

Attack of Teak Canker Grub, *Dihammus cervinus* Hope (Cerambycidae : Coleoptera) and Its Control in Teak Plantations of Bangladesh

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Abstract

This paper reports the infestation of teak canker grub, *Dihammus cervinus* Hope (Cerambycidae : Coleoptera) in teak plantations of Bangladesh. It deals with the nature and extent of damage, distribution, life history, number of generation and host plants of the pest and its control measures. The pest affected on an average 14% of the saplings. The attack was found mainly during the age of 2 - 6 years with a peak in the third year. The pest was more prevalent in Chittagong Hill Tracts (North and South) than in Chittagong or Cox's Bazar Forest Divisions. An infested sapling often contained one canker, but it might have up to four cankers. A canker usually contained one larva but it might have 2 - 3 larvae. Most of the cankers were found at or near the base of the saplings. About 10% of the infested saplings were found broken at the cankered site. As regards to control measures, application of carbofuran 5G @ 6 gms/sapling at the base and subsequently watered gave nearly 70% mortality of the larvae.

সারসংক্ষেপ

বাংলাদেশের সেগুন বাগানে ক্যাংকার সৃষ্টিকারী পোকাকার আক্রমণের বিষয়ে এ প্রবন্ধে আলোকপাত করা হয়েছে। এতে এ পোকাকার ক্ষতির প্রকৃতি ও ব্যাপকতা, প্রাণিস্থান, জীবন-বৃত্তান্ত, জীবন-ক্রমের সংখ্যা, পোষক গাছ এবং দমন ব্যবস্থা সম্বন্ধে আলোচনা করা হয়েছে। গড়ে প্রায় ১৪% গাছ এ পোকা দ্বারা আক্রান্ত হয়। প্রধানত ২ - ৬ বছর বয়স্ক গাছ আক্রান্ত হয়, কিন্তু তৃতীয় বর্ষে আক্রমণ সবচেয়ে বেশি দেখা যায়। চট্টগ্রাম ও কক্সবাজার বনাঞ্চলের তুলনায় পার্বত্য চট্টগ্রাম (উত্তর ও দক্ষিণ) বন বিভাগ সমূহে এ পোকাকার প্রাদুর্ভাব বেশি। আক্রান্ত গাছে সাধারণত একটি ক্যাংকার দেখা যায়। তবে অনধিক চারটি ক্যাংকারও থাকতে পারে। একটি ক্যাংকারে সাধারণত একটি লার্ভা থাকে, কিন্তু কখনও কখনও ২ - ৩ টাও দেখা যায়। প্রায় সব ক্যাংকারই গাছের গোড়া অথবা গোড়ার সন্নিহিতে দেখা যায়। আক্রান্ত গাছের প্রায় ১০% গাছ ক্যাংকারসৃষ্ট স্থানে ভেঙ্গে যায়। এ পোকা দমনার্থে কারবোফুরান ৫জি কীটনাশকের ৬ গ্রাম আক্রান্ত গাছের গোড়ার মাটির সংগে মিশিয়ে পানি প্রয়োগ করলে প্রায় ৭০% পোকা মারা যায়।

Key words : Bangladesh, control measure, *Dihammus cervinus*, teak canker

Introduction

Teak (*Tectona grandis* L. f.) is an important and highly valuable timber species of Bangladesh. The commencement of its plantation at Sitapahar (Chittagong Hill Tracts) in 1871 ushered in a new era of plantation forestry in Bangladesh. However, teak suffers from insect damage in all stages of growth from seed to maturity. About 280 insect species have been associated with teak (Mathur 1960, Mathur and Singh 1960). But only a few of them are of concern for the foresters. Though teak timber is more or less resistant to insect borers, an important borer feeding inside the bark and wood of saplings has been noticed in teak plantations of Bangladesh (Baksha 1990). In teak plantations extensive damage was caused by the borer resulting in cankerous growth in the affected portion of the stem. An attempt was, therefore, made to study the pest problems and devise its control measures.

Materials and methods

The study was conducted during 1983 - 93. Extensive field surveys were made to about 25 teak plantations of Chittagong, Chittagong Hill Tracts (North and South) and Cox's Bazar Forest Divisions. The nature and extent of damage were noted. The adults were reared from infested plants netted with wire at Dhoom, Chittagong and later identified in the laboratory of the Bangladesh Forest Research Institute, Chittagong. Field and laboratory notes were taken on the biology and ecology of the pest.

Chemical control measure was applied using carbofuran 5G at a heavily infested plantation at Ultacheri, Rangamati. Six grams of the granular insecticide was mixed with the soil around the base of the infested saplings and subsequently

watered, so that the insecticide leached down to the root zone. While mixing the insecticide with the soil around the base of the saplings care was taken to minimize the root damage as far as possible. Data on the mortality of the borer were taken one month after the application of the insecticide.

Results and discussion

Identification

The causal insect was identified as *Dihammus cervinus* Hope (Cerambycidae : Coleoptera) with the help of Beeson (1925, 1941). The adults were 15 - 22 mm long, uniformly grayish brown with long antennae. Its larva is commonly known as teak canker grub. The boring by the larvae in the cambial region stimulated the formation of large spherical swelling on the stem of saplings. The swellings, often much fissured or cankered, persisted for up to eight years.

Distribution

Besides Bangladesh, the species was reported to occur in northern and eastern (but not in southern) India, Nepal, Myanmar, China and Japan in both planted and natural teak (Beeson 1925, Mathur 1960).

Incidence of attack at different localities and ages

Only young teak plants were found to be attacked by the borer, mostly in the second to sixth years of age. The liability of attack was greatest while the plants were in the third year of growth. The pest was more prevalent in Chittagong Hill Tracts (North and South) Forest Divisions and less in Cox's Bazar and Chittagong Forest Divisions (Table 1).

Table 1: Locality and age related infestation by teak canker grub in teak plantations.

Forest Divisions	Age (years)	No. of plants examined	% of plants infested	% of cankered plants broken
Chittagong	1	150	0.0	0.0
	2	148	26.4	12.8
	3	125	37.6	6.4
	4	125	14.4	16.7
	5	127	12.6	18.8
	6	123	4.1	0.0
	7	124	1.6	0.0
		Mean ± S. E.	13.8 ± 5.2	9.1 ± 3.4
Chittagong Hill Tracts (North and South)	1	112	0.0	0.0
	2	143	34.3	16.3
	3	150	58.0	9.2
	4	129	20.2	15.4
	5	116	14.7	17.6
	6	127	7.9	10.0
	7	137	1.5	0.0
		Mean ± S. E.	19.5 ± 7.8	11.4 ± 2.7
Cox's Bazar	1	98	0.0	0.0
	2	132	15.2	10.0
	3	97	13.4	15.4
	4	99	15.2	20.0
	5	119	11.8	14.3
	6	124	4.0	0.0
	7	131	0.0	0.0
		Mean ± S. E.	8.5 ± 2.6	11.9 ± 3.4

Nature of damage

The larva at first tunneled in the cambial region and later in the wood. The partial girdling and injury to the cambium stimulated abnormal growth in the wood and consequent formation of a large globular canker around the wound (Figure 1). A canker usually contained one larva, but 2 - 3 larvae were also found. In an infested sapling there was usually one canker, but it might have up to four cankers. Cankers were usually found near the ground level, but occasionally it was found as high as 165 cm above the ground (Table 2). Longitudinal and transverse fissures were often formed on the canker.

Healing of the canker was often delayed possibly

by the activities of termites and ants which could fill up the cavities with mud or assist the development of rot by wood rotting fungi. The stem was sometimes so weakened through extensive tunneling by the larvae or by the damage caused by the woodpeckers that it broke off at the site of canker. About 10% of the cankered saplings were found broken. The liability of breaking a sapling at cankered site increased as the canker occurred at or near the base of the sapling.

If the infested plant survived from the attack the cankers were gradually occluded and normal growth was resumed. The infested plants usually recovered in about 7 - 8 years. The recovery was more quicker in *Gmelina arborea*, probably due to its fast growing nature as compared to teak.

Table 2 : Severity of infestation by teak canker grub in teak plantations.

Age (yrs)	n	No. of canker/plant			Height (cm) at which canker formed	
		Range	Mean±	S. E.	Range	Mean ± S. E.
1	20	0 - 0	0.0		0.0	
2	19	1 - 2	1.3 ±	0.1	2.5 - 61.0	14.7 ± 3.0
3	28	1 - 4	1.8 ±	0.2	0.0 - 165.0	38.6 ± 6.9
4	8	1 - 2	1.2 ±	0.2	5.1 - 152.4	57.4 ± 20.1
5	10	1 - 2	1.1 ±	0.1	2.5 - 15.0	8.2 ± 1.1
6	20	0 - 1	1.0 ±	0.0	0.0 - 160.0	25.8 ± 7.5
7	10	0 - 1	1.0 ±	0.0	2.0 - 15.0	8.7 ± 1.3



Figure 1: Canker caused by *Dihammus cervinus* on teak stem; above : initial stage, below : advanced stage that further aggravated by the damage caused by woodpeckers.

Life history

Egg : The eggs were laid in a transverse incision cut by the mandible of the female in the bark. Then the tip of the ovipositor was inserted and an egg was pushed in the cambium region. The incised hole was later sealed with cement. The bark which was raised slightly over the oviposition site usually cracked longitudinally. The fecundity is 40.0 ± 3.5 ($n = 5$). Incubation period was 5.0 ± 0.3 ($n = 10$) days.

Larva : The larva on hatching bored in the inner bark. It began to eject fine fibres and excretory particles through the bark fissures. An irregular tunnel was excavated, which went downwards and tended to round the stem. After 2 - 3 weeks it entered into the wood.



Figure 2: Last instar larva of *Dihammus cervinus* constructing pupal chamber in the teak wood.

Pupa : A pupal chamber was constructed in the wood by April. The chamber was 2.5 - 5.0 cm long, clean of wood dust, but closed by a plug of coarse wood fibres (Figure 2). The pupal period lasted for 16.0 ± 0.7 ($n = 6$) days. The adult emerged through circular exit hole on the stem.

Adult : The beetles started to emerge in April with the onset of the rainy season. They fed mainly at night on the soft bark making shallow irregular patches on it. Sometimes they devoured buds, petioles and tender shoots. They took shelter in shady places, under green leaves, etc. during the day. The caged adult longevity were 57.4 ± 1.6 ($n = 5$) days for male and 70.1 ± 1.1 ($n = 7$) days for female.

Number of generation

The pest was reported to have annual life cycle on teak in northern India (Beeson 1941). Observations on adult emergence from the netted saplings in teak plantations in Bangladesh suggest that the pest possibly passes through two generations in a year - the first starting in April - May and the second in October - November. It is likely that the later broods do not mature until the following hot weather.

Food plants

Besides teak, the pest also attacked gamar (*Gmelina arborea* Roxb.) and many others such as *Adina cordifolia* (Roxb.) Hook f.ex. Brandis, *Anthocephalus chinensis* (Lamk.) Rich. ex. Walp., *Duabanga sonneratioides* Buch.-Ham., and *Clerodendrum visconm* Vent. (Browne 1968). The incidence of attack seemed to be more pronounced on *C. viscosum* than on teak of the same locality. But in case of *C. viscosum* the attack was usually in the root which was hollowed out, but the canker

was found in the ground level. In *G. arborea* the attack was found to be less extensive than on teak.

Control measures

The insecticidal treatment gave about 70% mortality of the larva. Killing of the young larvae by opening the tunnels in the bark in the first month of infestation could give some control but it would be labour intensive. For the control of the pest, early workers (Beeson 1925, 1941) advocated several measures such as painting the lower part of the stem by coal tar or creosote during oviposition period, concealing the bark by wrapping with grass, cutting back badly cankered stem up to four years of age at ground level to obtain coppice shoot, avoiding the raising of teak plantations near gamar plantations, uprooting of *C. viscosum* before planting teak and ensuring rapid growth in early years. However, judicious integration of all these measures including the chemical one could likely give better management of the pest in teak plantations.

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