drought years to prevent the spread of mealybug. ■

Operational research on the control of brown planthopper in boro paddy

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The brown planthopper (BPH) has been endemic in boro paddy in Khanakul since 1974, and has now spread to other blocks of Hooghly district and into Midnapore district.

To find an effective chemical control measure for BPH, a field experiment was conducted in March-May 1979.

Hand compression sprayers, widely used in the area for BPH control, have not been very effective. Therefore, foot sprayers fitted with high jet lance and double delivery hose were tested in the plots of 15 local farmers. Lindane and other recommended insecticides were tried.

Foot sprayers were more effective both in placing insecticides in the affected zone of the paddy plants and in covering the area. Foot sprayers could cover about four times the area of hand compression sprayers.

Lindane at 2 ml/liter of water was effective in controlling BPH. ■

The *FARMCOP* suction sampler for hoppers and predators in flooded rice fields

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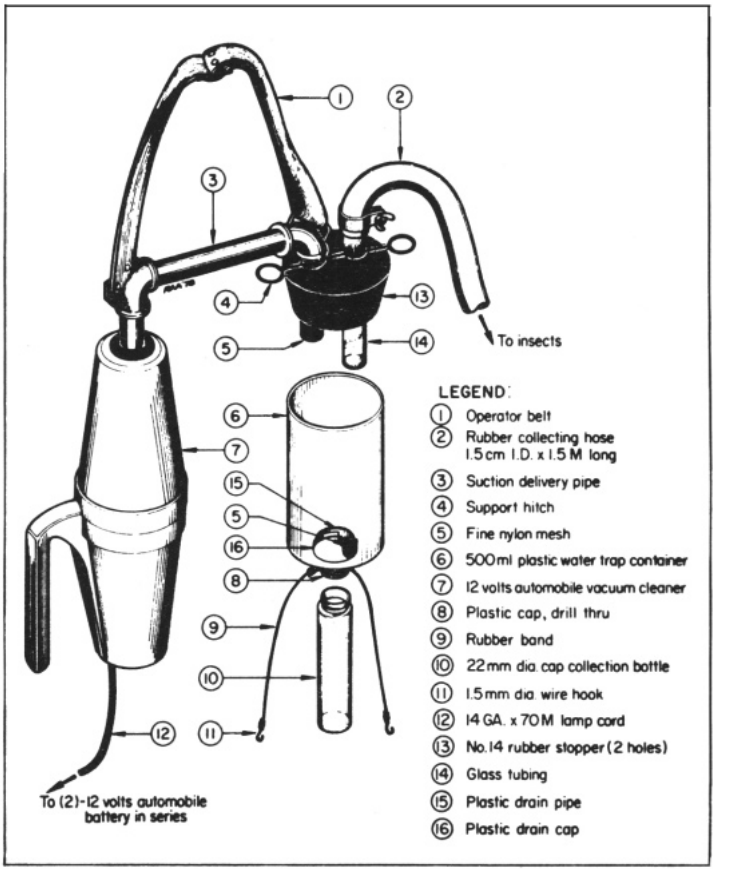
Research in rice insect ecology has been hampered by the difficulty or obtaining accurate absolute estimates of pest and natural enemy populations. *FARMCOP,* a simple new sampling device, was developed to remedy the problem; the name was derived from the names of the persons responsible for its construction.



The FARMCOP suction sampler. IRRI, 1979.

Sampling with FARMCOP and enclosure in flooded rice field.

FARMCOP consists basically of a light weight automobile vacuum cleaner, two batteries, and a collecting container (see figure). A square wire-frame enclosure of transparent plastic is care-

fully placed over a rice hill and insects are sucked into the container by moving the transparent hose by hand over the plant and water surfaces (see photo). After the machine is turned off, the plastic drain cap is removed and the machine is tipped to drain off any water sucked in. The wire hooks are released, the container is slipped off the rubber stopper, alcohol is squirted into the container, and the newly preserved insects are collected in the removable collection bottle.

The materials needed to construct a FARMCOP suction sampler (excluding batteries) cost about $40, much less than the price of commercial motorized sampling machines. An important feature is that it can sample arthropods on the surface of paddy water. But it is convenient to have two men rather than one man operating the FARMCOP. It requires about twice as much time for sampling as the D-VAC sampler, and the batteries must be recharged frequently.

Density in transplanted rice of brown planthoppers and predators ripple bugs *Microvelia atrolineata* and spiders *Lycosa pseudoannulata* determined by different sampling techniques.[a] IRRI, 1979.

Sampling technique	Brown planthoppers (no./5 hills)			Ripple bugs (no./5 hills)		Ripple bugs (no./5 hills)	
	Nymphs	Adults		Nymphs	Adults	Juveniles	Adults
	34 DT[b]	34 DT	55 DT	83 DT	83 DT	83 DT	83 DT
FARMCOP[c]	22 a	24 b	13 a	216 a	224 a	68 a	8 a
D-VAC[c]	8 b	48 a	6 a	51 b	184 ab	28 b	4 b
UNIVAC[c]	2 c	25 b	9 a	20 c	64 bc	19 b	8 a
Visual count	1 c	14 b	8 a	32 bc	32 c	9 b	3 b
Mouth aspirator[c]	2 c	17 b	6 a	0 d	0 d	15 b	5 b

[a]In a column means followed by the same letter are not significantly different at 5% level. [b]DT = days after transplanting. [c]Using enclosure.

Great care must be taken to prevent damage to maturing plants when the enclosure is placed over them.

Samples taken in wetland rice by the FARMCOP, the large D-VAC and UNIVAC suction machines, a mouth aspirator, and visual counting were compared. FARMCOP almost always gave the most accurate densities of brown planthopper nymphs and predators such as ripple bugs and spiders. But its estimate of adult hopper density is not the best (see table). Therefore it is necessary to place a cover over the enclosure during the initial phases of sampling a hill to prevent escape of active adults.

Individuals interested in FARMCOP construction details and operating instructions should write to the Entomology Department, IRRI. ■

Flight capabilities of the brown planthopper

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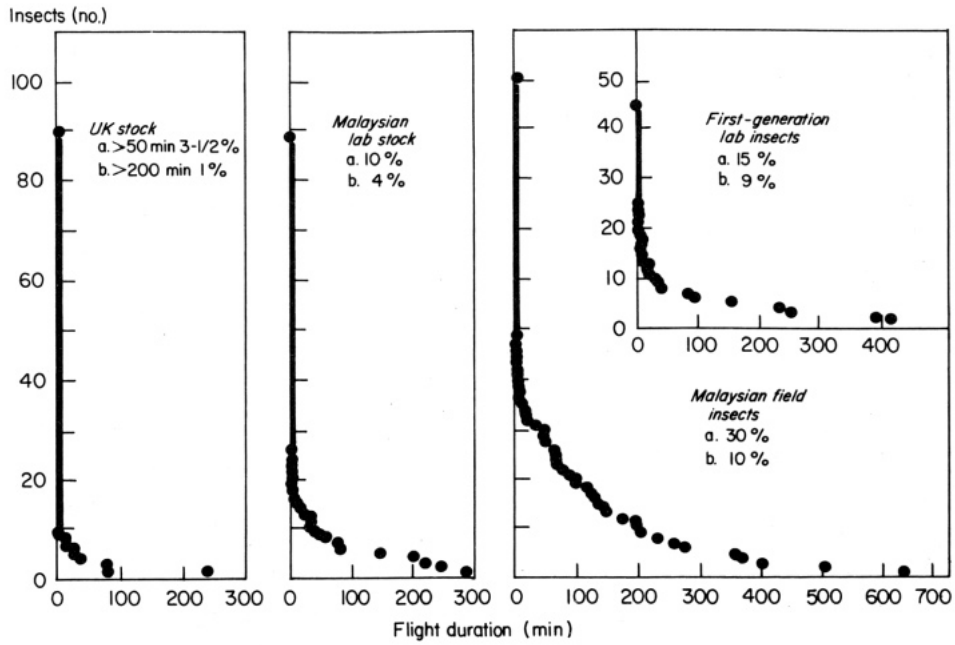
The brown planthopper (BPH) *Nilaparvata lugens* migrates from China and Korea to Japan each spring. There has been much speculation as to whether the BPH in the tropics make migratory flights. The flight capabilities of a field population of BPH were studied at a Malaysian field site in June and July 1978 and the results were compared with those obtained in the COPR laboratory in London.

The adult field insects used developed from late-instar hoppers taken into the laboratory on mature plants removed from naturally infested paddy fields. The laboratory-reared insects came from three sources: 1) BPH stock, of Japanese origin, held in the UK for more than 2 years, 2) caged insects held near the field site for a number of generations, and 3) first-generation adults reared from eggs laid by the field adults brought back to and reared in London. All insects were flown in still air (36–30°C, 80–85% relative humidity, 1,000–2,000 lux) on simple flight balances that indicated the amount of lift being produced. The figure summarizes the experimental results for flight duration. Percentages refer to all macropterous insects tested and therefore include nonfliers. The proportion of field-reared insects that flew for more than 200 minutes was larger than that of any other group.



Numbers of insects and flight duration. Percentage figures refer to all insects tested (including nonfliers).

Two points are of interest. First, the results may serve as a warning to other behaviorists and physiologists working on the BPH that even first-generation