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***Eutectona machaeralis*, Walker (Lepidoptera : Pyralidae) ; The Teak skeletonizer in Jharkhand and its Biocontrol**

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Abstract : Teak skeletonizer, *Eutectonamachaeralis* ,Walker (Lepidoptera : Pyralidae) is a major pest of teak (*Tectonagrandis*L.f.) responsible for severe defoliation in nurseries, plantations and natural forests. During survey (2011-2014) in teak forests of Jharkhand it was found that the pest is affecting the teak tree. The larva skeletonizes the leaves and defoliates it, causing weakening of the plant.

Keywords : Skeletonizer, Biocontrol, Pest, timber.

INTRODUCTION

Teak (*Tectona grandis* L.f.) is an economically important plant commonly known as sagwan. It belongs to family Verbenaceae. It is a potential tree species of high quality tropical timber (Tewari, 1992; Bhatt et al 2005). About 174 species of insects are associated with teak (Mathur, 1960). Many of these insects are minor or occasional pests and very few are recognised as major pests. Out of these The teak skeletonizer, *Eutectona machaeralis*, Walker (syn. *Pyrausta machaeralis*, Hampson (1894), *Hapalia machaeralis*, Beeson 1941) is a major pest of teak responsible for severe defoliation regularly in nurseries, plantations and natural forests of all teak growing areas (Beeson 1941; Browne 1968, Mathur 1960; Ghude et al 1993; Sudheendrakumar 1994.; Shukla et al; Appanch et al 2000; 2001, Roychoudhary 2002; Loganathan et al 2002; Nair 2005, Keshari 2007). Larvae of this insect feed only on the fleshy leaf tissues, leaving all the veins intact, thus it affects adversely the growth and vigour, resulting in both qualitative and quantitative loss in timber production

(Beeson 1941, Champion 1934). The investigations were carried out in teak plantations at Ranchi, Ramgarh and Hazaribagh districts from Feb. 2011 to Jan. 2014 to find insect pests associated with teak.

MATERIALS AND METHODS

The studies were made under laboratory conditions. Caterpillars of different instars were collected from teak plantations in Ranchi, Patratu road, Ormanjhi -Ramgarh road and some protected forest areas under Birsa Agricultural University, Ranchi. The larvae were collected by hand picking and moths were collected by light trap. Some pupas were also collected from under the leaf. Different stages of caterpillars were reared in the laboratory to obtain adults for further studies. The caterpillars were maintained on teak leaves in the glass jars (500ml capacity). About 2 cm thick and was placed in the bottom over which a circular blotting paper cut to the size (the jar diameter) was placed. The sand was moistened with distilled water. Teak leaves were placed on the blotting paper and caterpillars were allowed to feed on them. Thus the leaves remained fresh for at least two days. Mouth of the jar was covered muslin kept in position with the help of a rubber band. Food was changed every alternate day. Larvae that

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were caged over mature leaves consumed a significantly larger leaf in the 5th instar and had a significantly longer larval period than larvae caged over young leaves. When these caterpillars pupated they were removed and kept in specimen tubes 5cm long and 2.5cm in diameter. Upon emergence of the adults, the male and female moths were released in separate cages in which a teak twig was kept in a jar filled with water, so that the cut end remained under water. Open end of the mouth of the jar was closed with muslin. Eggs obtained were again reared in the laboratory.

OBSERVATIONS

The life cycle and feeding habit was observed in laboratory conditions. Eggs are laid singly on the upper or lower side of the leaf. They hatch in three days more or less. The 1st instar larva is minute in size and feeds on superficial cells of epidermis of the leaf under the protection of strands of silk spun in an open web. When the food accessible from this shelter has been consumed a new source is constructed elsewhere. The 2nd instar larva is about 0.5 cm in length. It is slender, elongate pale yellow with greenish tinge, head with a black pigment spot on each side near the hind margin. Prothorax is provided with numerous minute black specks. The 3rd instar larva can bite right through the leaf and the 4th instar larva about 2 cm in length. Mature larva about 2-3 cm in length and 3.4 mm in width. Two yellow sub-dorsal lines tinged with reddish purple are present in each segments with black spots bordered with white or yellow on the dorsum. Thoracic shield is spotted on the dorsum with minute black specks. Head is yellow speckled with dark brown marking

with conspicuously fuscous ring based hairs.

Mature larva eats the tissue between the network of veins, thereby skeletonizing the leaf which turns brown. All parts of the leaf attacked are uniformly skeletonized. It is a characteristic behaviour of larva of *Eutectona machaeralis*. The mature larva uses a shelter web combined with an escape-hole that enable the larva to retreat immediately to the opposite side of the leaf and drop by a thread of silk. Moulting takes place under surface of the leaf.

Pupation may take place either on green leaf or fallen leaf. It spins a thick opaque shelter-web in two layers at regular distances round the edges. Small oval 15-20 holes are left and an emergence hole is provided at one end. In winter season pupal period varies from one to two weeks (generally only 5-7 days of pupation is seen). Pupa is reddish brown in colour measuring about 1cm length.

Forewing bright with slightly brown transverse markings in the form of zig-zag lines; hind wing pale with an ochreous lines or band. The pattern and colour of the marking are variable and seasonal. In hot weather or summer the ground colour of the wing is pearly white to ochreous yellow with very indistinct to light orange-brown zig-zag lines. As the winter season comes, the ground colour of the wings seems deeper i.e. ochreous yellow to ochreous (light yellowish brown) and the zig-zag lines are darker.

The moths at a glance can be confused with *Hapalia aureolalis* but the zig-zag lines on the wing of *Hapalia machaeralis* are darker; Abdomen of the female is thicker and blunter than in male and it has only six abdominal segments visible ventrally. Wing expanse 2-2.5 cms.

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RESULTS AND DISCUSSIONS

Table-1: Mean larval survival and larval period of *Eutectona machaeralis* during different months (April 2012- July 2012)

month	temperature 2012		Rain fall	Rh	% larval survival			Larval period		
	Max.	min			No. of larva reared	No. of larva pupated	% of survival	Date of hatching	Date of pupation	Mean larval period in days
April	25.9	19.0	7.5	56.7	100	75	75	9/4	21/4	12.5
May	38.7	21.3	6.0	54.9	100	70	70	14/5	27/5	13.2
June	36.2	22.7	75.4		100	68	68	22/6	4/7	12.8
July	30.4	20.2	260.4		63.8	100	59	59	16/7	28/7
				74.1						
Mean	32.8	20.8	87.3	62.3	100	68	68	--	--	12.9

Table-2: Mean larval survival and pupal period of *Eutectona machaeralis* during different months (April 2012- July 2012)

month	temperature 2012		Rain fall	Rh	% pupal survival			pupal period		
	Max.	min			No. of pupa reared	No. of adults emerged	% of survival	Date of pupation	Date of emergence	Mean pupal period in days
April	25.9	19.0	7.5	56.7	50	42	84	21/4	27/4	6.5
May	38.7	21.3	6.0	54.9	50	29	58	27/5	3/6	6.7
June	36.2	22.7	75.4		50	38	76	4/7	10/7	6.8
July	30.4	20.2	260.4		63.8	50	45	90	28/7	4/8
				74.1						
Mean	32.8	20.8	87.3	62.3	50	77	77	--	--	6.8

Table-3 : longevity of male and female moths of *Eutectona machaeralis*

month	Date of emergence	Date of death	Longevity In days		Temp.		Rh
			male	female	Max.	Min.	
April	27/4	30/4	3-4	4-5	25.9	19.0	56.7
May	3/6	6/6	4-5	5-5	38.7	21.3	
June	10/7	14/7	3-4	4-5	36.2	22.7	54.9
July	4/8	10/8	5-6	5-6	30.4	20.2	63.8
			3.8-4.8	4.5-5.3	32.8	20.8	74.1
							62.3

Number of % of larva, pupa survived and mean larval period in laboratory is 68%, 77% and 12.9 respectively. Larval and pupal period is May and July. Maximum % of survival of larva in the month of April. Maximum % of survival of pupa in the month of July.

BIOLOGICAL CONTROL

The larva is parasitized by Apanteless ps. (Braconidae: Hymenoptera)

Pupa is parasitized by Braconsps. (Braconidae: Hymenoptera) *Brachymeria cupleae*, Westwood (Chalcidae)

Sturmia inconspicuella, Meigh (Tachinidae: Diptera)

Predators - Carabidae - *Calleidarapex*, and
Parena nigrolineata

Mantidae - *Creobotar usbana* .Fabr.
Reduvidae - *Sycanus felleni* .Stel.

Others - Ants (Formicidae)
Solitary Wasp (Eumenidae)
Mermisps. (Nematoda)

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