TRICHOGRAMMA WASPS  
(EGG PARASITOIDS)  

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Natural enemies of crop pests  
The genus *Trichogramma* is cosmopolitan in distribution and present in all terrestrial habitats and is one of 80 genera in the family *Trichogrammatidae*. *Trichogramma* are primary parasitoids eggs of Lepidoptera but parasitism also occurs in eggs of other orders such as Coleoptera, Diptera, Hemiptera, Hymenoptera and Neuroptera.

*Trichogramma* species are the most studied group worldwide of egg parasitoids for biological control due to their efficiency and easy maintenance under laboratory conditions. These natural enemies are used in more than 30 countries in biological control programs against insect pests. Because these species can be found in the majority of ecosystems where they can suppress many pests, these natural enemies are favored in many commercial biological control programs. *Trichogramma chilonis* Ishii (Hymenoptera: Trichogrammatidae) has been used as a biological control agent against various insect pests attacking crops worldwide, including sugar cane borers, corn borers, and cotton bollworms.

Biological Control Lab of Shakarganj Sugar Research Institute (SSRI)  
Introduction  
SSRI established a Biocontrol Laboratory in 1995 for rearing of *Trichogramma chilonis* for control of borer complex of sugarcane crop. Under laboratory condition *T. chilonis* is mass multiplied by using stored grain pest (*Sitotroga cerealella*) as a host. The production involves the multiplication of host insect on wheat grains, allowed to be parasitized by *Trichogramma*. Then eggs are clued in cards as "Tricho cards".

Two to three lacs cards are released in field every year for betterment of farmers, crop and society. A goal of this biological programme is to establish a self sustaining system. For example, a natural enemy introduced in an area with the hope that it will establish, cause the pest to fluctuate below the economic injury level.

What is Integrated Pest Management (IPM)?  
"IPM is a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks."
Biological Control

Biological control involves use of a specially chosen living organism to control a particular pest. This chosen organism might be a predator, parasite, or disease which will attack the harmful insect.

Parasitoids

Parasitoids are insects that prey on other insects and thus can be benefit to crop growers. Their eggs or larvae are usually found in or on a single insect host. The immature parasitoid develops within or on its host, ultimately killing the pest. Most parasitoids are wasps or flies.

What to look for

*Trichogramma* wasps are used worldwide as effective biological control agent. The female drills a hole through the chorion and deposits its eggs within the egg of the host. Larvae emerged from *Trichogramma* egg and feed on host insect. Venom injected by the female at the time of oviposition is believed to cause this predigestion of the egg’s contents. Pest eggs turn black. No pest larvae will emerge. One female parasitizes from one to ten eggs per day or from ten to 190 during her life. The number of eggs laid per host egg may vary from 1 to 20 or more depending upon the size of the host egg.

**Appearance**

Adults are very small 1/32 inch long, they have a yellow black compact body, red eyes and short antennae.

**Taxonomic Rank & Life Cycle of Trichogramma chilonis**

**Common Name:** *Trichogramma, Tricon*

**Technical Name:** *Trichogramma chilonis*

**Family:** Trichogrammatidae

**Order:** Hymnoptera

**Pests Attacked**

Two hundred hosts have been recorded worldwide, primarily in Lepidoptera and also Diptera, Coleoptera, and Neuroptera. Some of the major pests against which it has been used / recorded in India include sugarcane borers (*Chilo infuscatus, Chilo sacchariphagus indicus, C. auricilius, Emmalocera depressella, Raphimetopus ablutellus, Acigonasteniellus, Scirpopha ga excerptalis*), rice stemborer (*Scirpophaga incertulas*), leaffolder (*Cnaphalocrocis medinalis*), coconut blackheaded caterpillar (*Opisina arenosella*), diamond back moth (*Plutella xylostella*), cotton bollworms (*Earias vititella, E. insulana, Helicoverpa armigera, Pectin ophora gossypiella*), various species of moths and butterflies.

*Trichogramma* Parasitizing pest Eggs  
Cabbage Moth Eggs Parasitized by *Trichogramma*
Heliothis (American Bollworm) Eggs Parasitized by *Trichogramma*

**Time of Application**
As or when required when you see pests, cards are taken to the field and punched on the under side of the leaves to avoid the direct exposure to sun. *Trichogramma* releases in field on cards are in pupal stage. In two to three days *Trichogramma* adults emerge, search out pests eggs and destroy them by parasitism. In favorable environments, 70-80% borer egg parasitism is noticed which bring down pest population less than economic injury level.

**Recommendation**
Release of *Trichogramma chilonis* egg parasitoid fifteen to twenty cards at fortnightly intervals six times commencing from April onwards effectively checks the incidence of pests.

**Release Rates on Different Crops**

<table>
<thead>
<tr>
<th>Crop</th>
<th><em>Trichogramma</em> Population/Acre</th>
<th>No. of Cards/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugarcane</td>
<td>50,000-200,000</td>
<td>15-20</td>
</tr>
<tr>
<td>Cotton</td>
<td>50,000-200,000</td>
<td>15-20</td>
</tr>
<tr>
<td>Maize</td>
<td>50,000-200,000</td>
<td>15-20</td>
</tr>
<tr>
<td>Tree and Vine Crops</td>
<td>30,000-60,000</td>
<td>8-10</td>
</tr>
<tr>
<td>Vegetables</td>
<td>50,000-200,000</td>
<td>15-20</td>
</tr>
<tr>
<td>Enclosed Areas</td>
<td>10,000-20,000</td>
<td>5-8</td>
</tr>
</tbody>
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**Precautionary Measures**
1. Observe field carefully prior to release cards that there is no dangerous chemical in field damaging *Trichogramma* cards.  
   i. Handle cards carefully while shifting from lab to field.  
   ii. When you get cards from lab then you must release in field immediately.  

   iii. Don't press cards, if pressed then cards will expire and no *Trichogramma* emergence took place.  

**Advantages of Biocontrol**
1. Biological control is an environment friendly method and it does not have adverse effects on human and animals health.  
2. Biological control is a long term control.  
3. In biological control crops beneficial insects are save.  
4. Insect pests develop resistance in response to continuous use of certain chemicals. In case of biological control no such resistance could be seen.

**Crops Protected**
Sugarcane, cotton, maize, orchids and vegetables.