



SEASONAL INCIDENCE OF INSECT PESTS INFESTING TEAK PLANTATIONS IN KONKAN REGION OF MAHARASHTRA STATE, INDIA

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Abstract

The survey was conducted to record pests infesting teak plantation at University area, which revealed that the teak trees were damaged by five insect pests viz., teak leaf skeletonizer, *Eutoctona machaeralis*; teak defoliator, *Hyblaea puera*; leaf hopper, *Cocclida* sp., grasshopper and meagre infestation of termites. The incidence of *E. machaeralis* was maximum in the forty-second meteorological week. The peak incidence of *H. puera* was in the thirty-eighth meteorological week. Incidence of grasshopper was at its peak in the thirty-fifth meteorological week whereas the peak incidence of *Cocclida* sp. was recorded in the thirty-fourth meteorological week.

Key words: Insect pests, teak leaf skeletonizer, *Eutoctona machaeralis* Walker, teak defoliator, *Hyblaea puera*, *Cocclida* sp.

Introduction

'Forest' constitutes the most important asset of mankind and plays a vital role in the maintenance of our environment. They provide products, services and amenities. Indeed without them life on our planet would not survive. Important forest products includes woods, nuts, fruits, mushrooms, litter for cattle bedding, pharmaceutical plants, gums, resins, leaf extractives, greenery, forage and many other plant products. Forest gives abundant opportunity for outdoor recreation and also adds to life's amenities by softening and beautifying the landscape.

In India, forest constitutes an area of about 78.29 Mha. This is 23.81 per cent of total geographical area of the country. At the end of 2010-11 area under forest in Maharashtra was about 61939 sq. km., which is 20.13 per cent of total geographical area of the state (Anonymous, 2011).

The forest provide number of valuable products, but due to heavy deforestation during last few decades, the availability and supply of timber wood and other products is very less compared to present demand. In order to meet present demand of timber wood, the efforts are being made at government as well as farmers level to

increase the plantation of forest trees. Similarly, the forest nurseries are also maintained to produce healthy and quality planting material. However, the success of forest tree plantation as well as nursery is suffered a lot due to several problems including pests. Among important timber plants of India, teak (*Tectona grandis* Linn.) is the most valuable commercial timber tree. It is considered to be very durable due to presence of high oil and toxic substances. It is used in construction of ships, bridges, wharfs constructions, general carpentry carving and military services, etc. Besides these utilities of teak, the nurseries as well as plantation trees of teak are very vulnerable to damage by insect pests. In Maharashtra particularly in Konkan region, about thirty insect pests have been recorded on different forest trees (Ghorpade and Patil, 1991). As many as 300 insect pests have been recorded on teak by Tewari (1992).

Materials and Methods

A survey was carried out to record the pests associated with teak plantation at Biodiversity Park of the College of Forestry, Dapoli during January, 2012 to December, 2012.

Method of recording observations

Ten trees from teak plantation were selected randomly and marked permanently to record infestation

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of pests at weekly interval according to Meteorological week. The major insect pests found causing damage was categorized as sucking pest complex and foliage feeding insects. The following method adapted to record observations.

For sucking pest complex

Insect pests on big trees were counted by the quadrat method. The area of 50 cm² was randomly selected and marked at 4 sides of tree canopy for further observations. The total number of nymphs and adults of sucking insects per quadrat were counted at each observation and the average pest wise population per tree was calculated.

For foliage feeding insect pests

On teak trees, total number of larvae and adults present per quadrat was counted and the average pest wise population per tree was calculated.

Different larval stages found during study were collected and reared in the laboratory in glass jar separately by providing the leaves of host tree on which the larvae were observed. The top of the jar was covered with muslin cloth secured firmly with rubber band. The cotton swab soaked in 10 per cent honey solution was kept suspended in glass jar as food for newly emerged adults.

Results and Discussion

During present investigations, teak trees were damaged by five insect pests *viz.*, leaf skeletonizer, *E. machaeralis*; defoliator, *H. puera*; leaf hopper, *Cocclida* sp., grasshopper and termites (table 1). But very meagre infestation of termites was noticed during the period of study. The occurrence and the intensity of each pest is described below:

Incidence of leaf skeletonizer, *E. machaeralis*

The results presented in table 1 revealed that there was no pest infestation of pest upto the eighth meteorological week. The incidence noticed in the ninth meteorological week (0.5 larvae per tree), which gradually increased upto the fourteenth meteorological week (1.0 larva per tree). The incidence declined from the fifteenth meteorological week (0.75 larvae per tree). There was no incidence of pest during the seventeenth meteorological week upto the twenty-seventh meteorological week. The incidence reappeared in the twenty-eighth week (0.25 larvae per tree), which gradually increased and reached its peak in the forty-second meteorological week (5.75 larvae per tree). The pest declined from the forty-third meteorological week (4.25 larvae per tree) and

Table 1 : Pests Infesting teak trees and their intensity.

Meteorological week	Mean pest population per tree			
	<i>E. machaeralis</i>	<i>H. puera</i>	<i>Cocclida</i> sp.	Grass-hopper
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
6	-	-	-	-
7	-	-	-	-
8	-	-	-	-
9	0.5	-	-	-
10	0.5	-	-	-
11	0.75	-	-	-
12	1.0	-	-	-
13	1.0	-	-	-
14	1.0	-	-	-
15	0.75	-	-	-
16	0.5	-	-	-
17	-	-	-	-
18	-	-	-	-
19	-	-	-	-
20	-	-	-	-
21	-	-	-	0.75
22	-	-	-	1.25
23	-	-	-	1.50
24	-	-	-	2.00
25	-	-	-	1.75
26	-	-	0.50	2.25
27	-	-	0.50	2.00
28	0.25	1.00	0.75	2.25
29	0.75	1.50	0.50	2.50
30	0.50	1.75	1.50	2.50
31	1.0	2.50	1.75	2.75
32	1.5	2.00	1.25	3.00
33	1.75	3.25	1.75	3.00
34	1.75	3.00	2.00	2.75
35	2.0	3.00	1.75	3.25
36	2.25	3.25	1.50	2.50
37	2.0	3.75	0.75	2.25
38	2.50	4.25	1.00	1.50
39	3.00	4.00	0.75	0.75
40	3.25	4.00	1.00	-
41	4.50	3.75	1.50	-
42	5.75	3.50	1.25	-
43	4.25	1.75	0.75	-
44	3.50	1.00	0.50	-
45	2.25	-	0.50	-
46	1.00	-	-	-
47	0.25	-	-	-
48	-	-	-	-
49	-	-	-	-
50	-	-	-	-
51	-	-	-	-
52	-	-	-	-

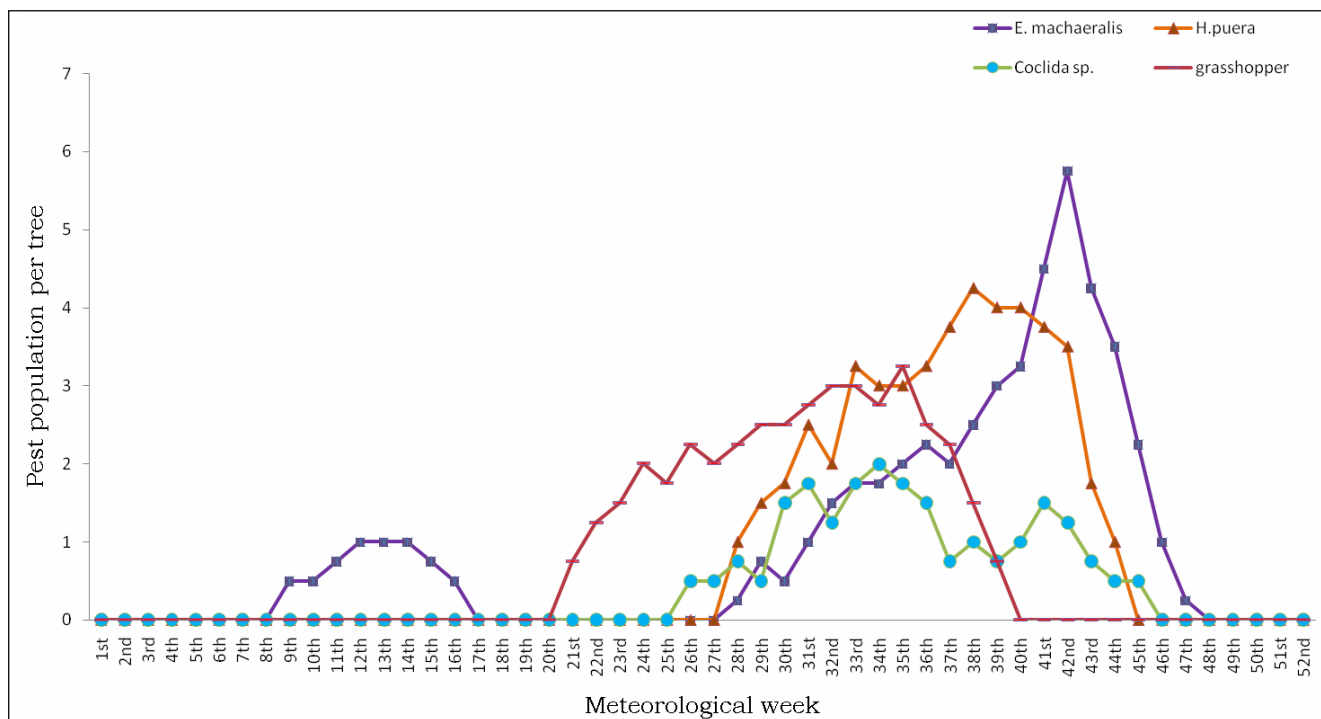


Fig. 1 : Incidence of pests of teak at plantation stage.

Table 2 : Pests infesting teak trees and their intensity.

Host	Scientific/common name of the pest along with order and family	Range	Average pest population per tree during period of infestation (Meteorological weeks)
Teak	<i>Eutoctona machaeralis</i> Walker (Lepidoptera: Pyralidae)	0.25 to 5.75	1.78
	<i>Hyblaea puera</i> Cramer (Lepidoptera: Hyblaeidae)	1.00 to 4.25	2.77
	<i>Coclida sp.</i>	0.50 to 3.25	1.08
	Grasshopper (Orthoptera: Tettigonidae)	0.75 to 3.25	2.13

completely disappeared from the forty-eighth meteorological week (fig. 1).

In general, the average pest incidence during infestation period ranged from 0.25 to 5.75 larvae per tree with a mean of 1.78 larvae per tree (table 2). Similar observations were recorded by Raut (1998). He reported the peak population of pest in first week of October. Katagall *et al.* (2000 a) also reported that the pest population was higher during July to October months. Khan *et al.* (1988), Meshram *et al.* (1990), Gawade (1992), Alam *et al.* (2004) and Pandey *et al.* (2010) also reported that the teak leaf skeletonizer, *E. machaeralis* was found very active during August to October with highest population and infestation during September, while low pest population during rest of the year.

Incidence of teak defoliator, *Hyblaea puera* Cramer

During the study, it was found that there was no

incidence of pest during the first meteorological week to the twenty-seventh meteorological week. The incidence of pest noticed in the twenty-eighth meteorological week (1.00 larvae per tree) which gradually increased and reached its peak in the thirty-eighth meteorological week (4.25 larvae per tree). The incidence declined from the thirty-ninth meteorological week (4.00 larvae per tree) and completely disappeared from the forty-fifth meteorological week (table 1) (fig. 1).

From table 2, it is revealed that the average pest incidence during infestation period ranged from 1.00 to 4.25 larvae per tree with a mean population of 2.77 larvae per tree. Similar observations were also made by Pawar and Bhatnagar (1989), who reported that the pest population was higher during August – September months whereas pest population was absent during January to June. Katagall *et al.* (2000 a) also reported that the pest

Appendix 1: Weekly weather data during the period of study at Dapoli station (January, 2012 to December, 2012).

Period	MW	Temp. max. (°C)	Temp. min. (°C)	RH (Mor.) (%)	RH (Evn.) (%)	Rainfall (mm)
01.01 - 07.01	1	31.8	14.8	91	58	0.0
08.01 - 14.01	2	30.0	9.6	91	57	0.0
15.01 - 21.01	3	28.8	10.4	93	59	0.0
22.01 - 28.01	4	29.0	12.6	93	58	0.0
29.01 - 04.02	5	31.3	13.1	93	49	0.0
05.02 - 11.02	6	30.7	10.4	86	44	0.0
12.02 - 18.02	7	30.1	10.4	91	54	0.0
19.02 - 25.02	8	35.6	14.2	91	48	0.0
26.02 - 04.03	9	32.6	11.0	91	52	0.0
05.03 - 11.03	10	30.8	11.9	90	54	0.0
12.03 - 18.03	11	34.2	14.1	89	42	0.0
19.03 - 25.03	12	33.6	15.6	92	47	0.0
26.03 - 01.04	13	31.8	19.7	92	64	0.0
02.04 - 08.04	14	32.5	20.5	93	67	0.0
09.04 - 15.04	15	32.4	20.4	94	64	0.0
16.04 - 22.04	16	34.1	22.4	91	65	0.0
23.04 - 29.04	17	34.4	20.4	86	75	0.0
30.04 - 06.05	18	31.8	20.5	92	71	0.0
07.05 - 13.05	19	32.7	22.6	85	68	0.0
14.05 - 20.05	20	32.9	22.4	81	78	0.0
21.05 - 27.05	21	32.7	22.7	82	70	0.0
28.05 - 03.06	22	33.0	22.9	83	79	0.0
04.06 - 10.06	23	32.0	23.8	91	85	100.
11.06 - 17.06	24	29.8	23.7	96	87	116.6
18.06 - 24.06	25	29.4	23.8	95	77	490.2
25.06 - 01.07	26	29.4	23.4	96	80	243.9
02.07 - 08.07	27	28.2	24.0	96	89	355.0
09.07 - 15.07	28	29.2	24.1	96	86	145.8
16.07 - 22.07	29	27.9	23.9	96	92	313.9
23.07 - 29.07	30	28.9	24.1	94	92	140.6
30.07 - 05.08	31	27.9	23.9	95	89	212.6
06.08 - 12.08	32	28.0	24.0	95	93	224.5
13.08 - 19.08	33	28.8	24.4	94	86	57.0
20.08 - 26.08	34	29.1	24.1	95	88	48.2
27.08 - 02.09	35	26.9	23.2	97	93	505.2
03.09 - 09.09	36	27.3	23.8	97	93	274.4
10.09 - 16.09	37	28.1	23.9	93	89	155.0
17.09 - 23.09	38	28.7	22.7	93	89	12.4
24.09 - 30.09	39	30.1	22.0	94	78	5.0
01.10 - 07.10	40	29.7	23.4	91	94	253.0
08.10 - 14.10	41	31.3	22.2	89	69	0.0
15.10 - 21.10	42	33.4	19.5	86	50	0.0
22.10 - 28.10	43	33.0	22.1	87	53	0.0
29.10 - 04.11	44	32.0	19.3	85	54	0.0
05.11 - 11.11	45	32.2	18.1	89	55	0.0
12.11 - 18.11	46	31.9	15.8	95	49	0.0
19.11 - 25.11	47	32.2	15.0	89	40	0.0
26.11 - 02.12	48	31.9	15.6	90	50	0.0
03.12 - 09.12	49	33.7	18.1	89	48	0.0
10.12 - 16.12	50	30.8	14.0	90	49	0.0
17.12 - 23.12	51	32.5	13.9	91	43	0.0
24.12 - 31.12	52	31.7	13.8	92	39	0.0

population was at its peak in second fortnight of September.

Incidence of leaf hopper, *Cocclida sp.*

Dark coloured nymphs and adults of *Cocclida sp.* were found to suck the sap from leaves of teak.

Incidence of *Cocclida sp.* was not observed upto the twenty-fifth meteorological week. The incidence of pest observed in the twenty-sixth meteorological week (0.5 nymphs and adults per tree), which increased gradually and reached its peak in the thirty-fourth meteorological week (2.0 nymphs and adults per tree). From the thirty-fifth meteorological week (1.75 nymphs and adults per tree) population declined upto the forty-fifth meteorological week (0.5 nymphs and adults per tree). There was no pest incidence from the forty-sixth meteorological week to the fifty-second meteorological week (table 1) (fig. 1).

The results presented in table 2 revealed that the average pest incidence during infestation period ranged from 0.50 to 3.25 nymphs and adults per tree with a mean of 1.08 nymphs and adults per tree. More or less similar observations were also recorded by Raut (1998), who found that the incidence of *Cocclida sp.* started from June and which was continued to first fortnight of October with peak infestation in July-August.

Incidence of grasshoppers

The incidence of grasshopper was not observed from the first meteorological week upto the twentieth meteorological week. Incidence of pest noticed in the twenty-first meteorological week (0.75 nymphs and adults per tree), which increased gradually and reached its peak in the thirty-fifth meteorological week (3.25 nymphs and adults per tree) and from the thirty-sixth meteorological week (2.50 nymphs and adults per tree) incidence declined. There was no pest incidence noticed from the fortieth meteorological week onwards (table 1) (fig. 1).

The results presented in table 2 revealed that the average pest incidence during infestation period ranged from 0.75 to 3.25 nymphs and adults per tree with a mean of 2.13 nymphs and adults per tree.

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