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Population Fluctuation of Onion Thrips (Thrips tabaci) on Onion Crop Under Biological Control Processes

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Abstract: *Onion thrips (Thrips tabaci Lindeman) are a significant pest affecting onion crops worldwide, causing yield losses through direct feeding and disease transmission. Biological control offers a sustainable alternative to chemical pesticides, yet its impact on thrips population dynamics remains underexplored. This paper reviews and synthesizes existing literature on the population fluctuation of onion thrips under biological control methods, including predatory mites, entomopathogenic fungi, and habitat manipulation. Findings suggest that biological control agents, such as Neoseiulus cucumeris and Beauveria bassiana, can reduce thrips populations, but their efficacy varies with environmental conditions, application timing, and integration with cultural practices. Habitat manipulations, like straw mulch and flower strips, enhance natural enemy populations, indirectly stabilizing thrips populations. However, challenges such as inconsistent control and limited scalability persist. This review highlights the need for integrated pest management (IPM) strategies to optimize biological control for sustainable onion production.*

Keywords: Onion thrips, *Thrips tabaci*, biological control, population dynamics, integrated pest management, onion crop