



# Successful Biological Insect Pest Management Protocol for Brassicaceae Crops



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# Indiscriminate Use of Insecticides



- Residues accumulated in plants & plant products
- Build up of resistance among insects
- Destruction of faunal diversity
- Environment pollution
- Health hazards to farmers and consumers
- High cost of production



# Advantages of using Biological Insect Pest Management

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- **Environment friendly**
- **Targets a narrow range of pests – harmless for other beneficial insects, birds etc.**
- **Cost effective**
- **Sustainable- maintain stable populations for generations**
- **Minimum health hazards to farmers and consumers**







# Diamondback Moth

- **Serious insect pest of cabbage**
- **Develop resistance easily to insecticides**
- **Indiscriminate use of insecticides for management**

**High amounts of insecticide residues**



# Successfully Mass Reared Locally Available Parasitoids of DBM

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Four parasitoids of DBM were identified;

- Two larval parasitoids

*Cotesia plutellae*



*Diadegma semiclausum*



# ...Successfully Mass Reared Locally Available Parasitoids of DBM

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- One pupal parasitoid

*Diadromus* sp.



- One egg parasitoid

*Trichogramma* sp.



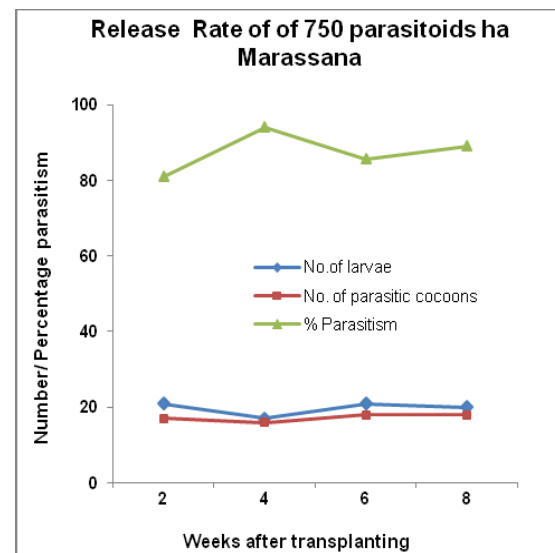
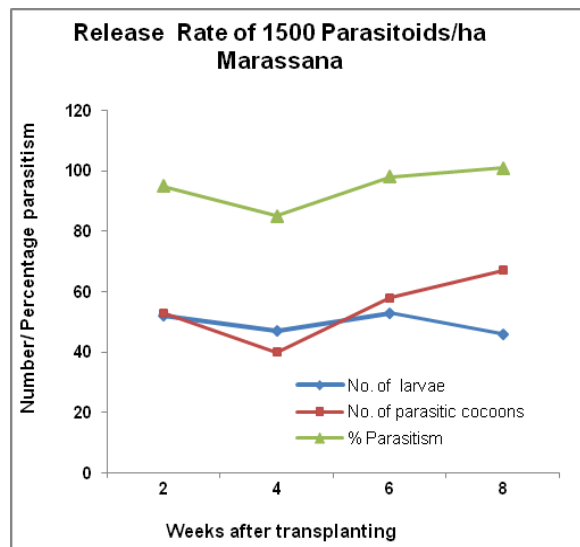


# Low Cost Artificial Diets

**Three** low cost diets were formulated by replacing expensive ingredients of standard Biever & Boldt diet with **locally available ingredients**;

- Partial replacement of agar with gelatin
- Partial replacement of casein with soya flour
- Brewer's yeast with ordinary yeast
- Raw wheat germ with semolina
- Alphacel with filter papers
- Aureomycin with Tetracycline
- Wesson's salt with salt mixture
- Linseed oil with vegetable oil

# Rate of Release of Parasitoids

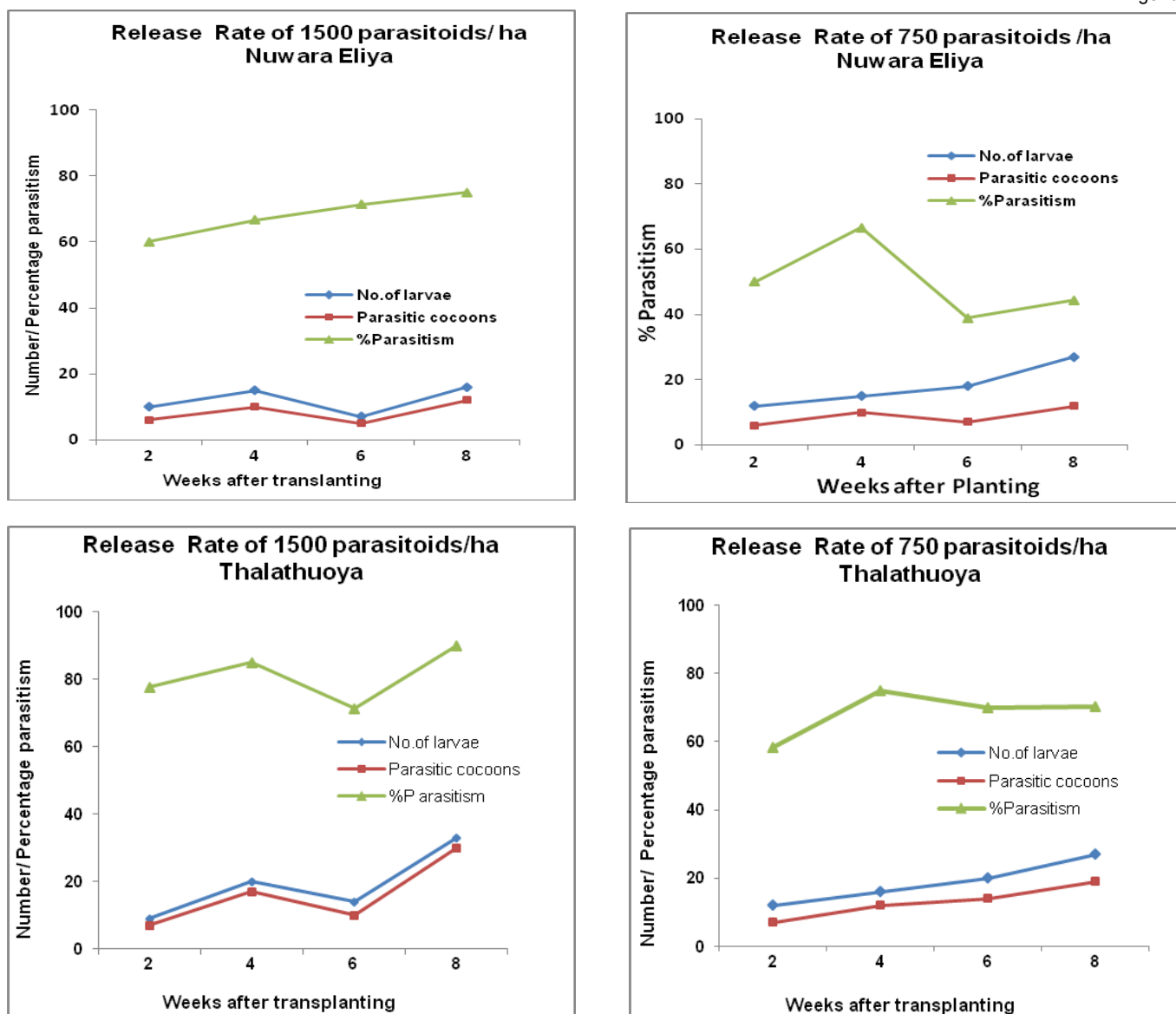


**Fig. 1** Number of larvae, parasitic cocoons per 20 plants & percentage parasitism at rate of introduction of 1500 parasitoids/ha and 750 parasitoids/ha in Marassana.



# ...Rate of Release of Parasitoids

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**Fig. 2** Number of larvae, parasitic cocoons per 20 plants & percentage parasitism at rate of introduction of 1500 parasitoids/ha and 750 parasitoids/ha in Nuwara Eliya & Thalathuoya.

# Time of Release of Parasitoids

Time of introduction	Nuwara Eliya	Marassana	Thalathuoya
2 weeks after transplanting	56.17 a	78.36 a	59.06 a
3 weeks after transplanting	50.23 a	66.91 a	41.59 a
4 weeks after transplanting	25.71 b	44.21 a	32.15 b
SED	3.01	9.55	11.77



# Research Outcome

- Low cost artificial diets were developed.
- *C. plutellae* released two weeks after transplanting of cabbage at the rate of 1500 parasitoids/ ha/ crop - more than 70% parasitism.
- Estimated savings on insecticide usage is about Rs.100,355.00 (699.03 USD @ Rs.150.00/USD)/ ha/crop.
- Other cabbage pests - neem seed kernel extract or neem based insecticides.



# Parasitoid Released Cabbage and Broccoli Fields

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## Biological Insect Management Protocol for Cabbage Pests

- Release of *C. plutellae* **2-3 weeks after transplanting** of cabbage at the rate of **1500 parasitoids/ha/crop** for DBM management .
- Recommended neem seed kernel (24kg/ha) water extract or neem based insecticides to manage other insect pests.
- Protocol could be extended to other crops of Brassicaceae family.
- Useful in organic agriculture, IPM & Good Agricultural practice (GAP) programs.





**Thank You !!!**

