bug in southern Sri Lanka. The pest was detected feeding on graminaceous weeds, and laboratory trials on the insect's survival on the following weeds gave positive results: *Panicum repens, Panicum maximum, Echinochloa crus-galli, Echinochloa colona, Dactyloctenium aegyptium, Alloteropsis cimicina, Axonopus affinis, Chloris barbata, Paspalidium punctatum, Brachiaria miliiformis, Brachiaria mutica, Ischaemum muticum, Setaria glauca, Bothriochloa pertusa, Eleusine indica, Dicanthelium clandestinum.*

The weed population on bunds and in the rice paddies could facilitate insect survival and help continue its life cycle, especially during the off-season. The insect survived during the off-season of rice cropping (Jul-Sep) soon after the yala season (Apr-Jul) and before the maha season (Nov-Feb) which are the main rice cropping seasons in Sri Lanka, Since weeds grow in rice fields throughout the year, eliminating them on bunds and rice fields will help in effective insect pest management. ■

Euscyrtus concinnus (Orthoptera: Gryllidae) – a new rice pest in the Philippines

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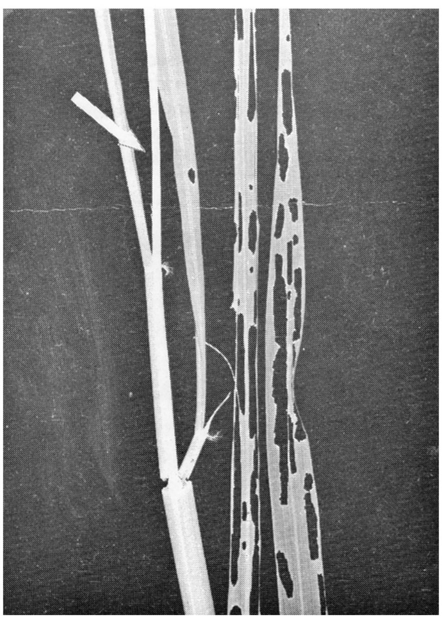
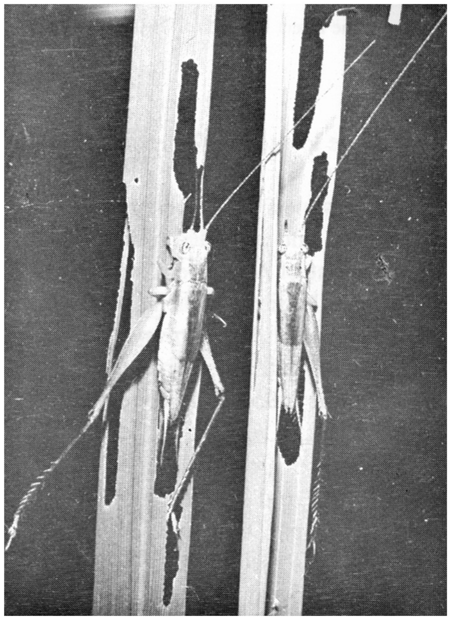
A survey of irrigated rice fields in Batangas province revealed the occurrence of a leaf- and stem-feeding gryllid recently identified as *Euscyrtus concinnus* de Haan (Orthoptera: Gryllidae). This is the first account of the insect as a rice pest in the Philippines.

E. concinnus makes irregular to longitudinal holes in the leaves, leaving the margins almost intact. Intense stem feeding sometimes causes deadhearts (photo 1). An average of 18-34 nymphs and adults/m^2 were found during November. Although both are pestiferous, the nymphs cause more damage than adults and prefer to feed on seedbeds and transplanted rice. The pest does not generally attack the rice plant beyond 75 days after transplanting, but in the absence of alternate hosts or young rice plants, it may feed on the very young rice panicles.



1. Damage on the stem (resulting in deadheart) and leaves caused by feeding of *E. concinnus* nymphs and adults.



2. Adults of *E. concinnus.* female (left) and male (right).

The following grasses and sedges were observed to be alternate hosts: *Echinochloa* spp., *Dactyloctenium aegyptium* (L.) Beauv., *Cyperus rotundus* L., *Digitaria sanguinalis* (L.) Scop., *Eleusine indica* (L.) Gaertn., *Paspalidium flavidum* (Retz.) A. Camus, and *Rottboellia exaltata* L.f.

The adults (photo 2) are 1-1.8 cm in length and pale brown in color, with long antennae and legs that easily detach from the body. The females are longer than the males and can easily be distinguished by their long, spear-shaped ovipositor. This species is also recorded in India, Thailand, and Bangladesh as a pest of rice. ■

Stylectomy of plant-sucking insects using a YAG laser to collect rice phloem sap

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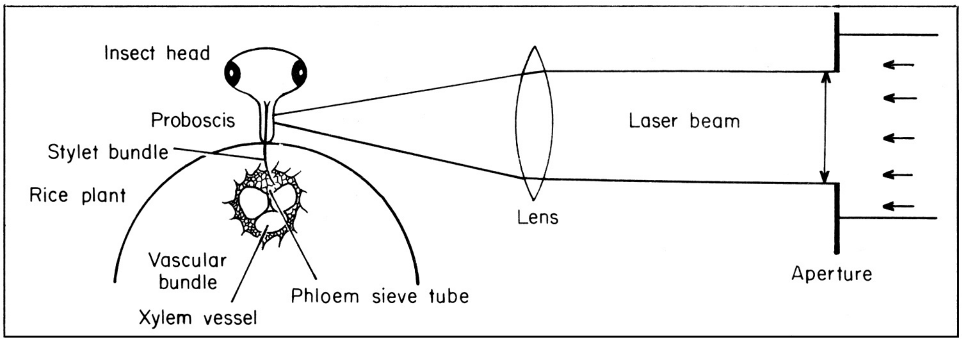
The lack of technique to selectively collect phloem sap from the rice plant has hampered investigation of the chemical basis of plant resistance to planthoppers and leafhoppers.

The use of YAG (Yttrium Aluminum Garnet) laser made it possible to sever the stylet bundle (stylectomy) of the brown planthopper *Nilaparvata lugens* and green leafhopper *Nephotettix cincticeps* while in the process of probing the rice plant. This allowed pure rice phloem sap to be collected from the excised stylets for the first time.

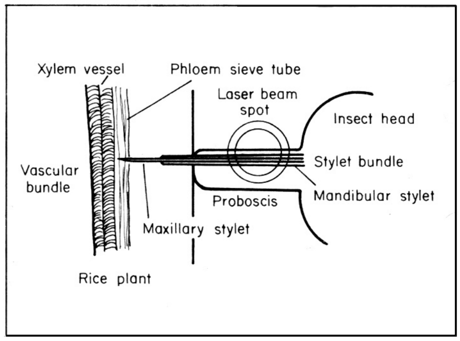
The laser beam (energy 0.1 joule and pulse width 0.2 m sec) emitted from the YAG laser system (Toshiba Inc., model LAY-508, wavelength 1.064 µm) was focused by a condensing lens and hit the proboscis of the insect feeding on the rice leaf sheath (Fig. 1). An aperture reduced the diameter of the beam so that the beam spot on the proboscis at the focal point in front of the lens was about 0.13 mm in diameter (Fig. 1,2).

An optical apparatus was attached to the system to display the image of the probing insect on the plant onto a cathode ray tube. By observing this image, the focused beam was aimed to hit the upper portion of the proboscis where the stylets are located (Fig. 2). The beam is also aimed to hit the halfway point of the proboscis between the plant tissue and the head of the insect.

Almost every pulsing successfully



1. Diagrammatic representation of a cross section of the rice plant. the insect head, and YAG laser beam focused on proboscis for stylectomy.



2. Diagrammatic representation of a longitudinal section of the rice plant, the insect mouthparts showing the proboscis, the stylets, and the laser beam spot. The stylets reach the sieve tube.

severed the stylet bundle without injuring the semitransparent stylet sheath (which did not absorb the beam). Phloem sap exuded from the cut end of stylets embedded in the phloem sieve element. The electronic measurement of insect feeding behavior (EMIF) improved by Kawabe and McLean in 1980 was useful for determining the tissue in which the stylets were located at the moment of amputation.

Severed stylets of *N. lugens* were more firmly fixed and provided more phloem sap than that of *N. cincticeps.* Turgor pressure in the sieve element often forced out the stylets of *N. cincticeps.*

The senior author is currently collecting the phloem sap of resistant and susceptible rice plants through the cut stylets of *N. lugens* to determine the chemical bases of resistance. Besides its use in entomological studies, stylectomy with the YAG laser would help plant pathologists studying disease transmission by sucking insects. ■

Effectiveness and economics of granular insecticides for control of hispa

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The effectiveness of five granular insecticides – quinalphos 5G, thiodemeton 5G, carbofuran 3G, phorate 10G, and disulfoton 5G – for contro1 of hispa *Dicladispa armigera* (Oliv.) was assessed in the 1978 wet-season rice crop at Jabalpur. The factors measured were population of adult hispa beetles, percentage of leaf damage, and height and length of tillers. The adult beetle population was assessed by visual counts of 10 random hills in each plot. Net profit was determined by subtracting the cost of insecticide application from the income from increased yield at $136.47/ t.

The granules were applied to Ratna in standing water at 1.5 kg a.i./ ha 38 days

Relative performance of some granular insecticides against adults of *D. armigera,* Jabalpur, Madhya Pradesh, India, 1978. [a]

Treatment	Adult population (av no./10 hills)				Damaged leaves (%)				Yield (t/ha)	Cost of insecticidal application ($/ha)	Net profit ($/ha)
	Pre-treatment	Post-treatment			Pre-treatment	Post-treatment					
		10 days	20 days	30 days		10 clays	20 days	30 days			
Quinalphos	3.8 (1.9)	7.5 (2.8)	1.3 (1.2)	0.0 (0.7)	15.2 (22.8)*	19.9 (26.1)*	6.5 (13.9)*	3.1 (9.6)*	2.0	70.89	19.49
Thiodemeton	4.0 (2.3)	2.5 (1.6)	0.0 (0.7)	0.0 (0.7)	16.0 (23.4)*	9.0 (17.3)*	4.9 (12.5)*	1.1 (5.0)*	2.2	50.43	56.02
Carbofuran	3.0 (1.8)	0.0 (0.7)	0.0 (0.7)	0.0 (0.7)	13.7 (21.7)*	5.8 (13.2)*	1.6 (6.2)*	0.2 (1.7)*	2.3	74.97	45.12
Phorate	5.3 (2.3)	3.0 (1.8)	0.8 (1.1)	0.0 (0.7)	17.9 (25.0)*	8.3 (16.4)*	4.2 (1 1.4)*	2.4 (8.9)*	2.0	43.09	35.41
Disulfoton	3.8 (1.9)	0.0 (0.7)	0.3 (0.8)	0.0 (0.7)	10.3 (18.5)*	8.5 (16.5)*	4.0 (10.9)*	1.8 (7.6)*	1.9	54.66	18.24
Control	3.0 (1.6)	7.0 (2.7)	26.3 (5.1)	20.5 (4.4)	17.4 (24.4)*	48.6 (44.6)*	67.5 (56.7)*	82.0 (71.2)*	1.4	0.00	0.00
S.Em.	0.394	0.211	0.213	0.272	1.66	3.80	4.15	4.81	0.13	–	–
C.D. at 5% level	N.S.	0.640	0.640	0.820	N.S.	11.44	12.50	14.51	0.40	–	–

[a] ( ) = $\sqrt{x + 00.5}$; ( )* = mean of percentages transformed to angle; N.S. = not significant.