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Impact of Cotesia Plutellae in the Management of Plutella Xylostella on Kale in Kenya

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Abstract

Diamondback moth (DBM) *Plutella xylostella* (L.) is the most destructive insect pest of crucifers resulting in the world and can cause yield losses of up to 100 % if left unmanaged. It is a difficult pest to control due to its intrinsic biology and ecology, ability to migrate and disperse over long distances, and its development of resistance to a wide range of insecticides. In 2003, Cotesia plutellae from South Africa was introduced and released in kale Brassica Oleracea var. acephala growing areas of Machakos and Kitui Counties with the aim of managing the DBM and reducing pesticide use that has deleterious effects on health, environment and natural enemies. Preliminary studies in 2004–2006 showed that the parasitoid had not established in the release sites and augmentation releases were done in 2006. Monthly surveys were conducted from May 2012 to April 2013 to assess the contribution of C. plutellae. Twenty five farmer managed farms were identified, where 20 plants were selected in each farm and sampled for DBM population, damage, parasitism and parasitoid guild. The DBM larvae and pupae were placed in containers and taken to the laboratory for DBM or parasitoid emergence. Mean number of DBM/plant ranged from 0.4 to 2.5 and 0.3 to 3.5 in Kitui and Matuu, respectively. Damage score ranged from 1.2 to 1.6, which was positively correlated to the number of DBM recorded. The parasitoids Cotesia plutellae, *Diadegma semiclausum*, *D. mollipla*, Apanteles sp., Chelonus sp., *Oomyzus sokolowskii* and Itoplectis sp.cies were recovered. Hyper-parasitoids recovered included Mesochorus sp., Pteromalus sp., Notanisomorphella sp., *Eurytoma* rosae and *Eurytoma* sp., Brachymeria sp. and Pediobius sp. Cotesia plutellae was the most abundant parasitoid followed by *D. semiclausum*. Diversity of parasitoids varied between months and study sites. Cotesia plutellae had established and spread beyond the release sites contributing between 40 and 90 % parasitism while the indigenous parasitoids *Itoplectis sp.*, Apanteles sp., and *D. mollipla* contributed less than 5 % parasitism. Cotesia plutellae had spread and established in the study sites and contributed in reduction on pesticides use, spraying regime and eventual reduction of cost of production and residues on the produce.

Keywords: Cotesia plutellae, kale, parasitism, parasitoids, plutella xylostella

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