

# Sprays that spare pest predators

*Using a pesticide to kill insect pests can be a boon. However, the technique is just not that relevant when farmers can't afford to pay for the sprays and they also kill some of the creatures the farmers want to keep. An alternative approach to controlling chickpea leafminer integrates environmentally-friendly pesticides with cultural controls.*

**T**ough times lie ahead for the chickpea leafminer. The high cost of chemical pesticides has previously allowed its larvae to carry on making a meal out of the chickpea crop throughout West Asia and North Africa. Now an integrated pest management (IPM) package is ready to stem the 30% crop yield losses caused by this important pest.

Feeding by larvae on the leaf mesophyll tissue is the cause of the desiccation and premature leaf fall which reduces yields and income for farmers. Research by ICARDA has indicated that the insect can be effectively controlled by insecticides but their use in farmers' fields is limited because of their high prices. Additionally, the environmental hazards associated with the use of insecticides have to be considered, particularly the threat imposed by the insecticides to the useful natural enemies of the leafminer (*Liriomyza cicerina* Rondani).

ICARDA and its partner organizations in West Asia and North Africa (WANA) have been evaluating integrated pest management (IPM) approaches as alternatives to the use of conventional insecticides. These approaches include the employment of host-plant resistance, planting dates and botanical insecticides.

Experiments comparing the effects of planting date (winter rather than spring), varieties (local against improved) and a safe chemical (neem oil versus deltamethrin) on leafminer damage and on natural enemies have been carried out in the field at ICARDA's headquarters for the last four years. The chickpea cultivars used were a Syrian local and the improved Ghab 3. Chemical treatments used were neem oil (2 ml per liter) and deltamethrin (0.25 cc per liter).

Neem oil is a natural insecticidal extract obtained from the fruit and

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*Chickpea leaflets damaged by leaf miner larvae.*

seeds of the Indian neem tree (*Azadirachta indica*). ICARDA scientists are also in the early stages of examining the effect of leaf and fruit extracts from another tree, *Melia azedarach* L., which is native to the Middle East and widely distributed in Asia, the Mediterranean basin, Africa and South America. It appears to have anti-feeding effects against chickpea leafminer and also against *Sitona crinitus* H., the main pest of lentil.

The results of the tests with neem oil have been very encouraging. An IPM package of winter-sown chickpea using the tolerant cultivar Ghab 3 and three sprays of neem oil reduced significantly the number of chickpea leafminers and the leaflet damage caused by larval mining. As tested, the IPM package is also environmentally friendly as it has little effect on natural enemies of leafminer.

On the other hand, using the syn-

thesized pyrethroid insecticide, deltamethrin, reduced the number of parasitoids, by about 70%, compared to the unsprayed check. Natural enemies of chickpea leafminer should be conserved as they play a major role in regulating the insect population. Studies show that the level of parasitism by the larval parasitoid (*Opius monilicornis*) reaches 70% on the third generation of the leafminer.

There is a further bonus for farmers, who are now being encouraged to adopt the IPM package. Besides escaping the chickpea leafminer infestation, the winter-sown (December planting) types of chickpea developed by ICARDA take advantage of early rainfall. This promotes crop establishment and increases the water-use efficiency of the crop. The yield advantage of the winter-sown chickpea is more than double that from traditional planting in spring (March).

A large number of countries in WANA have already adopted winter-sowing technology, and improved cultivars for general cultivation have been developed locally and released in different countries. Most of these varieties for winter-sowing possess tolerance to cold and to *Ascochyta* blight, necessary for winter sowing. ICARDA included these winter varieties in the IPM package for chickpea leafminer. With testing at experimental sites complete, the package is now ready for on-farm evaluation and demonstration in the countries of WANA. ■

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# Caravan



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