CULTURAL MEASURES AND THE USE OF *AZADIRACHTA INDICA* (MELIACEAE) IN THE MANAGE MENT OF POPULATIONS OF *PLUTELLA XYLOSTELLA* (L.) (LEPIDOPTERA: PLUTELLIDAE) *AND TRICHOPLUSIA NI* (HUBNER) (LEPIDOPTERA: NOCTUIDAE) – AN APPROACH THAT EXCLUDES SYNTHETIC INSECTICIDES

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ABSTRACT

Management of populations of *Plutella xylostella* (L.) (Lepidoptera: Plutellidae) and *Trichoplusia ni* (Hubner) (Lepidoptera: Noctuidae) without the use of synthetic insecticides, was undertaken in the present study. *P. xylostella* and *T. ni* are the two major pests of cabbage, *Brassica oleracea var capitata*, in Jamaica (Alam, 1996). The study was conducted with the background knowledge that the insects had developed high levels of insecticide resistance in Jamaica (Forbes, 1995). The purpose of the study was to investigate the feasibility of growing cabbage without the application of synthetic insecticides towards the furtherance of the development of an Integrated Pest Management (IPM) strategy for both Lepidoptera in Jamaica.

The cultural management methods investigated concentrated on the identification of suitable companion crops in cabbage, to manage primarily populations of *P. xylostella* and *T. ni* in the field, without applications of synthetic insecticides. Field trials on the use of mustard (*Brassica juncea* (L) Czern) as a trap crop and tobacco, *Nicotinia tabacum* as a companion crop in cabbage were conducted at Litchfield in Trelawny and at the Mona campus of the University of the West Indies. The effects of treatments of *Azadirachta indica*, (A. Juss) popularly known as neem, on populations of the subjects of the study under field conditions were also investigated at Mona.

The data showed that cabbage can be successfully grown in Jamaica without the application of synthetic insecticides. The results indicated that mustard can be used effectively to control populations of *P. xylostella* in cabbage. Larval populations of *P. xylostella* were reduced by 66 % in cabbage grown with mustard compared to the control. Percentage damage in the mustard grown cabbage compared to control was significantly reduced ($p < 0.01$) resulting in 51.8t/ha yield of marketable heads which was close to 3 times the yield in the control. However, mustard was not a suitable trap crop for *T. ni*.

Tobacco as a companion crop in cabbage was successful to a less extent than mustard trap crop experiments. However the intercropped arrangement showed reduced larval populations of *P. xylostella* in the cabbage-tobacco plots with significantly higher cabbage yield ($p<0.01$) and better cosmetic quality cabbage heads at harvest than in the control counterparts. Larval numbers were 52 % less in the intercropped plots than in the control. Cabbage yield in the intercropped plots was 2 times that of the control. Populations of *T. ni* were not affected by tobacco.

The field trials conducted on the effect of formulations of *A. indica* on larval and pupal populations of *P. xylostella* and *T. ni* gave positive results. *A. indica* was found to be efficacious against both pests. The results indicated that *A. indica* gave superior performance to Karate ® in the field. Leaf area damage was significantly reduced ($p<0.01$) in the treated plots resulting in near perfect

cabbage heads at harvest, compared to over 50 % damage loss in the control. Cabbage yield in the treated plots was 2 times the yield in the untreated plots.

In all the field trials, the incidences of parasitoids of *P. xylostella* were monitored. The effect of treatments of *A. indica* on incidences of spiders, predators of *P. xylostella* was also monitored in the field at Mona. Data collected revealed that the natural enemies of *P. xylostella* recorded were conserved in all the management methods with total parasitism of over 60 %. The combination of the experiments represents an IPM strategy, which can serve as a basis for a more structured and comprehensive IPM approach for *P. xylostella.*