Tuta absoluta (Meyrick) (Lepidoptera: Gelechiidae) on the "Offensive" in Africa: Prospects for Integrated Management Initiatives

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Abstract

The South American tomato pinworm Tuta absoluta (Meyrick) has aggressively invaded the African continent. Since its first detection in North Africa in Morocco and Tunisia in 2008, it has successfully invaded the entire southern, eastern and western Africa, where it has been on the offensive, causing significant damage to Solanaceous food crops. While control of this prolific invader is primarily based on conventional synthetic pesticides, this form of control is consistently losing societal approval owing to (1) pesticide resistance development and consequential loss of field efficacy; (2) growing public health concerns; (3) environmental contamination and loss of biological diversity and its associated ecological services; and (4) unsustainable costs, particularly for resource-poor African farmers. As such, more ecologically sound pest management strategies, e.g., the use of natural substances (NSs), may offer a more sustainable approach to tackling this offensive. A systematic literature search through digital libraries and online databases (JSTOR, PubMed, Web of Science, SCOPUS and Google Scholar) was conducted using predetermined keywords on T. absoluta, e.g., South American tomato pinworm. We use this to explain the invasion of T. absoluta in Africa, citing mechanisms facilitating African invasion and exploring the potential of its control using diverse biological control agents, natural and low-risk substances. Specifically, we explore how botanicals, entomopathogens, semiochemicals, predators, parasitoids, host plant resistance, sterile insect technique and others have been spatially employed to control T. absoluta and discuss the potential of these control agents in African landscapes using more integrated approaches. We discuss the use of NSs as assets to general insect pest control, some potential associated liabilities and explain the potential use and barriers to adoption in African systems from a legislative, economic, ecological and social standpoint.