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## Integrated Pest Management in Organic Vegetable Soybean Production

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### Abstract

Vegetable soybean (*Glycine max* L. Merrill) is an important vegetable in East and Southeast Asia. To control pests, farmers resort to repeated applications of synthetic chemical pesticides, the residues of which hinder the crop's potential for export. During 2006–2008 AVRDC — The World Vegetable Center developed an integrated pest management package for use in organic production systems. It was observed that *Helicoverpa armigera*, *Spodoptera litura*, and *S. exigua* caused slight defoliation during early crop stages; *Bemisia tabaci*, *Megalurothrips usitatus* and *Edwardsiana flavescens* were the major sucking insects; *Omiodes indicata* caused serious damage through leaf webbing; and *Porthesia taiwana* occasionally appeared as a major pest after eight weeks. *Etiella zinckenella* emerged as a major pod-borer during the pod stage. During autumn, *Maruca vitrata* also appeared. The integrated pest management package consists of sex pheromones, sticky traps, and bio-pesticides. Sex pheromone traps and sticky traps were used throughout the growing season to monitor and mass-trap the target insects. Neem was sprayed to control the sucking insects and defoliators in the early crop stages. *Bacillus thuringiensis* subsp. *aizawai* (Bta) was sprayed with neem to control *O. indicata* and *P. taiwana*. During the pod stage, the Bta and neem combination was sprayed against *E. zinckenella*. *Maruca vitrata* nucleopolyhedrovirus was also sprayed when *M. vitrata* damage was noticed. The package was compared with an untreated control (2006 and 2008), as well as farmers' practice (2007). The pod damage was significantly higher in control plots (2.45–17.9%) compared with integrated pest management (1.32–6.93%) plots. However, the integrated pest management plots did not record lower damage than the farmers' practice (0.92–1.8%). Although the total pod yield is mostly higher in integrated pest management plots (5.69–11.49 t ha<sup>-1</sup>) than control plots (5.08–12.06 t ha<sup>-1</sup>), the graded pod yield is always higher in integrated pest management plots than in control plots. During spring, farmers' practice recorded higher graded pod yield (8.9 t ha<sup>-1</sup>) than integrated pest management (4.9 t ha<sup>-1</sup>). Hence, it can be concluded that the integrated pest management package can successfully manage pests in organic vegetable soybean, and contribute to higher graded pod yields depending on the season and pest pressure.

**Keywords:** Integrated pest management, organic production system, vegetable soybean