



Occurrence, damage pattern and biology of fall armyworm, *Spodoptera frugiperda* (J.E. smith) (Lepidoptera: Noctuidae) on fodder crops and green amaranth in Goa, India

R. Maruthadurai · R. Ramesh

Received: 18 January 2019 / Accepted: 12 November 2019 / Published online: 9 December 2019
© Springer Nature B.V. 2019

Abstract The fall armyworm (FAW), *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera: Noctuidae) is an economically important polyphagous pest native to the Americas. The pest has recently introduced to India and causing severe damage to maize and other crops. The occurrence of fall armyworm on fodder maize (*Zea mays* L), Guinea grass (*Megathyrsus maximus*) (Jacq.), para grass (*Brachiaria mutica*) (Forssk.) and green amaranth (*Amaranthus viridis* L) is reported first time from Goa, India. The damage incidence of 16 to 52% was recorded on fodder maize. The other host plants viz., Guinea grass, para grass and green amaranth recorded damage incidences of 9.0, 4.0 and 13.0%, respectively. The pest was identified based on morphological characters and molecular techniques. Phylogenetic analysis of *COI* gene sequence revealed that fall armyworm on fodder maize from Goa is clustering with the fall armyworm isolates from India, Nigeria, Ghana, Kenya, Canada and Brazil. Goa isolate is aligning with the “Rice” strain of fall armyworm and not with “Corn” strain. Studies on the biology of fall armyworm indicated that longer larval and pupal developmental period (18.6 and 10.7 days) was recorded on Guinea grass and green amaranth, respectively. The highest number of eggs was recorded from fall armyworm population reared on fodder maize as compared to those reared on other host plants. Longer life cycle was recorded on Guinea

grass and green amaranth. Shortest larval and pupal period and faster life cycle of fall armyworm was recorded on fodder maize compared to other host plants indicating that fodder maize was the most preferred host for *S. frugiperda* in India.

Keywords Invasive pest · Life cycle · Host range · Fodder crops · Molecular identification

Introduction

The fall armyworm (FAW), *Spodoptera frugiperda* (J.E. Smith) (Lepidoptera: Noctuidae) is a highly polyphagous, migratory pest native to the tropical and subtropical region of Americas. It is considered as the most important pest of maize in Brazil, Argentina, Chile and Canada. In Brazil, *S. frugiperda* causes up to 34% reduction in grain yield amounting to an annual loss of US\$ 400 million (Prowell et al. 2004; Figueiredo et al. 2005; Clark et al. 2007; Lima et al. 2010). The FAW has a very wide host range and recorded on more than 353 host plants (Montezano et al. 2018). The most frequently damaged plants in the Americas include field maize, sorghum, rice, millet, soybean, peanut, cotton, sudan grass and other fodder grasses (CABI 2018; Montezano et al. 2018; Casmuz Augusto et al. 2010). The pest distribution was restricted in the American continents till 2015. A severe outbreak of FAW in maize was reported from African countries such as São Tomé, Nigeria, Bénin and Togo in 2016 (Goergen et al. 2016). Subsequently, the pest has spread rapidly to over 44

R. Maruthadurai (✉) · R. Ramesh
Crop Protection, ICAR- Central Coastal Agricultural Research
Institute, Ela, Old Goa, Goa 403 402, India
e-mail: duraiento@gmail.com