

ABSTRACT

POTENTIALS OF INSECTICIDES AND NATURAL ENEMIES IN THE MANAGEMENT OF THE DIAMONDBACK MOTH Plutella xylostella L. IN JAMAICA

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A survey of Jamaican cabbage growers revealed that they have little perception of occupational and environmental hazards of insecticides and do not have adequate advice on how and when to use chemicals, and what chemicals to use for pest control. Data collected for 14 months in 1986 and 1987 suggest that the diamondback moth (DBM), Plutella xylostella Linnaeus is present throughout the year in the cabbage growing areas studied, but fluctuated with temperature and rainfall. At Douglas Castle (DC), the highest density was recorded between September and November and again between late February and July. At Sandy River (SR), the population was lower than at DC, particularly between July and early December. At Mona, which is much warmer than DC and SR, the pest population was low.

Laboratory bioassay of 24 formulations of insecticides belonging to pyrethroid and organophosphate (OP) groups and five Bacillus thuringiensis (BT) formulations revealed that the DC, SR, Guys Hill (GH) and Mona populations of P. xylostella are highly resistant to insecticides. When compared with international data, the four populations showed up to a 47-fold difference in their susceptibility to various insecticides. Actellic, selecron, and five formulations of BT were most effective against the 3rd instar larvae.

Two species of parasites of Plutella xylostella - the larval parasite Diadegma sp. (Ichneumonidae) and the larval-pupal parasite Oomyzus (Tetrastichus) sokolowiskii (Kurdjumov) (Eulophidae) were recorded for the first time in Jamaica and the Caribbean respectively. A new species of hyper-parasite of Diadegma, a Spilochalcis sp. (Chalcididae) also was recorded. The monthly mean level of parasitism at DC, SR and GH locations during 1986 - 1987 period was $32.8 \pm 8\%$, $33.5 \pm 8\%$ and $16 \pm 10\%$ respectively.

Greenhouse and field bioassay of the persistence of certain insecticides showed that LT_{50} and LT_{95} values in the greenhouse were over twice as much as in the field. LT_{50} of bactospeine formulation III (3% BT + 1.2% pyrethrin 1.5% + 7.2% piperonyl butoxide) in the

field was over 4 days, compared with 3 days for actellic, and about 2 days for the other Bacillus thuringiensis, organophosphate and pyrethroid formulations.

Field trials of 12 formulations revealed that Bactospeine III was the most effective formulation in enabling the highest yield of grade 1 (68%) and grade II (61%) heads, when 4-day and 7-day spray cycle respectively, were practiced. Actellic and bactospeine II were less effective but better than selecron = bactospeine I = dipel = thuricide respectively. The pyrethroids belmark, decis, permethrin and fenom and the organophosphate, diazinon were significantly less effective. Four-day spraying cycles were significantly better than seven-day ones.