





**Figure 1.** a, Pupation inside infested seed; b, Adult moth; c, Larva infesting inflorescence head and d, Infested pod head.

anti-carcinogenic and inhibits the formation of squamous cell carcinomas in the fore-stomach of rats<sup>4,5</sup>. A number of workers have reported the biochemical and nutritional values of the plant, including various medicinal uses<sup>6-12</sup>.

During the months of June–July 2000, heavy infestation of caterpillars of *Cadra cautella* was observed on stored tree-bean seeds in properly sealed paper bags at Imphal (782 m above sea level), Manipur. These seeds were stored in April, after proper drying. Literature survey revealed few reports of pest infestation on *Parkia* spp. The pod-boring larvae of the pyralid moth, *Mussidia pectinicornella*

Hamps. and tortricid moth, *Argyroplote illepida* Btlr. infest the ripening seeds of *P. speciosa*, while *M. nigrivenella* Ragonot is a natural pest on *P. biglobosa*<sup>13-15</sup>. However, there is no record of *C. cautella* infesting tree beans.

The larvae of *C. cautella* feed voraciously on the green kernels. The larvae are elongated caterpillars, about 2 cm, grayish-white with numerous dark setae interspersed along the body. They are mobile and make webs as they tunnel through the food, and excrete yellowish-brown excreta near the point of entrance. The duration of larval stages was between 45 and 60 days. The larvae start feeding from the surface of the kernels and continue inside. In the case of heavy infestation, the whole kernel from the inside was consumed, while the outer skin of the seed had tiny holes through which the larva entered. Each seed bore only one larva. It caused considerable amount of damage in the infested seed, rendering it unfit for consumption. Pupation occurred inside the crevices of the infested seeds and the paper bags (Figure 1 a).

The pupa is reddish-brown, immobile, produces large webs and is enclosed in a cocoon. The adult moth appears after two weeks of pupation. Adult moths are mottled grey, fawn-coloured with a fringe on the back of each hind wing (Figure 1 b). They do not feed. They fly in the early morning and late afternoon. They are short-lived, surviving for approximately twelve days. Adults spread infestation through eggs laid in the bags and on seed surfaces. Immature dropping of inflorescence and pod heads during the months of October to February were found to be associated with larval infestation. The dissection of these heads revealed the larvae making extensive damage inside (Figure 1 c and d).

Thus it was observed that *C. cautella* infested the plant, both in the field and on storage. All the stages in the life cycle of the insect were observed on *P. timori-ana*.

1. Hopkins, H. C. F., *Kew Bull.*, 1994, **49**, 198–199.
2. Kanjilal, U. N., Kanjilal, P. C. and Das, A., *Flora of Assam*, Avon, Delhi, 1982, vol. 2, p. 151.

3. Suvachittanont, W., Kurashima, Y., Esumi, H. and Tsuda, M., *Food Chem.*, 1996, **55**, 359–363.
4. Tahira, T., Tsuda, M., Wakabayashi, K., Nagao, M. and Sugimura, T., *Gann*, 1984, **75**, 889–894.
5. Tahira, T., Ohgaki, H., Wakabayashi, K., Nagao, M. and Sugimura, T., *Food Chem. Toxicol.*, 1988, **26**, 511–518.
6. Burkill, I. H. (ed.), *A Dictionary of the Economic Products of the Malay Peninsula*, Ministry of Agriculture and Cooperatives, Kuala Lumpur, 1966, 2nd edn.
7. Quisumbing, E., Technical Bulletin, Dept. of Agriculture and Natural Resources, Manila, 1951, no. 16.
8. Sharma, B. D., Hore, D. K. and Salam, J. S., *Indian J. Plant Genet. Res.*, 1993, **6**, 171–173.
9. Salam, J. S., Khuman, M. S. and Singh, M. P., *Curr. Sci.*, 1995, **68**, 502.
10. Salam, J. S., *Agric. Sci. Digest*, 1996, **16**, 189–191.
11. Mohan, V. R. and Janardhanan, K., *Int. J. Food Sci. Nutr.*, 1993, **44**, 47–53.
12. Longvah, T. and Deosthale, Y. G., *Food Chem.*, 1998, **62**, 477–481.
13. Kalshoven, L. G. E., *The Pests of Crops in Indonesia* (revised and translated by van der Lann, P. A.), Ichtiar Baru-van Hoeve, Jakarta, 1981.
14. van der Goot, P., *Dierlijke vijanden van djengkol en peteh*, Meded. Algem. Proefst. Landb., 1940, no. 46.
15. Setamou, M., Schulthess, F., Gounou, S., Poehling, H. M. and Borgemeister, C., *Environ. Entomol.*, 2000, **29**, 516–524.

**ACKNOWLEDGEMENT.** We thank M. Shaffer, The Natural History Museum, London for identification of *C. cautella* moth and larva.

Received 10 June 2002; revised accepted 15 July 2003

ROBERT THANGJAM  
M. DAMAYANTI\*  
G. J. SHARMA

*Department of Life Sciences,  
Manipur University,  
Imphal 795 003, India*

*\*For correspondence.*

*e-mail: maidam@rediffmail.com*