



An emerging pest of radish, striped flea beetle *Phyllotreta striolata* (Fabricius), from Northern India: incidence, diagnosis and molecular analysis

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Abstract Severe incidence of striped flea beetle, *Phyllotreta striolata* (Fabricius) (Coleoptera: Chrysomelidae) in radish is being reported from Delhi National Capital Region and Haryana. The larvae and adult of this species were found to damage both roots and leaves of radish, respectively. Overall there was an average 63.02 percent leaf infestation and 53.96 percent root infestation in the radish fields surveyed, which was above the economic threshold level (25% infestation). Infestation was also observed on other cruciferous crops like turnip, mustard, cabbage and cauliflower in National Capital Region and Haryana. In the present study, we have furnished the species diagnosis, sexual dimorphism, nature of damage and illustrations of various stages of the pest. DNA barcoding was employed to confirm the species identity and molecular phylogenetic studies based on mt CO I sequences from across the world showed that there were two clusters; the Old World and the New World. The biology of the pest and the importance of studies on area specific population dynamics for formulating management strategies are discussed.

Keywords Infestation · DNA barcoding · Molecular phylogenetics · mt CO I · Sexual dimorphism

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Introduction

Flea beetles belonging to the genus *Phyllotreta* Chevrolat, are important pests of many cruciferous crops globally. Worldwide a total of 250 species have been reported under the genus (Konstantinov and Vandenberg 1996) and the Indian region has about 12 species (Heikertinger and Csiki 1939, Scherer 1969 and Basu et al. 1981). The members of the genus are specialist feeders of plants belonging to Brassicaceae, Resedaceae, Cleomaceae, Limnanthaceae, Capparaceae, and Tropaeolaceae (Jolivet and Hawkewood 1995). The presence of glucosinoides makes Brassicaceae plants attractive for this group of insects (Pivnick et al. 1992; Hopkins et al. 2009). In many countries *Phyllotreta striolata* (Fabricius) and *Phyllotreta cruciferae* (Goeze) are two predominant species which causes considerable yield loss in canola due to the adults feeding on the leaves and cotyledons. The adult stages of *P. striolata* is reported as a notorious pest attacking cruciferous crops in Taiwan (Lee et al. 2011) and Canada (Burgess 1977, Madder and Stemeroff 1988). Unfortunately, the species has developed resistance to insecticides in several countries including Taiwan (Feng et al. 2000). It is widely distributed in Europe and Asia and was introduced to North America and Republic of South Africa (Lee et al. 2011; Tansey et al. 2008). In India, *P. striolata* was previously not considered as a serious pest but, recent reports indicates that adult stages of the species is becoming an important pest in the region. Rather et al. (2017) studied the biodiversity of flea beetle attacking cruciferous crops in different agro ecological zones of