Predators associated with Insect Pests of Paddy

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Predators are responsible for maintaining the population of insect pests at general equilibrium position in undisturbed agro-ecosystems. There are rich communities of beneficial insects and spiders that attack insect pests of rice. Devoid of these beneficial species the insect pests would multiply aggressively that they will cause maximum damage to the crop. However, the balance between predators and their prey is being constantly disturbed by certain anthropogenic interventions *viz.*, applications of toxic pesticides and agronomic practices detrimental to natural enemies. If the stake holders are educated about the bioecology and diagnostics characters of important predators, they can be conserved more efficiently for augmentative biological control of paddy pests.

***Brumoides suturalis* (Fabricius)**

Taxonomic position: Coleoptera: Coccinellidae

Common name: Three striped beetle

Diagnosis: Head and pronotum orange yellow; Elytra glossy white to creamy yellow; scutellum black; three black stripes present onmid-dorsal position of each elytron extending towards apex.

Feeding habit: Both grub and adult are predacious on aphids & pseudo coccids. Adult female can lay up to 180-210 eggs in its entire life period. The adult beetle can live up to 40 days. An adult feed on 11 aphids or 2-3 nymphs of mealybugs per day.

***Coccinella septempunctata* Linnaeus**

Taxonomic position: Coleoptera: Coccinellidae

Common Name: Seven-spotted ladybird

Diagnosis: The adult is relatively large; white to pale spot present on either side of the head. Thorax black with white portion along the anterior margin; Seven large black spots on its orange or red wing covers. Larvae alligator shaped & range from 7-8 mm in length.

Feeding habit: Both grubs and adults are very good predators of aphids and other soft bodied insects. The females lay up to 800 eggs in clusters. Longevity of adults varies from 90 to 130 days. A grub can feed on 450-500 nymphs of aphids during the total larval period, whereas adult beetle feeds on 100-150 nymphs per day.

***Harmonia octomaculata* (Fabricius), *Menochilus sexmaculatus* (Fabricius)**

Taxonomic position: Coleoptera: Coccinellidae

Common name: lady beetles

Diagnosis: They are black-spotted lady beetles

Feeding habit: These beetles catch slow-moving prey. Life cycle takes 1-2 weeks from egg to adult and produces 150- 200 offsprings. Larval instars are more voracious than adults and consume 5-10 preys *viz.*, eggs, larvae, adults and nymphs of plant hoppers daily.

***Micraspis crocea* (Mulsant)**
Taxonomic position: Coleoptera: Coccinellidae
Common name: lady beetle

Diagnosis: Oval in shape and brightly coloured. Adults are yellow having variable spots behind the head.
Feeding habit: They are active during daytime in the upper half of the canopy. Both adult and grub feed on planthopper nymphs as well as on early instars of lepidoptera larvae and exposed eggs.

***Ophionea nigrofasciata* (Schmidt-Goebel)**
Taxonomic position: Coleoptera: Carabidae
Common name: Ground beetle

Diagnosis: Larvae are shiny black and adults are reddish-brown.
Feeding habit: Both adults and larvae feed on leaf folder larvae. They can be found inside the folded leaf chambers constructed by leafroller larvae. Each individual predates 3-5 larvae per day by leaving the hard head capsules. The adult beetle also feeds on planthoppers.

***Cyrtorhinus lividipennis* Reuter**
Taxonomic position: Hemiptera: Miridae
Common name: Plant bug

Diagnosis: The adults are green and black in colour.
Feeding habit: They feed on leafhopper and planthopper eggs and young nymphs. Mirid bugs oviposit in plant tissue and the life cycle completes in 2-3 weeks and produce 10-20 young ones. Each bug consumes 7-10 eggs or 1-5 hoppers daily.

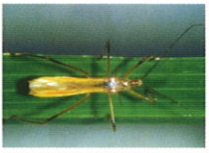
***Mesovelia vittigera* (Horvath)**
Taxonomic position: Hemiptera: Mesoveliidae
Common name: Water bug

Diagnosis: Adults are pale green colour. They have wingless and winged adults.
Feeding habit: Adults and nymphs of water bug feed on stem borer larvae and hoppers that fell on water surface.

***Microvelia douglasi atrolineata* Bergroth**
Taxonomic position: Hemiptera: Veliidae
Common name: Water bug

Diagnosis: They are small in size with 1-segmented front tarsi. The adults are either winged or wingless. The wingless forms are devoid of black and white marks on the fore wings and neck.
Feeding habit: Their life span is 1-2 months. Female lays 20-30 eggs in rice stems. Adults feed on planthopper nymphs that fall on water surface. The nymph feeds on hopper nymphs and other soft-bodied insects. Each can consume 4-7 hoppers per day.

***Polytoxus fuscovittatus* (Stal)**
Taxonomic position: Hemiptera: Reduviidae
Common name: Plant bug



Diagnosis: Adults are brown with three prominent spines on their back
Feeding habit: Assassin bugs are solitary predators, mainly on the larvae of moths and butterflies. They can attack a prey even bigger than themselves. They inject a paralyzing toxin to the body of host with its needle like mouthparts.

***Conocephalus longipennis* (de Haan)**
Taxonomic position: Orthoptera: Tettigoniidae
Common name: Grass hopper

Diagnosis: They are large insects with slanted faces having long antennae twice as long as their body. The adults are green and yellow with sword-like ovipositor.

Feeding habit: The adults can live for 3-4 months. They feed on stem borer and rice bug eggs. It also predates on leafhopper and planthopper nymphs. Each grasshopper consumes 3- 4 YSB or yellow stem borers egg masses a day.

***Metioche vittaticollis* (Stal)**
Taxonomic position: Orthoptera: Gryllidae
Common name: Crickets

Diagnosis: Adults are black and the nymphs are pale with brownish stripes. The sword-like ovipositor is meant for inserting eggs into the leaf sheaths of paddy and grasses.
Feeding habit: The life cycle lasts 60 to 80 days and each female produces 40-80 young ones. They are egg predators and also feed on hoppers and small larvae. They consume eggs of armyworms, striped and darkheaded stem borers, whorl maggots, leaf folders & nymphs of leafhoppers and planthoppers.

***Euborellia stali* (Dohrn)**
Taxonomic position: Dermaptera: Carcinophoridae
Common name: Earwig

Diagnosis: Earwigs are shiny black with white bands between gastor segments and a white spot on the apical part of antenna. Earwigs possess a pair of forceps-like pinchers used for defence.
Feeding habit: Adults live 3-5 months. A single female lays 200- 350 eggs. Earwigs enter stem borer tunnels to feed on stemborer larvae. Sometimes they move to upper part of canopy to feed on leaf folder larvae. They can consume 20-30 prey daily.

***Agriocnemis pygmaea* (Rambur)**
Taxonomic position: Odonata: Coenagrionidae
Common name: Damselflies

Diagnosis: Adults are yellowish green and black with elongated slender abdomen. Male individuals are highly colourful than females with orange abdominal tip.
Feeding habit: Aquatic damselfly nymphs feeds on hopper nymphs. Adults usually fly at the bases of rice plants in search of flying insects and hoppers.

***Solenopsis geminata* (Fabricius)**
Taxonomic position: Hymenoptera: Formicidae
Common name: Ant

Diagnosis: These are reddish to brown ants. They make nests in dryland fields and on bunds of wetland rice.
Feeding habit: Ants prey on small animals and a wide variety of insects. *Solenopsis* ants are aggressive insects, predates on any insect it can subdue. They feed on eggs of black bug.

***Argiope catenulata* (Doleschall)**
Taxonomic position: Araneae: Araneidae
Common name: Orb spiders

Diagnosis: The female has yellow and greyish white marks on the gastor while male is reddish brown in colour.
Feeding habit: They lay 600-800 eggs and live for 2-3 months. Orb weavers are highly colourful. They capture flying preys *viz.*, grasshoppers and butterflies in the circular webs constricted in the rice canopy.

***Atypena* (=Callitrichia) *formosana* (Oi)**
Taxonomic position: Araneae: Linyphiidae
Common name: Dwarf spider

Diagnosis: Dwarf spiders are small and have six grey marks on the abdominal back.
Feeding habit: Dwarf spiders can be seen at base of the hills. A single female lays globular eggs in the dried leaf sheaths covered with a layer of silk. A female produces 80- 100 offsprings. Adults live 1.5-2 months and catch their preys in the webs. They feed on planthopper nymphs and young leafhoppers. Each adult consumes 45 nymphs per day.

***Lycosa pseudoannulata* (Boesenberg and Strand)**
Taxonomic position: Araneae: Lycosidae
Common name:wolf spider

Diagnosis: Adults abdomen with white markings and the back portions with afork-shaped mark. They are highly mobile. Males have enlarged palps.
Feeding habit: The female lays 200-400 eggs in its lifetime of 3-4 months. Eventually 60-80 spider lings hatch and ride on the back of the female. Spider lings also attack planthopper, leafhopper nymphs and stem borer moths. Wolf spiders feed 5-15 nymphs per day.

***Oxyopes javanus* Thorell**
Taxonomic position: Araneae: Oxyopidae
Common name: Lynx spiders

Diagnosis: The female abdomen with two pairs of diagonal white bands on the sides and the male with enlarged palps.
Feeding habit: Lynx spiders are hunters and build no webs. The female protects its egg mass laid on foliage. Each female produces200- 350 offsprings and live for 3-5 months. They kill 2-3 moths daily.

***Phidippus* sp.**
Taxonomic position: Araneae: Salticidae
Common name: Jumping spider

Diagnosis: Jumping spiders with two bulging eyes and have brown hairs on the body surface
Feeding habit: They lay eggs in elongated egg masses within leaf fold covered with silk. Adult lives for 2-4 months and produce 60-90 offsprings. They prey upon small insects and green leafhoppers. Each adult consumes 2-8 per day.

***Tetragnatha maxillosa* Thorell**
Taxonomic position:Tetragnathidae
Common name: Long-jawed spider

Diagnosis: They have long body and legs. Commonly seen lying outstretched along the paddy leaf. The males can be identified by the enlarged jaws.
Feeding habit: Each female lays 100-200 eggs and live for 1-3 months. They spin a ring-shaped web and catch the flying leafhopper flies, moths, prey that hit the web will be quickly wrapped with silk. The eggs are laid in the upper half of rice plants in masses covered by cottony silk. Each individual consumes 2-3 prey daily.

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