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**Successes and Challenges of Implementation of the Convention - Successful
Biological Pest Management Protocol for Brassicaceae Crops**

Agenda item 16

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1. Indiscriminate use of insecticides on vegetable cultivations in Sri Lanka during the last few decades has created extinction of faunal diversity, detrimental effects to the environment and for human health. Overuse of insecticides also results in insecticide residues in agriculture produce exceeding internationally acceptable maximum residue levels (MRL) and development of resistance to insecticides. Vegetables of the family Brassicaceae; cabbage, cauliflower, knol-khol, broccoli and kale are vulnerable to the most destructive pest, diamondback moth (DBM), *Plutella xylostella* L., among insect pests. The objective of the study was to develop a protocol for the management of DBM using parasitoids and the control of other insect pests using botanical insecticides. The availability of parasitoids locally, their mass rearing technique and field release techniques were investigated. Experiments were conducted in the laboratory and farmers fields in three locations; Marassana, Thalathuoya and Nuwara Eliya, Sri Lanka.

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2. Survey on insect parasitoids in three locations, identified four parasitoids; two larval parasitoids (*Cotesia plutellae* and *Diadegma semiclosum*), a pupal parasitoid (*Diadromus* sp.) and an egg parasitoid (*Trichogramma* sp.). Of these, project concentrated on *C. plutellae*, which is adapted for intermediate and cold climates and could be used in all three locations compared to *D. semiclosum*, which is more suitable for cooler climates. Laboratory rearing of DBM on low cost artificial diets formulated by replacing expensive ingredients of standard Beaver and Boldt diet with locally available ingredients was investigated in order to mass rear the parasitoid. Thirty five diets were formulated and tested of which three diets gave comparative results to fresh cabbage leaves based on mean life span, mean pupal weight, sex ratio and fecundity of DBM.
3. Field experiments were carried out on cabbage in Nuwara Eliya, Marassana and Thalathuoya, in five farmer fields in each location to find out the rate and time of release of parasitoids to the field. Release rate of 1500 parasitoids/ha was the best without any augmentation releases. The highest parasitism obtained at 1500 parasitoids/ha release rate in locations Marassana, Nuwara Eliya and Thalathuoya was 100%, 66% and 80% respectively. Further, introducing parasitoids 2-3 weeks after transplanting of cabbage gave significantly higher parasitism and was adjudged the best time of introduction.
4. Comparing the cost of cultivation of cabbage between the developed biological insect pest control protocol and the farmer practice of cultivating cabbage using synthetic insecticides revealed that there is a saving of Rs.100,355.00 (699.03 USD @ Rs.150.00/USD)/ha/crop. The protocol is of immense importance to Integrated Pest Management (IPM), organic agriculture and Good Agriculture Practices (GAP) programs in Sri Lanka as well as for export of Brassicaceae crops.
5. Results concluded a biological pest management protocol to manage insect pests of cabbage, where 1500 parasitoids/ha of *C. plutellae* to be introduced to the field at 2-3 weeks after transplanting to control DBM and neem seed kernel (24 kg/ha) water extract for the control of other insect pests. The protocol could be extended safely to other crops of Brassicaceae family since the insect pest complex is similar in all crops.