The natural control agents of the fall armyworm, Spodoptera frugiperda in Togo: moderating insecticide applications for natural control of the pest?

Abstract

Although there has been intensive use of insecticides for the fall armyworm, Spodoptera frugiperda (Lepidoptera: Noctuidae) management, their effects on population reduction and natural enemies' performance have not been adequately studied. Therefore, this study investigated the diversity and activity of natural enemies under insecticide and insecticide-free applications. Natural enemies were collected annually from 2016 to 2022 from 348 maize farms throughout the West African nation of Togo. The collections included an entomopathogenic nematode, unidentified bacteria from Enterobacteriaceae and Enterococcus, unidentified viruses from Ascoviruses and Baculoviruses, and several fungal species. Parasitoids collected included hymenopteran and dipteran species that attacked eggs and larvae. The collected predators included species in the following families: Anthocoridae, Carabidae, Chrysopidae, Coccinellidae, Forficulidae, Formicidae, Mantidae, and Reduviidae. The parasitism rates were from 14.72% in 2018 to 45.38% in 2022 for egg masses and from 1.32% in 2016 to 41.85% in 2021 for larvae. The parasitism rates were three to four times higher in unsprayed farms than sprayed farms.