



Host plant influences life cycle, reproduction, feeding, and vector competence of *Thrips palmi* (Thysanoptera: Thripidae), a vector of tospoviruses

Heena Dhall · Sumit Jangra · Y. B. Basavaraj ·

Amalendu Ghosh 

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Abstract *Thrips palmi*, an important pest of vegetables and ornamentals, transmits several tospoviruses. Effect of tospovirus on host plant and vector is well studied. Little is known about the host-mediated alteration in biological traits of *T. palmi*. The present study reports the effect of different hosts viz. brinjal, cowpea, cotton, cucumber, sweet pepper, and tobacco on development, survival, fecundity, feeding, and vector competence of *T. palmi*. A higher net reproductive rate and lowest generation time were recorded in brinjal and cotton. Cowpea, tobacco, and sweet pepper reduced reproductive potential of *T. palmi*. Exposure to brinjal caused greater feeding by *T. palmi*, whereas it was least on sweet pepper. The vector competence of *T. palmi* was highest on cucumber and cowpea, however, tospovirus transmission was inhibited in brinjal and cotton. The alteration in biology could be due to the biochemical and morpho-physiological traits of hosts interfering with essential physiological processes of *T. palmi*.

Keywords Tripartite relationship · Thrips · Development · Reproduction · Feeding · Virus transmission · Watermelon bud necrosis virus

Introduction

Plant virus and insect vector share same host and influence each other in direct and indirect ways. The relationships between plant virus, insect vector and host plant can be beneficial, neutral, or antagonistic, depending on the species involved. In a plant pathosystem, most of the plant viruses depend on insect vectors for transmission, where vector is the only mobile component. In a tripartite relationship among host, virus, and vector, the virus modifies its host as well as vector leading to enhanced transmission (Stumpf and Kennedy, 2005, 2007; Chatzivassiliou et al., 2001; Belliure et al. 2004; Jacobson and Kennedy, 2013; Ghosh et al. 2016, 2019a). Besides, host also exerts differential responses to lifecycle, feeding behavior, reproduction, and vector competence.

Thrips are important pests of agricultural, horticultural, and forest crops causing serious losses of quantity and quality of yield (Trdan et al. 2005, 2007, Ghosh et al. 2009). Besides direct damage caused by feeding, they transmit several tospoviruses. *Thrips palmi* (Thysanoptera: Thripidae) is the predominant tospovirus vector in the Asia-Pacific region, transmitting more than seven tospoviruses (Rotenberg et al. 2015; Ghosh et al. 2017; Jangra et al. 2020; Priti et al. 2021). *T. palmi*-transmitted groundnut bud necrosis virus (GBNV) causes losses of more than US\$ 89 million per annum across Asia (Reddy et al. 1995). Yield losses up to 100% have been reported due to infection of watermelon bud necrosis virus (WBNV) (Singh et al. 1997).

The effect of tospovirus on host plant is well studied. Tospovirus alters the host quality by modulating the

H. Dhall · S. Jangra · Y. B. Basavaraj · A. Ghosh (✉)
Insect Vector Laboratory, Advanced Centre for Plant Virology,
ICAR-Indian Agricultural Research Institute, New Delhi 110012,
India
e-mail: amal4ento@gmail.com