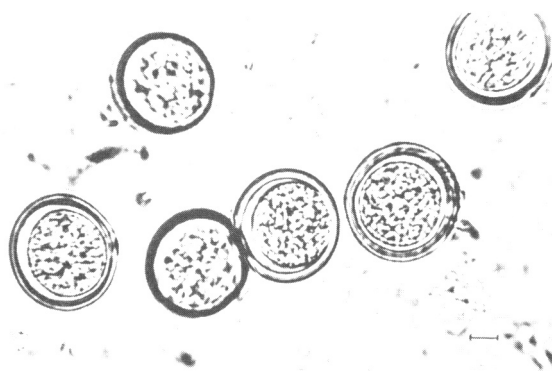


with conidia appeared on the intersegmental membranes (Fig. 1) and on all thin cuticular areas of the head. Conidia of the papillata type of Lakon, 30-40 × 25-36 µm spread over dead insects and plants. Their length-to-breadth ratio varied. Uniform resting pores 30-40 µm in diam developed inside the infected locusts (Fig. 2).

E. grylli may be an important natural enemy of this locust in local outbreaks. □



2. Resting spores of *E. grylli* from the interior of dead *O. intricata*. Scale = 10 µm.

Effect of planting time on rice panicle bug incidence

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Rice panicle bug *Leptocoris acuta* (Thumb) is becoming a major rice pest in Tamil Nadu in the Dec-May and Apr-Aug cropping seasons. Adults and nymphs suck sap from developing grains and cause significant yield loss.

We studied the effect of planting time on panicle bug incidence in a field trial with seven planting dates and four replications in 1983-84 Dec-May season. Twenty-five-day-old, short-duration

TM8089 seedlings were planted in 9-m² plots at 20- × 10cm spacing. Plots were fertilized with 100 kg N/ha (50% basal and 2 equal splits topdressed) and 22-42 kg PK/ha. No crop protection was practiced.

Feeding activity was assessed at harvest by counting the insect's stylet sheaths in the grains obtained from five randomly selected panicles from each plot. Undamaged and damaged grains were counted and damage percentage was calculated. Grain yield also was recorded (see table).

The crop planted on 30 Jan had lowest grain damage and yielded highest. At 20-30% grain damage, yield ranged from 4.3

Effect of planting time on rice panicle bug incidence Tirur, India.

Planting date	Damage grain (%)	Grain yield (t/ha)
31 Dec 83	34	3.1
10 Jan 84	29	4.4
20 Jan 84	42	3.7
30 Jan 84	17	5.4
10 Feb 84	23	4.5
20 Feb 84	25	4.3
1 Mar 84	34	3.7

to 4.5 t/ha. When damage exceeded 30%, yield fell to 3.1-3.7 t/ha. Very early and very late crops were prone to panicle bug attack. □

A new record of rice shoot fly in the northwestern hills of India

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During a survey of rice nurseries in experimental field plots at Hawalbagh in 1983 kharif (May-Oct), we found plants of various entries yellowed and dried in

patches. Plants had deadhearts and small, whitish maggots were recovered from the base of the stems. The maggots were reared in petri dishes and flies emerged and were identified as rice shoot fly *Atherigona oryzae* Mall. This is the first recorded occurrence of *A. oryzae* in the northwestern hills of India.

Newly hatched shoot fly maggots bore into the stems of young plants and feed inside the central shoot, severing the

apical parts of the plant from the base. The leaf whorl fails to unfold, dries, and falls off.

Preliminary field observations showed that maximum infestation was 3-4 wk after sowing. Rice planted early, in the first week of May, was more severely damaged than normal plantings in the last week of May. There was no infestation in the transplanted crop. □

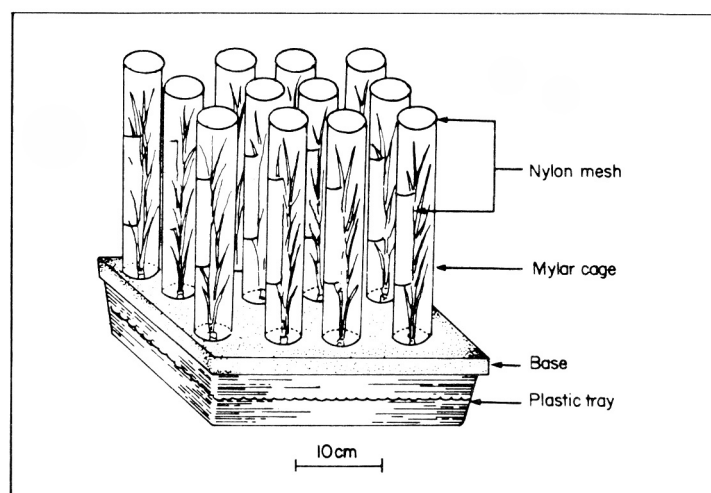
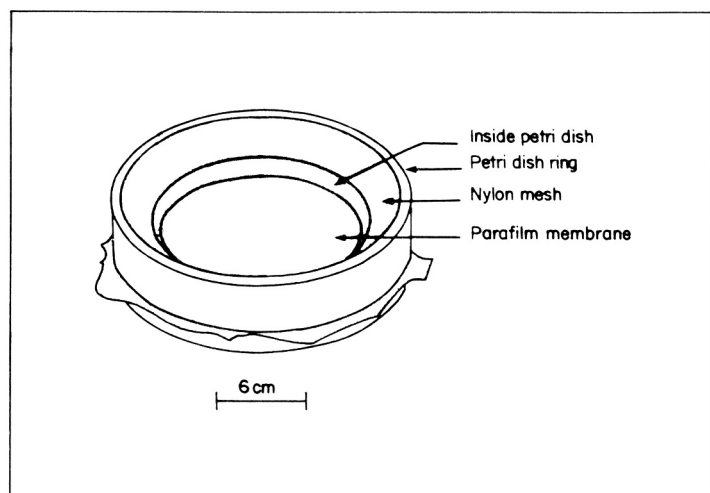
Mortality of adult brown planthoppers (BPH) in different types of cages used for bioassays of entomopathogenic fungi

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Many hyphomycetous fungal pathogens of the BPH *Nilaparvata lugens* Stål and related leafhopper species have been collected and isolated on artificial media. A suitable bioassay test is necessary to determine the most virulent species and strains of these entomopathogens for use in a biological control program against BPH. In addition, standardized bioassay

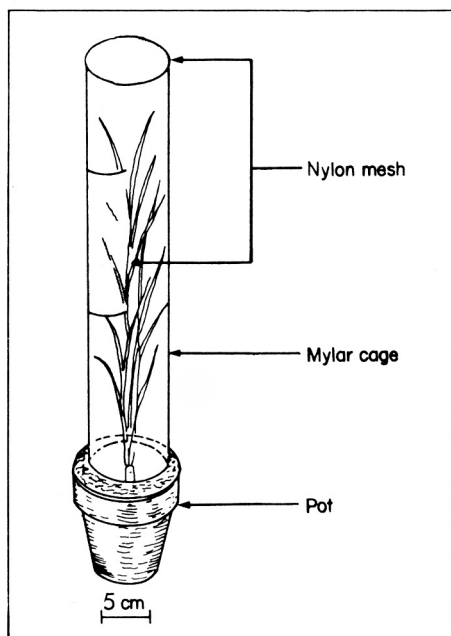
techniques that minimize mortality are essential to developing programs for subsequent production and field application of the fungi.

Entomopathogenic fungi invade the insect host through the cuticle, grow in the body cavity, and eventually kill the host. BPH fungal pathogens normally kill the host in 2-7 d. During this time,

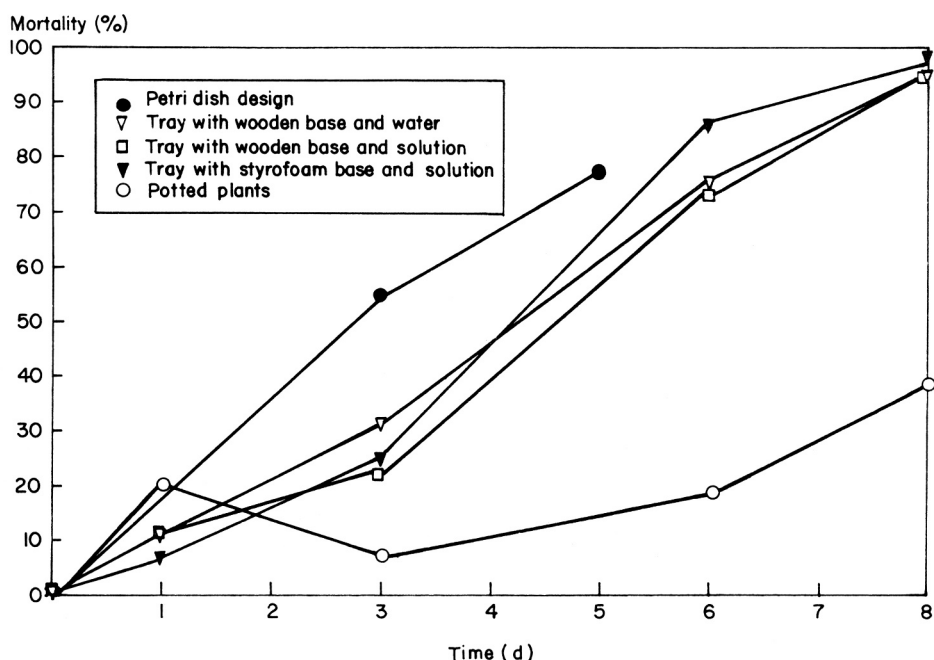


1. A petri dish cage containing a parafilm sachet with 10% sucrose solution as food source.

2. Rice plants rooted in a plastic tray with a nutrient salt solution or water. The cages are attached to a wooden or Styrofoam base.



3. Rice plants covered with mylar cages in clay pots.



4. BPH mortality in different types of cages.

the BPH must be caged on suitable food until the fungus has time to act.

We tested three cage types for suitability in reducing mortality of the control BPH during the bioassay test period. The first (Fig. 1) was constructed from petri dishes and the BPH fed on a sachet containing a 10% sucrose solution. The second (Fig. 2) used living rice plants placed on trays and rooted in a nutrient salt solution or water. Plants in each replication were covered with cylindrical mylar cages attached at the base by

masking tape and vented with nylon screen. The two design had wood or Styrofoam bases.

A third cage (Fig. 3) consisted of potted plants covered by mylar cages. Pots were set inside plastic trays and flooded with water up to the soil surface in each pot. Plants (cultivar IR1917) were about 30 d old. Initially, at least 20 cages of each type each contained 25-35 newly emerged BPH adults. At each interval, 10 cages of each type were evaluated for BPH mortality.

There were no significant differences in BPH control mortality in cages with wood or styrofoam bases or with water versus the nutrient salt solution at 1 d (Fig. 4). But after 3 d incubation at ambient room temperature, mortality was unacceptably high (more than 20%) in all cages except those with potted plants. Mortality in the petri dish-sucrose cages was highest, with more than 50% of the BPH population dying after 3 d. Hopper mortality on potted plants did not exceed 20% even after 6 d. □