OBSERVATIONS OF *PRASINOXENA MONOSPILA* AND *DOLOESSA VIRIDIS* (LEPIDOPTERA: PYRALIDAE) ON THE BARK OF *KHAYA IVORENSIS* IN MALAYSIA

G. T. Lim

Forest Research Institute Malaysia, Kepong, 52109 Kuala Lumpur, Malaysia

Prasinoxena monospila Meyrick and *Doloessa viridis* Zeller (Lepidoptera: Pyralidae: Galleriinae) were found to be new pests of *Khaya ivorensis* (Meliaceae) in West Malaysia, causing severe but superficial bark necrosis. *Khaya ivorensis*, or African mahogany, has recently been established in several small trials in Malaysia. The impressive growth performance that this exotic species has exhibited so far indicates its potential as a plantation tree species. According to Robinson *et al.* (1994), *P. monospila* has previously been reared from *Hydnocarpus wightiana* (Flacourtiaceae) in West Malaysia and has also been found in Kalimantan, Indonesia. It is a species similar to *P. metaleuca*, which has been reared from the bark of *Lansium* sp. (Meliaceae) (*langsat*) in Thailand and from *Acacia mangium* (Leguminosae) in West Malaysia. *Doloessa viridis* has been reared from *Aglaia wallichii* (Meliaceae) and from plant detritus such as fallen leaves and flowers of the coconut tree, *Cocos nucifera* (Palmae), as well as seeds of *Shorea* (Dipterocarpaceae). *Doloessa viridis* is also a pest of stored grains like rice and maize (Lim & Tan 1981). In Southeast Asia *D. viridis* occurs in West Malaysia, Singapore, Thailand, Java and Sarawak. In the Indo-Australian region, it has been recorded as far east as Fiji and as far north as Hong Kong and Taiwan (Robinson *et al.* 1994).

The morphologies of *P. monospila* and *D. viridis* have been described by Robinson *et al.* (1994). The adult moth of *P. monospila* (Figure 1) has distinctive bright green forewings and bright yellow hindwings. Described as a species similar to *P. metaleuca* Hampson, *P. monospila* has a wing span of about 15 mm. There are faint transverse violet-grey spots in the forewing and a dark-banded speckled termen. The female labial palpus is straight and drooping whereas the male palpus is very small, with an apical segment that is turned inward and hooked. The glandular area on the underside of the male forewing is small and inconspicuous but there is a broad longitudinal band of convergent yellow scales extending from the base to three-quarters the length of the wing. The forewing cell is open.

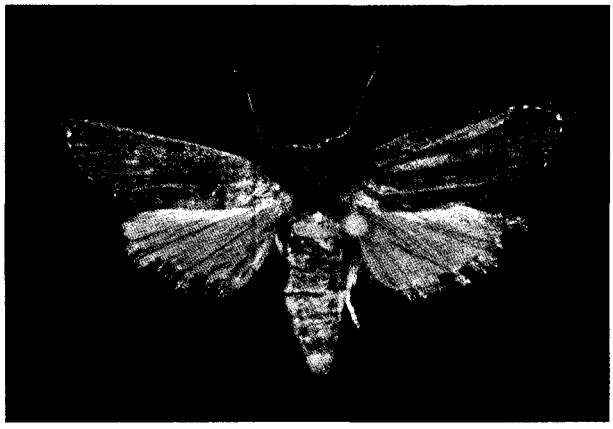


Figure 1 Adult of *Prasinoxena monospila*

Received November 2000

Doloessa viridis (Figure 2), with bright green forewings and brilliant white hindwings, appears similar to *P. astroteles* Meyrick. However, the dark terminal fascia in the forewing of the former is narrower and its pale spots have red-brown rings. The labial palpus of the female is fully developed whereas the male palpus is modified as that of *Prasinoxena* (Robinson *et al.* 1994). The forewing cell is also open with a very small basal glandular area but there are no obvious forewing androconial scales. The wing span of *D. viridis* is variable and males are smaller than females (Robinson pers. comm.). The specimens reared from the bark of *K. ivorensis* in this study had wing spans of approximately 15 mm; shorter than the 27 mm reported by Robinson *et al.* (1994).

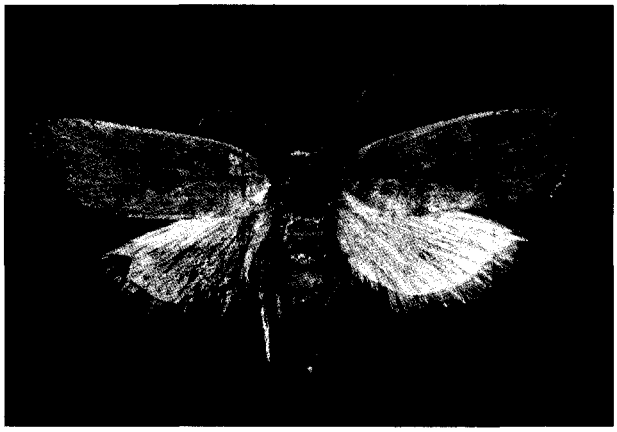


Figure 2 Adult of *Doloessa viridis*

Not much is known about the life cycle of the pests. The adult female moths may oviposit in small cracks in the bark of the trees, a preference also seen in bark borers such as the leopard moth, *Zeuzera pyrina* (Lepidoptera: Cossidae) and the lesser peach tree borer, *Synanthedon pictipes* (Lepidoptera: Aegeriidae) (Metcalf & Metcalf 1993). These cracks could be a result of disease or leaf scars. On the other hand, it could also be due to mechanical or chemical injury since the bark of *K. ivorensis* was found to break up upon application of paint and on contact with metal. Points of infestation in *K. ivorensis* were usually at leaf scars and also where there had been injury to the bark. The larvae of both species burrowed horizontally into the soft bark tissue immediately beneath the surface of the bark crust, eventually resulting in a ring of broken bark around the trunk of the tree. Feeding and pupation occurred under a protective covering of webbing and frass.

A trip to a five-year-old stand of *K. ivorensis* in Sungai Chinoh Plantation, Perak in May 1999 revealed a high degree of pupal parasitism in both pests. From the 17 pupae collected, only 12% emerged as adults whereas 59% were parasitised and the remaining 29% of pupae failed to emerge. No parasitoids were recovered from the 10 larvae collected, six of which pupated. Three subsequently emerged as adults. The pupation period ranged between 8 and 11 days.

One of the symptoms of damage was raised areas of bark on the trunk. The bark lifted easily from the trunk, revealing frass and webbing beneath and sometimes the insect itself. These bark-boring caterpillars caused serious disfiguration to the bark of infested trees (Figure 3). Feeding activity appeared to be confined to the soft bark tissue immediately beneath the dead outer bark. Cross-sections of infested trees revealed no

damage to the wood or cambium tissue. Therefore, although unsightly, the damage was superficial and the apparent ringing of the trunk did not kill the tree. However, the affected bark was raised and spongy and, thus, tended to be very moist as it retained rain water that ran down the trunk of the tree. This condition may predispose the tree to secondary infection by fungi or bacteria.

Figure 3 Serious disfigurement of *Khaya ivorensis* bark

Robinson *et al.* (1994) suggested that the larva of *D. viridis* may be a general feeder in plant detritus but made no such mention regarding *P. monospila*. In the laboratory, both *P. monospila* and *D. viridis* in this study continued feeding on the bark, thus, it was possible that *P. monospila* could also be a detritivore. The relationship between *D. viridis* and *P. monospila* and their interactions has yet to be examined.

Chlorpyrifos was observed to reduce damage caused by these pests when painted on the tree trunks from which the affected bark was removed. New bark eventually grew over the damaged areas. However chemical control may not be warranted due to the superficial nature of the damage caused by the insect.

Acknowledgements

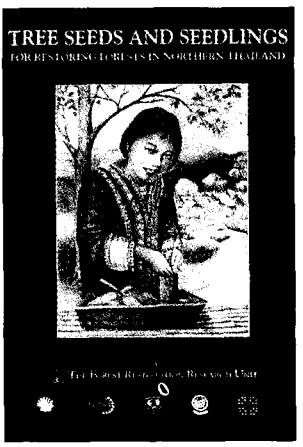
I am indebted to M. Shaffer and G. Robinson (British Museum of Natural History, London) for their help in confirming the identity of the insects, and to L. G. Kirton (FRIM) as well as K. C. Khoo (UPM) for their useful comments and suggestions in the preparation of the manuscript. I would also like to thank S. H. Lim and the staff of Sungai Chinoh Plantation for their kind assistance.

References

LIM, G. S. & TAN, K. H. 1981. Insect pests of stored products in Malaysia. Pp. 29–37 in *Pests of Stored Products*. BIOTROP Special Publication No. 9. Bogor, Indonesia.

METCALF, R. L. & METCALF, R. A. 1993. *Destructive and Useful Insects: Their Habits and Control*. 5th edition. McGraw Hill, N. Y.

ROBINSON, G. S., TUCK, K. R. & SHAFFER, M. 1994. *A Field Guide to the Smaller Moths of Southeast Asia*. Natural History Museum, London. 308 pp.



REVIEW

FOREST RESTORATION RESEARCH UNIT. 2000. **Tree Seeds and Seedlings for Restoring Forests in Nothern Thailand.** Kerby, J., Elliott, S., Maxwell, J. F., Blakesley, D. & Anusarnsunthorn, V. (Eds). Chiang Mai University, Thailand. 151 pp. ISBN 9748530663.

As Thailand's forest cover decreased dramatically over the recent years, the government takes concerted efforts to restore and reforest 40% of the natural forest cover through conservation. This book, published by the Forest Restoration Research Unit (FORRU) at Chiang Mai University with the support from Royal Thai Forest Department and the British Council, aims at assisting reforestation projects nationwide.

This book consists of three parts. Part 1 emphasises the use of native trees to restore forest ecosystems. It highlights the importance of forest and gives some historical background behind Thailand's degraded forest ecosystem. In addition the lack of skill and knowledge of the locals in large-scale restoration projects are also discussed. Considerable emphasis is placed on FORRU's aims and activities as the main contributor to the technical knowledge of tree planting. The experience gained by the institute from several experiments is briefly mentioned. The second section of Part 1 covers sketches and photos of "framework species method" in restoration activities. This method can be used to restore degraded sites so that it can retain the original habitat while providing resources for wildlife. A general note on seed collection, germination, growing and caring of saplings in nursery right through the planting and aftercare aspects are described in an easy to follow manner. The drawings and sketches are extremely helpful.

Part 2 presents a description of 45 local tree species of Thailand that have been recommended for forest restoration. This part provides sufficient information that enables readers to identify the species, collect seeds and grow seedlings. Progress of seed germination of some species are depicted. On top of this, the habitat in which each species usually grow, its distribution, recommended propagation techniques and its uses are also outlined. Keys to identify young seedlings are given, complete with scientific name, family and local name in English and Thai.

Part 3 of the book provides a colour guide to fruits and seeds of 42 species. The book ends with glossary, references and proposed further reading.

On the whole, this book is definitely the one handy book to look out for, especially by the locals. A Thai version of the book is published concurrently to ensure that the Royal Forest Department staffs and local communities alike are assisted especially in taking steps to reverse the decline in forest cover, whilst retaining high levels of biodiversity. As this book is meant for practical use, the language is simple and straightforward.

One of the minor drawbacks that should be mentioned is that the book lacks a monthly phenological information of all the species. This should be presented in a table form on the last page to assist the collections of seeds according to time frame. Major problems that can occur if seedlings are kept too long in the nursery should also be mentioned. Nevertheless, this book can set a precedence for other countries involved in large-scale restoration projects. A good book with lots of illustration and pictures such as this, together with hands-on training and guidance, are the tools for fruitful results in such projects.

Marzalina, M.
Forest Research Institute Malaysia
Kepong, 52109 Kuala Lumpur
Malaysia