

## Georgia Peanut Commission: (UGAT-30-19/20)

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**Title:** *Nonchemical-based sprays for triggering host resistance: A new biotechnological approach to manage Tomato spotted wilt orthotospovirus (TSWV).*

**Principal Investigator:**

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**Layman's Summary:**

Thrips-transmitted tomato spotted wilt orthotospovirus (TSWV) continues to be a constraint to peanut, pepper, tobacco, and tomato production in Georgia and elsewhere. TSWV is being managed by an integrated disease management strategy that includes a combination of cultural practices, vector management, and growing virus-resistant varieties where available. We used a non-transgenic strategy to induce RNA interference (RNAi)-mediated resistance in tobacco (*Nicotiana tabacum*) plants against TSWV. Double-stranded RNA (dsRNA) molecules for the NSs (silencing suppressor) and N (nucleoprotein) genes were produced by a two-step PCR approach followed by in vitro transcription. When topically applied to tobacco leaves, both molecules elicited a resistance response. Host response to the treatments was measured by determining the time to symptom expression, and the level of resistance by absolute quantification of the virus. We also show the systemic movement of dsRNA\_N from the inoculated leaves to younger, non-inoculated leaves. Post-application, viral siRNAs were detected for up to nine days in inoculated leaves and up to six days in non-inoculated leaves. The topical application of dsRNAs to induce RNAi represents an environmentally safe and efficient way to manage TSWV in tobacco crops and could be applicable to other TSWV-susceptible crops.

The results from this work is published and freely available online:

- Konakalla, N.C<sup>#</sup>., **Bag, S<sup>^</sup>**., Deraniyagala, A.S., Culbreath, A.K., and Pappu, H.R. (2021) Induction of plant resistance in tobacco (*Nicotiana tabacum*) against tomato spotted wilt orthotospovirus through foliar application of dsRNA. *Viruses*. 13 (4): 662. <https://doi.org/10.3390/v13040662>

A new Post-Doc joined our team and continuing this work along with other ongoing projects in the lab. Thank you for your continual support.