RAMA UNIVERSITY

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FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

Pests of Crops and Stored Grains and their Management ENT- 311 3(2+1)

Lecture 1 PESTS OF RICE

More than 100 insect species are associated with the rice crop at one stage or the other and 20 of these are pests of major economic significance. Among the sucking pests, BPH, GLH, WBPH, rice ear head bug pose severe threat to rice production.

Major pests				
1.	Thrips	*Stenchaetothrips biformis*	Thripidae	Thysanoptera
2.	Green leafhopper	*Nephotettix virescens*, *N. nigropictus and N. cincticeps*	Cicadellidae	Hemiptera
3.	Brown plant hopper	*Nilaparvata lugens*	Delphacidae	Hemiptera
4.	White backed plant hopper	*Sogatella furcifera*	Delphacidae	Hemiptera
5.	Rice earhead bug	*Leptocorisa acuta*	Alydidae	Hemiptera
6.	Mealy bug	*Brevennia rehi*	Pseudococcidae	Hemiptera
7.	Rice black bug	*Scotinophora lurida* and *S. coarctata*	Podopidae	Hemiptera
Minor pests				
8.	Earhead stink bug/ Shield bug / Red spotted bug	*Menida histrio*	Pentatomidae	Hemiptera
9.	Rice striped bug	*Tetroda histeroides*	Pentatomidae	Hemiptera
10.	White rice leafhopper	*Cofana spectra*	Cicadellidae	Hemiptera
11.	Blue rice leafhopper	*Empoascanara maculifrons*	Cicadellidae	Hemiptera
12.	Zigzag striped leafhopper	*Recilia dorsalis*	Cicadellidae	Hemiptera

Major Pests

1. Thrips

Thrips (*Stenchaetothrips biformis)*

Order: Thysanoptera

Family: Thripidae

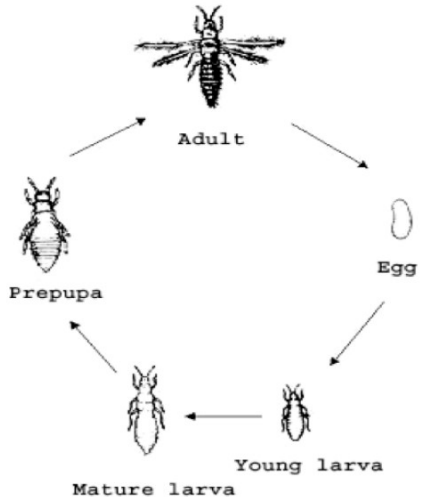
Distribution and status: Bangladesh, India, Indonesia, Japan, Malaysia, Sri Lanka, Thailand and Vietnam. Minor but has potential to become major.

Host range: *Echinochloa* sp.

Damage symptoms: Both nymphs and adults lacerate the tender leaves and suck the plant sap, causing yellow or silvery streaks on the leaves of young seedlings. Terminal rolling and drying of leaves from tip to base is the typical symptom of attack. It causes damage both in nursery and main field.

ETL: 60 Nos. per 12 wet hand sweeps in nursery.

Bionomics: Adults dark brown, female inserts the eggs singly within the leaf tissues in young leaves. Egg period 3-5 days, life cycle completed in 13-19 days.



Management:

Spray endosulfan 35 EC 80 ml or monocrotophos 36 WSC 40 ml/800 m2 nursery.

Spray Endosulfan 35 EC 1.0 L or Monocrotophos 36 WSC 1.0 L or

Azadirachtin 0.15% w/w 1.5-2.5 L or Lambda-Cyhalothrin 2.5 EC 500 ml or Lambda-Cyhalothrin 5 EC 250 ml in 500 L water/ha

Leaf curling caused by Rice Thrips (IRRI)

2. Green leafhopper

Green leafhopper: *Nephotettix virescens*, *N. nigropictus* and *N. cincticeps*

Order: Hemiptera

Family: Cicadellidae

Nephotettix virescens

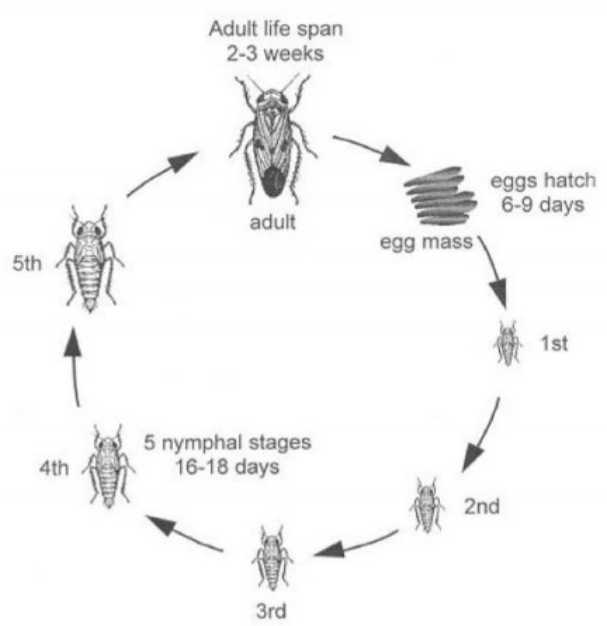
N. nigropictus

Distribution and status: India, South Japan to oriental region, west of south Africa, Phillippines, Formosa, Sri Lanka Host range: Rice, millets, grasses

Damage symptoms: Both nymphs and adults desap the leaves and cause "hopper burn" due to heavy infestation. Yellowing of leaves from tip downwards is the typical symptom caused by this pest. However, it is more important as a vector for rice tungro virus, rice yellow dwarf and transitory yellowing diseases.

ETL: 60 Nos. / 25 sweeping – Nursery
10 Nos. / hill - Flowering stage
5 Nos. / hill - Vegetative stage
2 Nos. / hill - Tungro endemic area

Bionomics: Adults green with black spot and black patch on wings, gravid female inserts 200-300 eggs in batches of 8-16 in midrib of leaf blade. Egg period 6-7 days, nymphs undergo five instars and become adult in 25 days. Adult longevity 20-30 days. The population normally increases from August onwards, reaches maximum during September - October and declines from November.



Management

1. Use resistant varieties like IR 20, IR 50, CR 1009, Co 46, PTB 2, PTB 18, IET 7301, IET 7302, IET 7303 and Vani, Vikra marka, Lalit, Nidhi

2. Nursery should not be raised near the lamp posts.

3. Apply neem cake @ 12.5 kg/800 m2 nursery as basal dose.

4. Apply carbofuran 3 G @ 3.5 kg or phorate 10 G @ 1.0 kg or quinalphos 25 EC 80 ml or endosulfan 35 EC 80 ml per 800 m2 nursery. Maintain the water level at 2.5 cm for 3 days after granular application.

5. Spray any of the following insecticide in 500 L water/ha

• Acephate 75 SP 666-1000 g

• Imidacloprid 17.8 SL 100 -125 ml

• Endosulfan 35 EC 1000 ml

• Quinalphos 25 EC 1000 ml

• Buprofezin 25 SC 800 ml

• Phosphamidon 40 SL 875 ml

• Ethofenoprox 10EC 500-750 ml

• Thiamethoxam 25 WG 100 g

• Fipronil 5 SC 1-1.5 kg or 0.3 GR 16.7 - 25.0 kg

• Lambda-Cyhalothrin 2.5 EC 500 ml or 5 EC 250 ml

• Fenobucarb (BPMC) 50 EC 500-1500 ml

3. Brown plant hopper

Brown plant hopper: *Nilaparvata lugens*

Order: **Hemiptera**

Family: Delphacidae

Distribution and status: Orissa, Andhra Pradesh, Tamil Nadu, Karnataka, West Bengal, Maharashtra, Madhya Pradesh, Uttar Pradesh, Haryana and Punjab in India, South East Asia, China, Japan, Korea

Host range: Rice, sugarcane, grasses

Damage symptoms: Nymphs and adults congregate at the base of the plant above the water level and suck the sap from the tillers. The affected plant dries up and gives a scorched appearance called "hopper burn". Circular patches of drying and lodging of matured plants are typical symptoms caused by this pest. It is the vector of grassy stunt, ragged stunt and wilted stunt diseases.

ETL: 8-10 Nos./hill or 20 Nos./hill when spider is present at 1 No./hill

Bionomics: The brown plant hopper has a brown body and chestnut brown eyes. Adult measures about 4 - 4.5 mm in length capable of flying a long distance drifting with the wind. Adults are of two forms viz., macropterous (long winged) and brachypterous (short winged). The female makes an incision in the leaf sheath and inserts 200-300 small eggs, egg period -6 days; nymphal period - 15 days and adult longevity 18-20 days.

Management

1. Use resistant varieties like Aruna, Karnataka, Karthika, Krishnaveni, Makon, Abhey, Asha, Divya, Py 3, Co 42, Co 46, PTB 21, Jyoti (PTB 29) and PTB 33, Manasarowar, Bhadra, IET 7575, IET 6315, MTU 1249, R 650 - 1820, Shyraksha, Arvindar, kartik, bharatidasan, neela, uday, sonasali, vajram, chaitanya, nagarrjuna and chandana,

2. Avoid close planting and provide 30 cm rogue spacing at every 2.5 m to reduce the pest incidence.

3. Avoid use of excessive nitrogenous fertilizers.

4. Control irrigation by intermittent draining. 5. Set up light traps to monitor and control pest population.

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6. Release of natural enemies like wolf spider, *Lycosa pseudoannulata* and green mirid bug *Cyrtorrhinus lividipennis*.

7. Avoid use of insecticides causing resurgence such as synthetic pyrethroids, methyl parathion, fenthion and quinalphos.

8. Drain the water before the use of insecticides and direct the spray towards the base of the plants.

9. Spray neem seed kernel extract 5% (25 kg/ha) (or) neem oil 2% (10 L/ha).

10. Spray imidacloprid 17.8 SL 125 ml or buprofezin 25 SC 325 ml or or acephate 75 SP 625 g /ha.

• Acephate 75 SP 665-1000 g • Fenobucarb (BPMC) 50 EC 500-1500 ml • Methyl demeton 25 EC 1000 ml • Dichlorvos 76 WSC 350 ml • Chlorpyriphos 25 EC 1250 ml • Ethofenoprox 10 EC 500-750 ml

4. White backed plant hopper

White backed plant hopper: *Sogatella furcifera*

Order: Hemiptera

Family: Delphacidae

Distribution and status: India, Burma, Sri Lanka, China, Pakistan, Japan, Indonesia, Korea Host range: Rice, maize, millets, sugarcane, grasses

Damage symptoms: Both nymphs and adults suck the sap and cause stunted growth and "hopper burn" leading to yield loss. "Hopper burn" is caused in irregular patches. Nymph falls on water keeping its legs stretched.

Bionomics: In white nymphs, vertex characteristically gives a narrow face to the hoppers. Forewings hyaline with dark veins and a dark spot in the middle of posterior edge. Pronotum pale yellow and adults possess a diamond like marking on the thorax. The female lays upto 758 eggs in as many as 112 egg masses with 1-24 eggs in each in leaf sheath and in the mid rib of leaves. The ovipositional site characterized by black streaks. Egg period 6-7 days; nymphal period 12- 17 days with five instars. The feamle longevity about 2 months.

Management:

- Same as given for BPH.

- Use resistant varieties like AR 133, IC 25687, Tangner, Amelbero, HKR-10, HKR-126, IET 8116