

DEVELOPMENT OF PESTICIDE-FREE IPM FOR CONTROLLING CORN STALK BORERS

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Introduction

High crop loss in corn production in Malaysia is largely due to plant damage caused by the Asiatic corn stalk borer, *Ostrinia furnacalis* Guenee (Hussein and Kamadeer, 1998). Pesticides are still widely applied in our cornfields to control or suppress the borer populations. Presence of pesticide in the corn ecosystem, plants and harvested cobs are undesirable and could pose a health hazard to human and other living things. A pesticide-free cornfield could be established through the integrated pest management (IPM) approach. The objectives of this project were to develop and integrate appropriate biological control method, particularly, the use of egg parasitoids and cultural methods that preserve and enhance the action of biotic agents and to reduce over-reliance on pesticides while protecting consumers and the living environment.

Materials and Methods

The project covers field surveys, laboratory studies and field-plot trials. While field studies using small plot (10mx10m) were conducted to establish the moth's oviposition in relation to environmental factors, laboratory studies were focussed on mass rearing of parasitoids and bioassays of kairomones. Trapping to determine the presence and distribution of natural parasitoid populations was done in various agro-ecosystems in the university farms. Data on the oviposition trends were correlated to rainfall and crop phenology for consecutive croppings. The effects of ultraviolet light on the suitability of the host eggs to parasitisation of *Trichogramma papilionis* Nag was investigated under laboratory conditions (Loh, 1991). Variables tested include dosage of UV, time of exposure and age of host egg. Laboratory bioassays using the Y-tube glass olfactometer using extracts of corn leaf, scales of adult moth and host eggs were carried out to determine the presence of a kairomone that attracts or excite the adult parasitoids. Such a kairomone is crucial in maintaining

the optimum level of parasitisation is maintained in the ecosystem for effective biological control.

Results and Discussion

The field studies have provided strong indication that *Trichogramma papilionis* Nag's is the sole egg parasitoid of *Ostrinia furnacalis* in the corn fields at UPM, Serdang (Hussein et al. 1996) the parasitoid population in the field is strongly correlated with the peak of oviposition of host eggs. Rainfall had little or no effect on the host abundance (Hussein and Kamadeer, 1998). The abundance of *Trichogramma* may be influenced by the stage of corn plant i.e. the whorl stage which was the most preferred stage for oviposition by *Ostrinia* (Hussein and Kamadeer, 1998). The natural populations of *Trichogramma* were detected in specific agro-ecosystems especially where graminaceous plants were found in abundance. Cornfield the highest parasitoid populations followed by sugar cane and grasslands. The level of parasitisation in these ecosystems were high (80-100%). Results of the laboratory bioassays indicated that corn leaf contains certain semiochemical (kairomone) which could attract adult parasitoids while searching for their hosts (Hussein et al. 1996). The use of ultraviolet light to treat the *Corcyra* eggs was shown to increase the level of parasitisation in the mass rearing of *Trichogramma* in the laboratory (Loh, 1991).

Conclusions

Overall, the use of egg parasitoid, *Trichogramma papilionis* is practical and effective in controlling corn borer attacks. The parasitoid could be mass-reared for field releases provided certain precautionary measures are taken such as stage of crop growth, surrounding vegetation, and pattern of rainfall. *Corcyra* eggs need to be treated with UV-light to ensure high parasitoid production level.

References

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