total shoots/ten plants, ** total leaves/5 shoots × ten plants, *** ten shoots/plant × ten plants. For leaf minor * 5 young leaves/shoot ×5 shoots × 5 plants.

	Defoliating caterpillar		***Jassid (Mean no./5 top leaves)	***Thrips Mean no./5 top leaves	***Aphid		Scale insect	*Leaf miner
Months	*Mean % infested shoots	**Mean % infested leaves			43.5	Mean % infested leaves	Mean % scale infested stem	Mean % infested leaves
November	9.2	10.4	70.3	48.6	47.5	70.4	43.6	70.4
December	13.6	15.6	75.4	54.3	51.4	81.5	47.5	81.5
January	18.5	23.3	78.2	67.4	46.1	76.5	51.4	76.5
February	22.7	25.8	80.4	72.2	36.2	54.9	46.1	54.9
March	21.4	23.7	78.1	70.1	23.2	32.4	36.2	32.4
April	19.5	22.4	74.3	70.4	23.4	23.5	23.2	23.5
May	19.6	23.8	70.5	63.2	26.3	16.3	23.4	16.3
June	31.2	29.9	23.2	10.5	37.6	18.2	26.3	18.2
July	45.3	42.1	5.6	6.5	31.6	26.3	37.6	26.3
August	49.6	49.9	6.8	12.5	32.7	22.1	31.6	22.1
September	36.2	41.1	24.3	25.8	38.1	43.3	32.7	43.3
October	42.3	35.2	35.6	40.2	38.1	53.2	38.1	53.2

Infestation of scale insect of *Morinda* sp.

This is another hemipteran which was recorded during the entire observation periods, though there were some fluctuations in their populations. Substantial numbers of green stems were found to be infested by this insect which varied between (23.2–51.4%). Apparently, the attack was more intense during coolar months, October to February and the mean infestation on the stems during the period varied between (38.1—51.4%); the highest infestation of (51.4%) recorded during January. This insect feeding directly affects the plant vascular tissues; as a result, the ascent of sap is interrupted and biomass accumulation also gets affected which ultimately affects the developing fruits. The infestation by black scale insects was maximum in December and January and minimum in the months of May and July. Infestation was not recorded in the months of October and February [6].

Infestation of leaf miner on *Morinda* sp.

Leaf miners attack the younger leaves. This plant species was no exception and significant numbers of leaves were infested by the leaf miner species. Dry hot conditions were not suitable fo this insect species and young leaves were also not abundant during that period; as a result, this combinaton of biotic-abiotic factors strongly discouraged growth and development of the pest population. Mean infested leaves during this period varied between (16.3—26.3%) and the peak infestations were recorded during cooler conditions (70.4%) November, December (81.5%) and January (76.5%). Variyal and Bhut [7] recorded the infestation of leaf minor on tomato attained the highest peak (29.40%) during 1st week of January. Overall, the activity of leaf miner was higher during December-January.

Apart from the above insect, some more insect pests were also found to feed on the plants, though in small numbers and the damages caused by them were also not so concern during the observation period. It included mealy bugs, gandhi bug, cow bug, green stink bug, dusky stink bug, weevil, whitefly, beetles, eriophyiid mite.

Results indicated that defoliating caterpillars, jassids, thrips, aphids, scale insects and leaf miner

were the important phytophagous insect species that were present in significant numbers and produced considerable impacts on the test plant species. Noni has been reported to be attacked by a large array ofinsect species like aphids (*Aphis gossypii*), scales (*Coccus viridis*), weevils, leaf rolling hispine beetles leaf miners, whiteflies (*Dialuerodes kirkaldyi*), defoliating caterpillars (*Achaea janata*, *Spodoptera* sp. *Anomis* sp.), and thrips (*Heliothrips hemorr-idalis*) [8]. *Mathivanan* [9] also found that aphids, whiteflies and scales caused serious problems on noni. Results of the present studies are in line with these earlier works. The complex of natual enemies on noni had been reported also as similar in some other places [1]. Similar literatures have also been cited in the noni web site [10, 11].

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