THE ROLE OF PREDATORY INSECTS IN THE PEST MANAGEMENT OF LEAF-EATING CATERPILLARS OF OIL PALM

K.C. Khoo, Evawaty Sri Ulina, P.L. Ng and Yusof Ibrahim

Faculty of Agriculture
Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia

Keywords: oil palm, biological control, predatory insects.

Introduction

one of the most important insect pests of oil palm are the leaf-eating caterpillars. The control of these caterpillars depend almost entirely on the use of insecticides, chiefly trichlorfon as foliar sprays (Wood, 1987; Norman and Basri, 1992), and monocrotophos and methamidophos by trunk injection (Wood et al. 1977; Chung, 1989). The frequent use of insecticides is a cause for concern because of the problems that are likely to arise, e.g. development of resistance, outbreaks of secondary pests, product contamination, hazard to humans, environmental pollution. Natural enemies such as predatory insects can be useful in preventing and arresting outbreaks. At the same time, the use of natural enemies should preferably not exclude the use of insecticides. These studies therefore had the following objectives: (a) to develop diets for mass rearing of the bugs; and (b) to evaluate insecticides that can be integrated with the use of the bugs.

Materials and Methods

Colonies of three species of predatory bugs, *Platynopus melacanthus, Cantheconidea furcellata, andrallus spinidens*, were maintained in the laboratory at UPM. ***Diets for mass rearing***: Experiments were carried out to evaluate the suitability of diets that are more cheaply and readily available than live caterpillars of *Spodoptera litura* reared on fresh foliage. Diets evaluated were mealworms, frozen caterpillars, live caterpillars reared on artificial diet. Parameters measured were development time, survival rate, adult weight of *C. furcellata. Evaluation of insecticides*: The biopesticide *Bacillus thuringiensis* subspecies *kurstaki* (Dipel ES) was administered to nymphs and adults of *P. melacanthus* by dipping, and orally through the drinking water. The insecticide trichlorfon was tested for its residual effect against nymphs and adults of *A. spinidens*.

Results and Discussion

Diets for mass rearing: Comparing diets of live larvae of *S. litura* and frozen larvae: development time was shorter and adult weight higher on live larvae; survival rates were not significantly different. Comparing diets of larvae of *S. litura* reared on artificial diet and fresh foliage of *Ricinus communis*: there was no difference between the two diets. Comparing diets of live larvae of *S. litura* reared on artificial diet and live mealworms: development time was significantly shorter on live larvae of *S. litura*; survival rates and adult weight were not significantly different for the two diets. Comparing diets of frozen larvae of *S. litura* and live mealworms: there was no significant difference between the two diets for development time, survival rate and adult weight. Critical nymphal instar of *C. furcellata* to which live caterpillars of *S. litura* should be fed: second instar nymph. *Evaluation of insecticides*: Whether *B. thuringiensis* was administered orally or by dipping, no significant difference in mortality of both nymphs and adults of *P. melacanthus* was found between treatment and control. Trichlorfon had a short residual (contact) effect of less than 2 days on both nymphs and adults of *A. spinidens*.

Conclusions

Live caterpillars of *S. litura*, reared on either artificial diet or fresh foliage, are important in the diet of the predator *C. furcellata* to minimise development time, and maximise survival rate and adult weight. If availability and cost of live caterpillars are a problem, the bugs can be fed live caterpillars only during the second nymphal instar and reared on mealworms or frozen caterpillars in the other instars. *Bacillus thuringiensis* and trichlorfon are suitable insecticides because they have minimal effect on the predatory bugs under normal usage.

References

Chung, G.F. 1989. Spraying and trunk injection of oil palm for pest control. Planter (Kuala Lumpur), 65:500-524.

Norman, H.K. and Basri, M.W. 1992. A survey of current status and control of nettle caterpillars (Lepidoptera: Limacodidae) in Malaysia (1981-1990). PORIM Occasional Paper No. 27: 1-22.

Wood, B.J. 1987. Economic aspects and chemical control. In: Cock M.J.W, and Godfray, H.C.J, Holloway, J.D., eds. Slug and Nettle Caterpillars. Wallingford, UK: *CAB International.* 223-235.

Wood, B.J, Hutauruk C, Liau S.S, 1977. Studies on the chemical and integrated control of nettle caterpillars. In: Earp DA, Newall W, eds. International Developments in Oil Palm. Kuala Lumpur, Malaysia: Incorporated Society of Planters. 591-616.

Supported by IRPA Grant 01-02-04-0253