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Biological and biochemical diversity in different biotypes of spotted stem borer, *Chilo partellus* (Swinhoe) in India

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Because of variation in incidence and severity of damage by *Chilo partellus* (Swinhoe) in different geographical regions, it is difficult to identify stable sources of resistance against this pest. Therefore, the present studies were undertaken on biological attributes (damage in resistant and susceptible genotypes, survival and development) and biochemical profiles (amino acids and lipophilic compound) of *C. partellus* populations from eight geographical regions to understand its population structure in India. There was a significant variation in biological attributes and biochemical profiles of *C. partellus* populations from different geographical regions. Based on virulence and biological attributes, similarity index placed the *C. partellus* populations in five groups. Likewise, lipophilic and amino acid profiling also placed the *C. partellus* populations in five groups. However, the different clusters based on biological and biochemical attributes did not include populations from the same regions. Similarity index based on virulence, biological attributes, and amino acids and lipophilic profiles placed the *C. partellus* populations in six groups. The *C. partellus* populations from Hisar, Hyderabad, Parbhani and Coimbatore were distinct from each other, indicating that there are four biotypes of *C. partellus* in India. The results suggested that sorghum and maize genotypes need to be tested against these four populations to identify stable sources of resistance. However, there is a need for further studies to establish the restriction in gene flow through molecular approaches across geographical regions to establish the distinctiveness of different biotypes of *C. partellus* in India.

There are distinct biological and genetic differences between geographically isolated populations of a given insect species as a result of diverse climatic conditions, variation in host plants, and their nutritional quality. Geographic isolation has been perceived to be one of the factors for phenological differentiation in the evolutionary history of herbivores, as the genetic exchange among the neighbouring populations is likely to be more frequent than among the populations separated geographically^{1–3}. Wider geographic distribution also results in behavioural, physiological and genetic differences in insect populations^{4–6}.

Spotted stem borer, *Chilo partellus* (Swinhoe) is one of the most widely distributed insect pests of coarse cereals in Asia and Africa⁷. The presence, abundance and intensity of infestation by *C. partellus* is influenced by both biotic and abiotic factors in a geographical region^{7,8}. There is a wide physiological and behavioural variation in *C. partellus* populations in terms of diapause (hibernation in northern India and aestivation in southern India)^{7,9}. The nature and intensity of diapause exercises a profound effect on post-diapause development and reproduction¹⁰, while the mating behaviour influences reproduction and population build-up of *C. partellus*¹¹. Mating between adults from diapausing and nondiapausing *C. partellus* populations from different geographical regions also results in genetic polymorphism¹², which will have implications to breed for resistance, and develop strategies for the management of this pest.

Genetic variation within a crop also results in differential herbivory by the insect pests in different geographical regions under diverse environmental conditions^{13–17}. Matsubayashi et al.¹⁸ suggested that genetic variation is the basis for differences in host plant preference, and survival and development, which results in evolution

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