Impact of an exotic parasitoid on Plutella xylostella (Lepidoptera: Plutellidae) population dynamics, damage and indigenous natural enemies in Kenya


Diadegma semiclausum (Helle´n) (Hymenoptera: Ichneumonidae), an exotic diamondback moth parasitoid, was released in two pilot areas (Werugha in Coast Region and Tharuni in Central Province) in Kenya. Fifteen month before release, observations on the diamondback moth, Plutella xylostella (Linnaeus), and local natural enemy population dynamics and pest damage were initiated in both areas and continued for three years after release. The P. xylostella population was bimodal with higher records during dry seasons. At Werugha, the peak population of P. xylostella was 16.8 per plant (October 2001); at Tharuni it was 12.8 (February 2002). Populations at Werugha declined from three months after release and decreased from 5.4 per plant (before release) to 0.8 (year 3 after release). Concurrently, average damage (1.9 to 1.5) (on a 0–5 scale), proportion of attacked plants (72 to 31%) and proportion of plants in damage group > 2 (plants with head damage) decreased (21.4 to 5.3%), while total parasitism increased from 14.4 (before) to 52.5% (year 3 after release, 90% due to D. semiclausum). At Tharuni, D. semiclausum was only recovered 3 months after release. Average populations of P. xylostella declined from 5.9 per plant (before release) to 2.4 (year 3 after release) and damage scores from 2.3 to 1.7. The proportion of plants in damage group >2 declined from 39.7 to 4.5% while overall parasitism increased from 4.2 to 40.6% (98.3% by D. semiclausum). Four species of indigenous parasitoids (Diadegma mollipla (Holmgren), Oomyzus sokolowskii (Kurdjumov), Apanteles sp. and Itoplectis sp., all primary parasitoids) were almost completely displaced by D. semiclausum. Possible reasons for the different parasitoid development between the two release areas and the displacement of the indigenous species are discussed.