

# STUDIES ABOUT THE INSECT PESTS SUCCESSION ON TAMARIND, *Tamarindus indica* AT BASTAR DISTRICT OF CHHATTISGARH

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## KEYWORDS

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## ABSTRACT

The experiment was conducted at Shaheed Gundadhoor College of Agriculture and Research Station, Jagdalpur, Bastar during 2015-16. In pest succession studies, six species of different insect pests were recorded, among these some were found damaging the tree while others were only visitors presented in very few numbers. Fruit borer, *Cryptophlebia ombrodelta* was categorized as major pest of tamarind. Its occurrence in the field was noticed throughout the green fruiting period. Maximum fruit borer infestation of 19.91 infested pods / unit area was recorded during second week of October with seasonal mean of 9.70 fruit borer infested pods / unit area. Peak population of mealy bugs was recorded during second week of October with 29.58 nymphs and adults / unit area. Two peaks of scale insects were observed, first in the fourth week of September followed by second week of November with 28.83 and 29.95 scale insects / unit area. Peak population of plant hopper 20.76 nymphs and adults / unit area recorded during second week of October. Peak activity period of tree hopper was recorded during second week of October with 5.73 nymphs and adults / unit area with the seasonal mean of 2.52 nymphs and adults / unit area.

## INTRODUCTION

Tamarind (*Tamarindus indica*) is an important tree of semi arid tropical conditions. Tamarind belongs to dicotyledonous family leguminaceae sub family caesalpiniaceae which has multipurpose use. Tamarind is a leguminous, long lived, medium growth, bushy tree which attains a maximum crown height of 12 to 18 meters (40 to 60 feet).

Every part of the plant is used for different purpose. The fruit pulp, sweetish in taste, is used for serving curries, chutneys, sauces and soups because of its anti ascorbic properties, pulp is used by sailers in place of lime or lemon. Tamarind kernel powder (TKP) is used as a sizing material in textile and leather industries. Seeds are used as source of carbohydrates for paper and jute products. Seed yield fatty oil which is used in paints and varnishes. Wood is used for making agricultural implements, tool handles, wheel mallets and rice pounders. Tender leaves, flowers, and young seedlings are eaten as vegetables. The flowers are rated as a good source of nectar for honeybees (Anonymous, 2013a).

The annual production of tamarind in India is ranging from 2, 50,000 to 3, 00,000 tonnes. Annual returns from tamarind seed powder are estimated about 17 lakhs. A mature tree may annually produce 330 to 500 lbs (150.225 kg) of fruits pulp may constitute shells and fibres 11 to 30 per cent and seed 33 to 40 per cent (NAS, 1979).

Poor peoples of Bastar collect fruits of tamarind in the month of January to April and engaged in related work up to June. Jagdalpur Krishi Upaj Mandi is the largest auction centre of

tamarind in Asia. According to an estimate of Forest Department of Bastar, average production of tamarind fruit is 21,430 metric tons which values about Rs. 10.35 crores. These productions generate employment of 24,000 man days in the month of January to April. Besides this about 5660 tons of tamarind seed worth about 3.02 crore rupees @ 550/- quintal is transported from Jagdalpur. (Anonymous, 2015). Marothia and Gauraha (1992) studied the marketing mechanism of minor forest produce (MFPs) in Raipur district, Madhya Pradesh, India. They reported that 80 per cent of villagers were engaged in collection of MFPs including tamarind and earned their livelihood by consuming and marketing these products.

Fruit borer, *Aphomia gularis* Zeller among the insect pests is most devastating pest causing yield loss to the extent of 27 to 30 per cent followed by aphids, *Toxoptera aurantii*, jassids, *Amrasca bigguttula bigguttula*, thrips, *Scirtothrips dorsalis*, mealy bugs, *Nipaecoccus viridis*, scale insects, *Aonidiella orientalis*, cow bug and butterfly, *Charax fablus* (Patil, 2005). In the pest succession studies, six species of different insect pest i.e. fruit borer, mealy bug, tree hopper, scale insect, hairy caterpillar and bag worm were observed in tamarind crop. Among these, fruit borer, *A. gularis* was categorized as major pest causing 27.95 per cent fruit borer infestation/tree (Patil, 2015). Singh (2014) reported *Cryptophlebia ombrodelta* as major pest of tamarind and bael at eastern region of Orissa state. The damage of borer started at green fruit stage and went up almost till the maturity of fruit.

## MATERIALS AND METHODS

For the study of different insect pests associated with tamarind,

two blocks of Bastar district namely Jagdalpur and Tokapal were selected. In each blocks, five villages were selected where, eight trees per village were tagged randomly. For the present investigation, area of one square meter and one square feet (30 cm<sup>2</sup>) was marked in all four directions (N, S, E and W) in each selected tree. Fortnightly observation on insect pest population with their predators and parasites were observed on randomly selected trees during the cropping season *i.e.* July to March. Fruit borer infestation was recorded fortnightly from one square meter area in all directions of selected trees randomly on the basis of total number of fruits and number of fruit borer infested fruits. The population of other insect pests and their natural enemies was counted from one square feet (30 cm<sup>2</sup>) area in all directions of eight randomly selected trees. Insect pests and natural enemy population was subjected to simple correlation where insect population was as dependent factor and weather parameters, such as temperature, humidity and rainfall as independent factors.

## RESULTS AND DISCUSSION

The incidence of various insect pests and associated natural enemies was observed on tamarind during *kharif-rabi*, 2015-16. Fortnightly observation on insect pests population with their natural enemies were recorded on marked area of trees randomly per village are given in Table 1. The occurrence of insect pest complex on tamarind commenced from second week of July. During the course of study, six insect pest species were noticed causing damage at various growth stages of tamarind, namely fruit borer, mealy bug, plant hopper and scale insect were first to infest the crop followed by hairy caterpillar and tree hopper which infested tamarind crop from flowering stage to fruit maturity stage. Besides these, their natural enemies *i.e.* dragon fly, damsel fly, red ant, black ant, spiders, Ichneumonid wasp, orange wasp, preying mantid, lace wing were observed during the course of work. Findings on the incidence of insect pests and their natural enemies are as mentioned below

### Fruit borer

Fruit borer *C. ombrodelta* is one of the most prevalent insect pest of tamarind. Its first appearance on fruiting stage of the crop was observed in the second week of July with a mean population of 1.97 fruit borer infested fruits / unit area. . Density of fruit borer infested fruits increased gradually up to 19.91 / unit area during second week of October which was the peak activity period. Thereafter, the population was slightly down up to 17.23 / unit area and second peak activity period of fruit borer was recorded during second week of November with 18.12 population / unit area. After second peak, population of fruit borer gradually declined up to 1.88 fruit borer / unit area in second week of March with seasonal mean of 9.70 fruit borer / unit area. This finding is also supported by Ushman and Puttarudriah (1955) who reported that *Cryptophlebia sp.* boring into the fruits of tamarind and recorded as polyphagous pest.

Male Fruit Borer, *Cryptophlebia ombrodelta* Female Fruit Borer, *Cryptophlebia ombrodelta*

### Mealy bug

Mealy bug was first recorded on crop in second week of July with a mean population of 0.55 nymph and adult / unit area. Its population increased suddenly up to 17.64 nymphs and adults / unit area in second week of September and reached maximum population up to 29.58 nymphs and adults in second week of October. Thereafter, the pest population gradually decline up to 2.01 nymphs and adults / unit area in second week of March with seasonal mean of 12.10 nymphs and adults / unit area. The mealy bug population disappeared from the crop after March as the fruit become mature. These findings are in accordance with Butani (1979) who reported that mealy bug, *Nipaecoccus viridis* Newst. attacks tamarind trees. The nymphs and female suck the sap from ventral surface of leaflets, the base of leaf petioles, tender shoots and even mature shoots were also found to be affected by mealy bug.

### Scale insect

The initial infestation by scale insect was first recorded on

**Table 1: Fortnightly population of insect pests on tamarind crop during *kharif – rabi*, 2015-16**

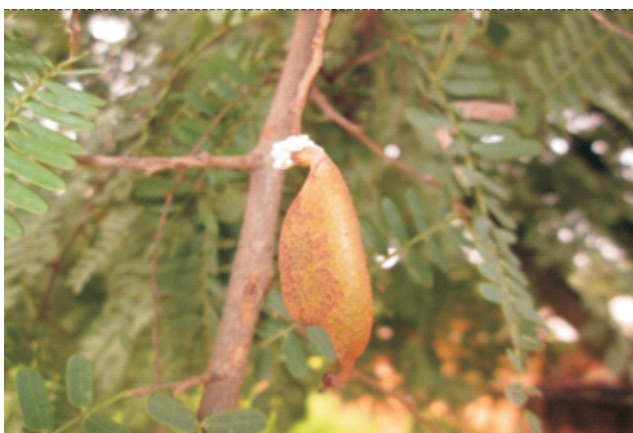
SMW	Date of Observation	Fruit borer ( per m <sup>2</sup> )	Mealy bug ( per fit <sup>2</sup> )	Scale insect (per fit <sup>2</sup> )	Plant hopper ( per fit <sup>2</sup> )	Tree hopper ( per fit <sup>2</sup> )	Hairy caterpillar ( per fit <sup>2</sup> )
28	9/7/2015	1.97	0.55	0.25	0.12	0	0
30	23/07/2015	3.25	1.09	0.59	0.15	0.1	0
32	9/8/2015	4.14	1.53	0.67	0.23	0	0.09
34	23/08/2015	9.61	1.83	1.56	0.42	0.46	0.06
36	9/9/2015	13.92	17.64	16.03	10.99	4.02	0.27
38	23/09/2015	18.08	26.53	28.83	18.68	5.28	0.14
40	9/10/2015	19.91	29.58	25.83	20.76	5.73	0
42	23/10/2015	17.23	25.75	26.08	19.29	5.46	0
44	9/11/2015	18.12	22.73	29.95	17.93	5.35	0
46	23/11/2015	15.62	19.95	21.69	16.98	5.14	0
48	9/12/2015	13.23	18.57	20.97	16.25	5.08	0
50	23/12/2015	9.89	17.68	19.36	15.55	5.08	0
2	9/1/2016	6.76	8.12	8.31	1.25	0.39	0
4	23/01/2016	5.23	5.42	6.74	0.59	0.71	0
6	9/2/2016	3.39	4	5.58	0	0	0
8	23/02/2016	2.72	2.75	2.17	0	0	0
10	9/3/2016	1.88	2.01	0	0	0	0
	Seasonal mean	9.7	12.1	12.62	8.19	2.52	0.03



Male Fruit Borer, *Cryptophlebia ombrodelta*



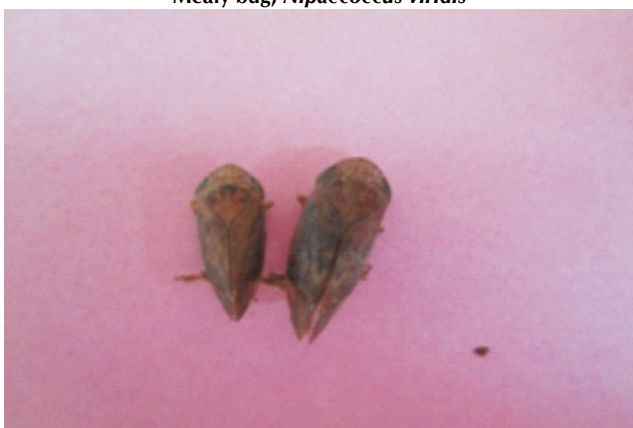
Female Fruit Borer, *Cryptophlebia ombrodelta*



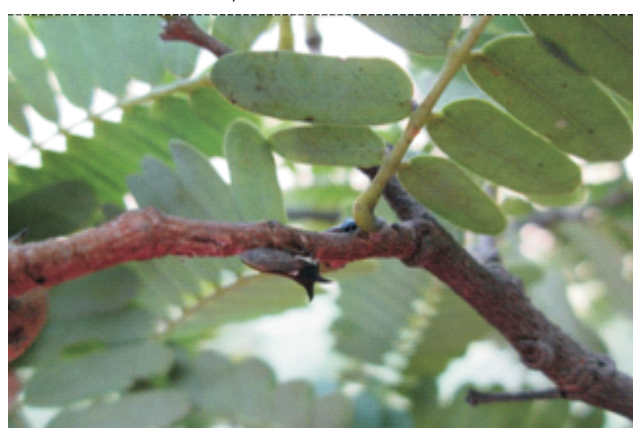
Mealy bug, *Nipaecoccus viridis*



Scale insect, *Aonidiella orientalis*



Plant hopper (Unidentified)



Tree hopper, *Otinotus oneratus*

tamarind during the second week of July with a mean population of 0.25 scale insect / unit area. The pest pressure gradually increased up to 28.83 scale insects / unit area as the first peak during the fourth week of September. Thereafter, one more peak period was recorded during second week of November with the maximum population of 29.95 scale insects / unit area. After second peak, population was gradually declined and went down to a minimum population of 2.17 scale insects / unit area during the fourth week of February with the seasonal mean of 12.62 scale insects / unit area. Thereafter, the pest population completely disappeared from

second week of March. Patel (2015) also reported number of sap suckers viz. mealy bug, scale insect, aphid, cow bug, tree hopper. Among these, scale insect was one of the important pests of tamarind.

#### Plant hopper

First appearance of plant hopper was recorded with mean population of 0.12 nymph and adult / unit area in the second week of July. The pest population increased suddenly up to 10.99 nymphs and adults / unit area during second week of September and then it reached to peak population of 20.76 nymphs and adults / unit area in second week of October.





Hairy caterpillar, (Unidentified)

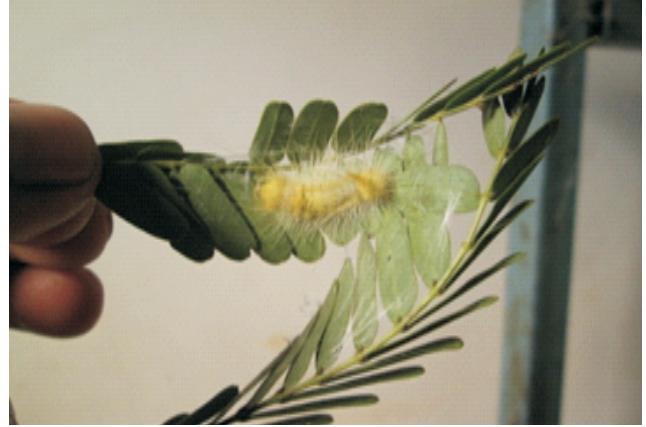
After that, the pest population declined suddenly and reached to a minimum of 0.59 nymph and adult / unit area during the fourth week of January. The seasonal mean population of 8.19 nymphs and adults / unit area was recorded. These findings are in accordance with Patel (2015) who reported plant hopper as pest of tamarind at Jagdalpur.

#### Tree hopper

The activity of tree hopper was first observed from fourth week of July with mean population of 0.10 nymph and adult / unit area. The pest population gradually increased up to 5.73 nymphs and adults / unit area as peak recorded in second week of October. The pest population was gradually decreased and reached to a minimum of 0.71 nymph and adult / unit area in fourth week of January with the seasonal mean of 2.52 nymphs and adults / unit area. Hairy caterpillar was first recorded during the second week of August with a mean population of 0.09 caterpillar / unit area. Mean population of hairy caterpillar was noticed less than one throughout the observation period and the pest population completely disappeared from second week of October with the seasonal mean population of 0.03 hairy caterpillar / unit area. These findings are supported by Patel (2015) who also mentioned that the tamarind is attacked by tree hopper, *O. oeneratus*.

#### Hairy caterpillar

The incidence of hairy caterpillar was first recorded during the second week of August with a mean population of 0.09 caterpillar / unit area. Mean population of hairy caterpillar was noticed less than one throughout the observation period



and the pest population completely disappeared from second week of October with the seasonal mean population of 0.03 hairy caterpillar / unit area.

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