Biology, Ecology and Control of Amra Defoliator, *Podontia quatuordecimpunctata* Linn. (Chrysomelidae : Coleoptera) in Bangladesh

M. W. Baksha
Bangladesh Forest Research Institute, P. O. Box 273, Chittagong 4000, Bangladesh

Abstract

The beetle, *Podontia quatuordecimpunctata* Linn. (Chrysomelidae : Coleoptera) is a major defoliator of amra *(Spondias pinnata* (L. f.) Kurz and *S. dulcis* Forst. f.*)* in Bangladesh. Besides *Spondias* spp., the pest also attacks *Ficus elastica* Roxb. and *Duabanga grandiflora* (Roxb. ex DC) Walp. Both the adult and the larva cause partial or complete defoliation affecting the growth of the plant seriously. The peak infestation period occurred during August and September. Younger trees are most heavily attacked. The incidence is more pronounced in the hilly areas than in the plains. The pest was controlled by foliar application of cypermethrin (Ripcord 10 EC) @ 12 ml/10 litres of water.

সারসংক্ষেপ

বাংলাদেশে পাতাভোজী পোকা, *Podontia quatuordecimpunctata* Linn. আমড়া গাছের একটি প্রধান ক্ষতিকর পোকা। আমড়া গাছ ছাড়াও এ পোকা ভারতীয় রাবার ও বান্দরহোলা গাছ আক্রমণ করে। প্রাপ্ত ও অপ্রাপ্ত বয়স্ক পোকা গাছের আংশিক বা সম্পূর্ণ পাতা খেয়ে গাছের বৃদ্ধি মারাত্মকভাবে ব্যাহত করে। আগষ্ট ও সেপ্টেম্বর মাসে এ পোকার আক্রমণ বেশী দেখা গেছে। কম বয়স্ক গাছে আক্রমণের ব্যাপকতা বেশী। সমতল এলাকার চেয়ে পাহাড়ী এলাকায় বেশী পোকাক্রমণ দেখা গেছে। সাইপারমেথ্রিন (রিপকর্ড ১০ ইসি) নামক কীটনাশক প্রতি ১০ লিটার পানিতে ১২ মিঃ লিঃ মিশিয়ে গাছের পাতায় প্রয়োগ করে এ পোকা দমন করা হয়েছে।

Key words : Amra defoliator, Bangladesh, pest biology, pest control, pest ecology, *Podontia quatuordecimpunctata*

Introduction

Amra *(Spondias pinnata* (L.f.) Kurz and *S. dulcis* Forst. f.) is a deciduous tree planted as fruit and fodder purpose. Quite often the trees are defoliated by the beetle, *Podontia quatuordecimpunctata* Linn. (Chrysomelidae : Coleoptera). The pest sometimes causes serious defoliation making the tree completely leafless. The incidence of the pest was first recorded by

Bateman from Calcutta in 1875 (Stebbing 1914). However, only fragmentary information on this pest are available (Lefroy 1909, Maulik 1926, Beeson 1941). The information on this pest from Bangladesh is still more rare (Rahman *et al.* 1997). The present study was, therefore, undertaken to study the biology, ecology and control measures of this pest in Bangladesh.

Materials and methods

Biological studies were conducted in the laboratory of the Bangladesh Forest Research Institute (BFRI), Chittagong during the period from September 1996 to August 1997. Twig samples with live larvae were collected from the infested amra trees in the BFRI campus, and reared in the laboratory. The pest was identified with the help of Beeson (1941), Browne (1968) and Maulik (1926). Besides constant observations to the infested trees in the campus, field observations were made periodically in the homesteads and in the hilly areas of Bangladesh. Field and laboratory notes on the nature and extent of damage, biology and ecology of the pest were taken. Records on length and breadth of various developmental stages of the pest were based on 10 observations. Cypermethrin, a synthetic pyrethroid locally available as Ripcord 10 EC, was sprayed once in August on the infested trees @12 ml/10 litres of water, and its effect was observed after a week.

Results and discussion

Nature of damage

Both the adult and the larva eat the foliage of the plant. The newly hatched larvae feed gregariously on the leaves making them skeletonized. Mature larvae eat the leaves completely leaving only the mid-ribs (Fig.1). The young trees are more heavily attacked. The trees are not killed outright, but the growth and fruiting are definitely affected that have not yet been quantified.

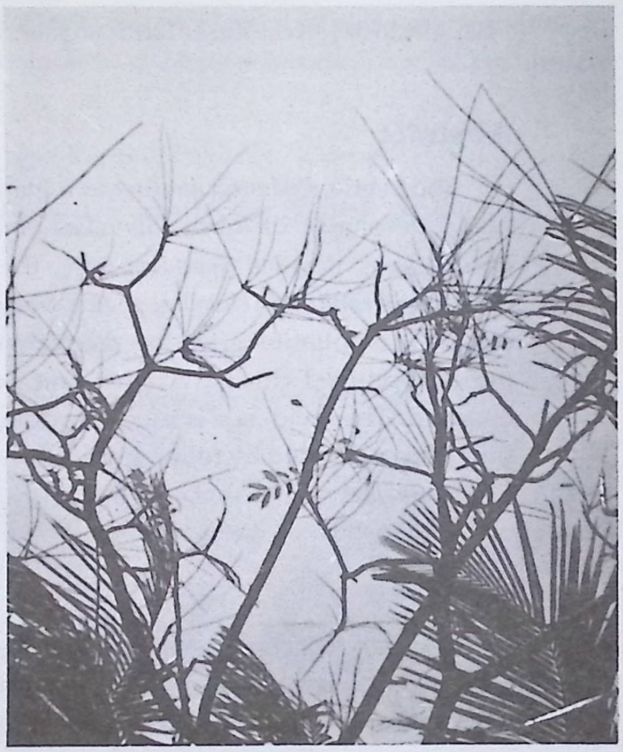

Figure 1. Branches of *S. pinnata* completely defoliated by *P. quatuordecimpunctata*

Host plants

Besides *S. pinnata* and *S. dulcis*, the pest was also found to attack *Ficus elastica* Roxb. and *Duabanga grandiflora* (Roxb. ex DC) Walp. In the latter cases the incidence was found occasionally.

Distribution

The pest was found more prevalent in the hilly areas than in the plain land of Bangladesh. Besides

Bangladesh, the pest was reported to occur in India, Myanmar and Malaysia (Lefroy 1909, Stebbing 1914, Browne 1968).

Life stages

Egg: The females started depositing eggs in June. The eggs are laid on the underside of leaves near the tips in clusters, each egg stands perpendicular to the leaf surface and touches the next one. Another layer was placed at the top of this and so on. The number of eggs in each egg mass varied from 20-70. The eggs are bright yellow. They are oval in shape being 2.0 ± 0.2 mm in length and 0.6 ± 0.01 mm in breadth. The incubation period was 7-8 days.

Larva: The newly hatched larva is dirty yellow or yellowish brown with a black head and legs. Six rows of black spots, each bearing a seta, run longitudinally over the body. The first thoracic segment bears a shield with 10 anterior projections. A yellow protrusible sucker at the anal extremity is provided with projections which help the larva to adhere to or clasp the leaves. Anus is situated just above the base of the sucker. The mature larva is greenish in colour and 21.9 ± 2.7 mm to 25.7 ± 2.1 mm in length and 7.5 ± 1.4 mm to 8.3 ± 1.6 mm in width (Fig. 2). The newly hatched larva fed gregariously for 2-3 days skeletonizing the leaves. There are five larval instars that lasted for 12-20 days. The full-grown larva dropped down to the ground and formed an oval cell made of earth, and pupated inside. The mature larva are shade loving and feed on the underside of the leaves. The larva has a wonderful method of self-protection from natural enemies. It

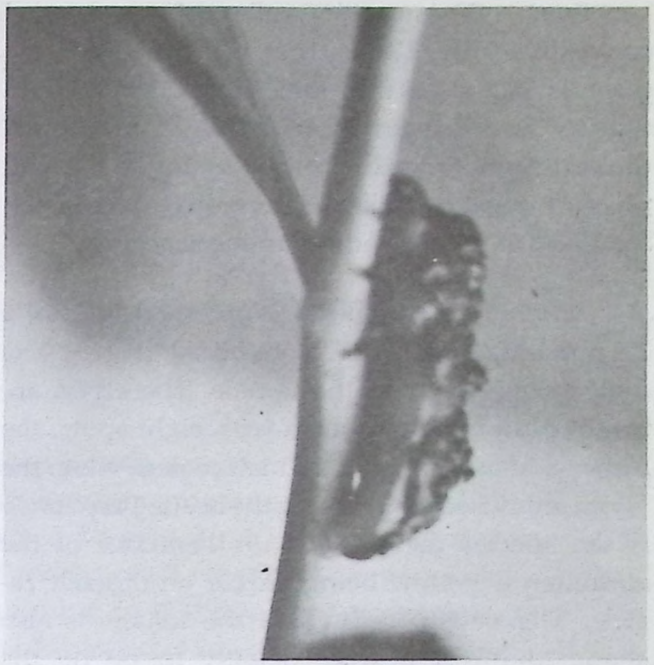

Figure 2. Larva of *P. quatuordecimpunctata* on the twig of *S. pinnata*

curved its abdomen upwards depositing its excrements on the body. The excrement frequently formed a complete covering over the body that may be mistaken as a bird dropping.

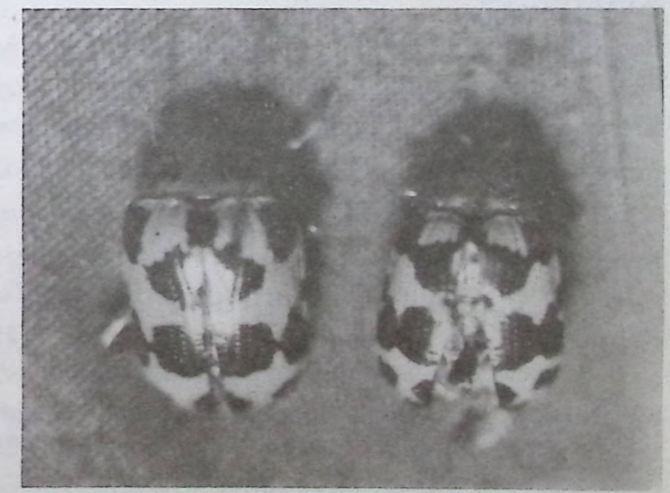

Figure 3. Adults of *P. quatuordecimpunctata*

Pupa : The pupa is yellowish brown and convex dorsally. The earthen cell containing the pupa is 18.2 ± 3.3 mm long and 12.4 ± 2.2 mm width. The cells were formed 8.5 ± 2.3 cm deep in the soil. Sometimes the cells were found under a piece of wood or rubbish. The pupal stage lasted for 15-30 days, depending on the season.

Adult : The adult beetle is oblong being 15.7 ± 2.5 mm long and 7.3 ± 1.7 mm broad (Fig. 3). The male is bigger than the female. The elytra are bright pink in colour, each with eight spots, the upper and lower ones of which coalese when the elytra are closed, thus giving the beetle 14 spots (so is the species name). The undersurface of the abdomen is yellow being darker on thoracic region. The beetle feeding on the foliage is also shade loving and were usually found on the udersurface of leaves. They did not fly readily. When disturbed, they usually dropped down to the ground and feigned death and kept themselves quiet for some time. Just after emergence the beetle started mating.

Seasonal abundance

The adult beetle emerged in June. They were abundant during July to September and disappeared in October. However, the peak infestation period was during August and September.

Control measures

Biological : Excepting a record of an egg parasitoid, *Pediobius* sp. 'A' from Chittagong (B. A. Bhuiyan, pers. com.), no biocontrol agent has been recorded in Bangladesh. However, an encyrtid *Ooncyrtus corbetti* Ferr. from Malaysia (Myers 1931), and a parasitic nematode, *Mermes* sp. and a pathogenic fungus, *Cephalosporium* sp. from India were recorded, the latter caused 10% mortality of the field collected larvae (Singh and Misra 1989).

Chemical : Foliar spraying of cypermethrin (Ripcord 10 EC) gave effective control of both the larva and adult of the pest.

Physical : The adult beetles were also killed by hand when dropped down to the ground by jerking the trees or branches.

References

Beeson, C. F. C. 1941. *The Ecology and Control of the Forest Insects of India and the Neighbouring Countries.* Govt. of India Press, Delhi. 767 pp.

Browne, F. G. 1968. *Pests and Diseases of Forest Plantation Trees.* Clarendon Press, Oxford. 1330 pp.

Lefroy, H. M. 1909. *Indian Insect Life.* Today and Tomorrow's Printers and Publishers, New Delhi. 786 pp.

Maulik, S. 1926. *Fauna of British India –Col. : Chrysomelidae : Halticinae.* Taylor and Francis, London. 442 pp.

Myers, J. G. 1931. Description and records of parasitic Hymenoptera from British Guiana and the West Indies. *Bulletin of Entomological Research* 22(2) : 267-277.

Rahman, M. A.; Baksha, M. W. and Ahmed, F. U. 1997. *Diseases and Pests of Tree Species in Forest Nurseries and Plantations in Bangladesh.* Bangladesh Agricultural Research Council, Dhaka. 39 pp.

Singh, P. and Misra, R. M. 1989. Bionomics of the ambara defoliator *Podontia 14-punctata* Linn. (Coleoptera: Chrysomelidae). *Indian Forester* 115(12) : 910-915.

Stebbing, E. P. 1914. *Indian Forest Insects of Economic Importance : Coleoptera.* J. K. Jain Brothers, Bhopal. 648 pp.