B-25: Effect of pest management practices on cabbage caterpillars and their natural enemies

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Cabbage suffers heavy crop losses from leaf eating caterpillars (*Plutella xylostella* (L) (Lepidoptera: Yponomeutidae and *Plusia eriosoma* (F)). Insecticides have been recommended by the Department of Agriculture and safer products are included instead of highly hazardous chemicals. However, farmers do not follow the recommendations but select pesticides as guided by traders who act as advisers to farmers. Very often, prophylactic spraying is followed. This practice can cause various environmental problems and pest build-up, but there are no records available in this regard. Therefore, studies were conducted to understand the effect of pest management prctices on cabbage caterpillars and their natural enemies.

Effect of pest management practices on cabbage caterpillars and their natural enemies was assessed in the laboratory and in field plots using excluding cages, pitfall traps and plant surveys. Cabbage was planted in four 3 x 4 m plots every month and maintained without any insecticide spraying. Various safer insecticides were screened at the research fields at Regional Agricultural Research Centre, Bandarawela, having 4 replicates for each treatment.

Data was gathered on selected farmer fields for 2 years from 1993 with respect to their pest management practices and samples were taken bi-weekly to estimate parasitism. Safer insecticides such as different formulations of *Bacillus thuringiensis* (MVP, Delfin), Neem (Neemzal) and Insect growth regulators chlorfluazuron and Tebufenozide which were found to be effective were given to farmers to evaluate the efficacy in large blocks.

Selected farmer fields had different pest management practices as follows;

(1) Low management level where insecticides recommended about 10 years ago only were screened once or twice a season.

(2) Insecticides were screened every other week.

(3) Insecticides were screened every week.

(4) Newly recommended insecticides were used

(5) Non recommended insecticides were screened weekly or biweekly. Total weight of the cabbage and weight of undamaged head after removing damaged leaves were recorded. DMRT test was performed on yield data.

Cabbage looper (*Plusia erisoma* (F)), Diamondback moth (*Plutella xylostella* (L)), Web worm (*Hellula undalis* (F)), Cut worm (*Agrotis ipsilon*) (Huf.) and Army worm (*Spodoptera litura* (F)) were found in the early stage of the crop. The population of cabbage looper consisted of over 50% caterpillar populations from Nov. to May in Bandarawela. Their population was very low in isolated cabbage fields in the highlands and in fields where cabbage or other crops were planted after a rice crop. In Nuwara Eliya, cut worm population was high, except in very dry months Feb, March. Cabbage looper

was common in almost all locations and farmers used various insecticides to control this pest. The insecticides widely used were chlorpyrifos (Lorsban, Pyrinex), Phenothoate (Cedial, Elsan), Ethofenprox (Trebon) Endosulphan (Thiodan) Methamidaphos (Tamaron Monifor 600) Profenophos (Selecron) Prothiofos (Tokuthion) Chlorfluazuron (Atabron) and Pyrethroid insecticides such as Deltamethrin (Decis) and fenvalerate (Sumicidin). There were less than 10 looper larvae per 50 plants in these fields. However. Diamondback Moth population varied from 0 to 300 per 50 plants in these fields.
Diamondback moth population consisted of over 60% caterpillar populations during the dry period of the year and in locations where chlorpyrifos, methamidaphos phenothoate and pyrethroids were widely used. Parasitism by *Cotesia plutelae* was always less than 1% in these fields. With 2-3 sprays of safer insecticides, such as Delfin, MVP (both are Bt formulations) chlorfluazuron (Atabron) Tebufenozide (Mimic) cabbage caterpillars could be controlled keeping caterpillar population below 5 per 50 plants.

Preventive spraying of pyrethroid insecticides and some persisting insecticides decrease natural enemies and as a result diamondback moth population build up had caused severe damage.