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Thrips Choice Tests on Uninfected/Infected Soybean Plants Demonstrate Mechanism of SVNV Transmittance

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Abstract

From its original discovery in 2008, the Soybean vein necrosis virus (SVNV), first prevalent in Tennessee, has since spread to fifteen states in the Northern region. Typically vectored by thrips, the Tospovirus genus virus' effects are gaining attention even as SVNV’s agricultural importance has yet to be fully assessed. Currently, soybean thrips is considered the primary vector or most efficient transmitter of the virus, whereas tobacco thrips and eastern flower thrips are secondary vectors. The purpose of this study was the following: Investigate the mechanism by which thrips spread the virus from plant to plant by conducting choice tests. Choice tests were conducted in enclosed structures to isolate an individual leaf connected to two distinct living plants. Six SVNV-infected thrips were released inside the enclosure. This allowed for random choice of the thrips. The choice-test can explain whether infected thrips (1) prefer to feed on uninfected plants rather than infected plants or (2) thrips show no feeding preference at all. A series of twenty non-choice tests were completed using two uninfected plants to reveal thrips preference for two leaves, which laid the groundwork to support the non-choice tests in which infected thrips feed and infect a healthy plant their offspring will become infected which could lead to increased virus transmission as a result of increased population of viruliferous thrips.

Results

The collected data displayed in Figure 6 using an uninfected plant vs. an infected plant with infected thrips confirmed that majority of the infected thrips preferred to feed on the uninfected plant. This therefore confirmed that when SVNV-infected thrips feed and infect a healthy plant, their offspring will become infected and increase virus transmission. Furthermore, the findings of this experiment agree with the findings of the published article (Han et al, 2016) where similar experiments was conducted using Petri dishes whereas our experiment used whole plants.

Figure 4. Choice test assay

Thrip Choice-Test Using Uninfected Soybean Plants

Figure 5. The figure above displays the data collected from twenty trials of choice tests in which infected thrips indicated their preference for two uninfected plants.

Figure 6. The figure above displays the data collected from twenty trials of choice tests in which infected thrips indicated their preference when given an infected plant and an uninfected plant.

Discussion

Based on the conducted experiments, it is understood that in order to create an ideal, highly effective virus management method, fundamental aspects of the virus including the means by which thrips infect plants must be established.

Future research

The next step in the study would be to conduct a set of 20 trials with identical setup using non-infected thrips instead of infected. The results from conducting the trials would aid in explaining the feeding mechanism of non-infected thrips when given the choice between feeding on an infected or non-infected plant. This could potentially provide insight on the reproductive tendencies of thrips.

References


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