

# Developing pheromone traps and lures for *Maruca vitrata* in Benin, West Africa

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## Abstract

In previous work successful trapping of the legume podborer, *Maruca vitrata* Fabricius (Lepidoptera: Pyralidae), was accomplished using a synthetic pheromone blend consisting of (*E,E*)-10,12-hexadecadienal, (*E,E*)-10,12-hexadecadienol, and (*E*)-10-hexadecenal in a 100 : 5 : 5 ratio. In the present work, experiments were conducted in cowpea fields in Benin to compare different trap designs, and other aspects of the lures. A water-trap made from a plastic jerry-can was found to be superior to commercial funnel- and sticky-trap designs, and 120 cm was the optimum height for captures. Generally, lures consisted of polyethylene vials containing 0.1 mg of pheromone. Results showed that shielding the lures from the adverse effects of sunlight with aluminium foil did not increase trap catches of *M. vitrata*. The degree of isomeric purity of the (*E,E*)-10,12-hexadecadienal and (*E,E*)-10,12-hexadecadienol blend components, in the range 73–99%, had no significant effect on captures, while lures of 80% isomeric purity showed no loss of effectiveness for up to 4 weeks. Similar results were observed with lures from a commercial source containing 0.46 mg of pheromone in the blend ratio 100 : 11 : 6 and 95% isomeric purity. Residue analysis showed that vial lures exposed for 2 weeks in the field still contained 73% of the initial amount of (*E,E*)-10,12-hexadecadienal, compared to rubber septa dispensers, which only retained 22%. Females comprised 11–50% of total catches, confirming earlier, unexpected results for synthetic lures. The observations that effective traps can be made from locally available plastic containers, and that pheromone blend composition and purity are not critical, should reduce costs and improve the feasibility of traps as practical monitoring tools for *M. vitrata*.

## Introduction

Cowpea, *Vigna unguiculata* (L.) Walp. (Leguminosae), is a highly important grain legume crop grown in semi-arid and dry savannah areas of the tropics (Singh & van Emden, 1979). It provides a cheap source of dietary protein for low-income populations (Rachie, 1985), and forms a vital cattle forage crop in many farming systems (Mortimore et al., 1997). Africa produces 75% of world production, of which the majority comes from West Africa (Coulibaly & Lowenberg-Deboer, 2002, derived from FAOSTAT, 2000).

The legume podborer, *Maruca vitrata* Fabricius (syn. *M. testulalis*) (Lepidoptera: Pyralidae), is a key pest of

cowpea (Jackai, 1995) as well as other legume crops. The larvae attack flower buds, flowers, and young pods (Singh & Jackai, 1988), and yield losses have been reported in the 20–80% range (Singh et al., 1990).

Insecticides can control cowpea insect pests and raise yields several-fold (Afun et al., 1991; Amatobi, 1995; Asante et al., 2001). However, in West Africa, their expense limits insecticide use (Alghali, 1991; Bottenberg, 1995). Careful timing of application is required because the webs produced by young *M. vitrata* larvae, and their tendency to bore into flowers and pods, help to protect them from insecticides (Lateef & Reed, 1990). Afun et al. (1991) demonstrated the effective use of action thresholds, based on flower infestation rates, to time insecticide applications. Potentially, catches in pheromone-baited traps for *M. vitrata* could be used by cowpea farmers to determine the most

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