lings were placed in test tubes containing the surviving viruliferous insects. Successive inoculation feeding of the survivors on treated plants continued until insects died. The experiment used 1,600 insects and 3,352 seedlings in a split-plot design. The first disease symptoms were observed on day 12.

One day of feeding on oil-sprayed seedlings markedly reduced insect survival. All insects survived in the control (Table 1). Insect survival in all treatments with oil blends was significantly lower than in treatments with individual oils.

Two days after feeding, all insects in the control were alive, but insect survival was 0-4% in treatments involving oil blends and 20% custard-apple oil. Three days after feeding, insect survival was 97% in the control, but 0-7% on seedlings sprayed with different concentrations of oil blends or individual oils, except 5% neem oil.

One-day inoculation feeding infected 69% of the control seedlings. Infection of seedlings in treatments involving all concentrations of oil blends and custard-apple oil was only 11–38% (Table 2). However, neem-oil-treated seedlings had significantly reduced infection only at 10 and 20% concentrations.

After 2 days of inoculation feeding, 56% of the control seedlings were affected, while ⩽7% infection occurred in treatments involving all oil blends and 20% custard-apple oil.

After 3 days of feeding, 36% of the control seedlings were infected, while infection was negligible in all oil treatments except at the lowest neem oil concentration. □

Influence of lunar cycle on light trap catches of rice stem borer

B. Janarthanan and S. Mohan, Agricultural Entomology Department, Tamil Nadu Agricultural University, Madurai, India

Effect of lunar cycle on light trap catches of stem borer (SB) *Scirpophaga incertulas* (Walker) was studied at Madurai Agricultural College and Research Institute during four lunar periods between October 1981 and January 1982. A modified Robinson light trap with a 125-w mercury vapor lamp was used. The average number of insects trapped from 2 days before to 2 days after the new moon and full moon was analyzed (see table).

Although some studies report that the lunar cycle influences SB catch, our study indicates a nonsignificant relationship between SB trapped in new moon and full moon periods. The use of a high intensity light source (46 lm/w) may have influenced the results. □

Influence of lunar cycle on light trap catches of rice stem borer.

Moths trapped [a] = (no.)	
New moon	Full moon
291.40 (2.46)	860.80 (2.93)
844.00 (2.93)	396.00 (2.60)
106.00 (2.03)	371.46 (2.57)
10.00 (1.00)	6.40 (0.81)
$F = 0.20^{ns}$	
ns = nonsignificant	

[a] Mean of 5-day catch. Figures in parentheses are transformed values.

Brown planthopper in eastern Uttar Pradesh, India

S. M. A. Rizvi and H. M. Singh, Entomology Department, N. D. University of Agriculture and Technology (NDUAT), Faizabad, Uttar Pradesh, India

Brown planthopper (BPH) *Nilaparvata lugens* Stål infestations were observed at the Crop Research Station, Masodha, NDUAT, Faizabad, and surrounding areas during 1980 kharif. Twenty-four rice varieties were attacked; among them are three important commercial varieties in the region: Saket 4, Sarjoo 52, and Jaya.

Because eastern Uttar Pradesh has a large rice growing area, the appearance of BPH may soon create a serious problem. □

White grub outbreak on rainfed dryland rice in Uttar Pradesh

D. K. Garg and N. K. Shah, Vivekananda Laboratory for Hill Agriculture (ICAR), Almora, U. P., India

White grubs are important pests of rainfed rice in the hill areas of Uttar Pradesh. Severe infestation occurs sporadically and is normally restricted to small areas. Severe outbreaks occurred over large areas during 1981 and more than 50% of the crop was damaged by the pest. In some heavily infested fields, 80% of the crop was damaged.

Anomala dimidiata var. *barbata* Burm. (Rutelinae: Scarabaeidae: Coleoptera), *Holotrichia seticollis* Moser (Melolonthinae: Scarabaeidae: Coleoptera), and *Heteronychus lioderes* Redt. (Dynastinae: Scarabaeidae: Coleoptera) are damage-causing species. *H. lioderes* is found only on rice, but the other species attack almost all other kharif Jun–Oct crops, including millet *(Echinochloa frumentacea),* maize *(Zea mays),* soybean *(Glycine max),* and French bean *(Phaseolus vulgaris).* Dryland rice, which covers the largest area, is the most affected crop.

These white grub species are univoltine. Adult beetles emerge at the onset of monsoon rains, usually in early June. Beetles are metallic green *(A. dimidiata),* dark brown *(H. seticollis),* or black *(H. lioderes). A. dimidiata* and *H. seticollis* beetles feed on leaves of apple, apricot, walnut, poplar, and oak trees and on some wild shrubs. *A. dimidiata* beetles also feed on maize leaves and tassels. *H. lioderes* beetles burrow into the base of the rice plant. Peak activity period is at night. They burrow underground and damage many plants, causing patches of dead plants in the fields. Maximum damage is caused during seedling stage in June and July. Beetles also damage irrigated crops in flooded fields.

Beetles lay eggs a few days after emergence. About one month later grubs begin to cause damage. They feed on roots, rootlets, and roothairs. Attacked plants can easily be pulled from the soil. Grub damage has been observed through-