**Impact of *Cotesia plutellae* (Hymenoptera: Braconidae) in the management of diamondback moth *Plutella xylostella* (Lepidoptera: Plutellidae) on kale *Brassica Oleracea* var. *acephala* in semi-arid areas of Kenya**

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**Abstract**

Diamondback moth (DBM) *Plutella xylostella* (L.) is the most destructive insect pest of crucifers resulting in the world. The pest 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 decimation of 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 spread and contribution of *C. plutellae*. Twenty five farmer managed farms were randomly 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 ventilated containers and taken to the laboratory for DBM or parasitoid emergence. The mean number of DBM/plant in Kitui and Matuu ranged from 0.4 to 2.5 and 0.3 to 3.5, respectively. Mean damage score ranged from 1.2 to 1.6 in both regions, 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* species 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* hadspread 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:** *Plutella xylostella*, *Cotesia plutellae,* parasitoids, parasitism, kale