

Influence of Chemical Ecological Traits in Transmission of Tobacco Streak Virus by *Thrips palmi* in Parthenium Infested Cotton Ecosystem

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Cotton necrosis disease (CND) caused by tobacco streak virus (TSV) is of sporadic importance, but the recent devastating epidemics in India and Pakistan indicated it to be an emerging threat. This paved the way for more focused investigation. At present, the *Thrips palmi*, is suspected to be the vector of TSV in presence of TSV infected perennial weed *Parthenium hysterophorus*. Chemical communication between plants and insect vectors are the well-known ecological concept. Based on this, transmission and olfactometer studies were carried out to assess the ecological interaction of *Thrips palmi* and *P. hysterophorus* in transmission of TSV in cotton. Eight different treatment combinations of viruliferous and aviruliferous adults of *T. palmi* mixed with TSV inoculated and healthy *P. hysterophorus* pollen were used for conducting studies. These treatment combinations were replicated thrice. Transmission studies conducted with cotton hybrid Ankur 3220 revealed that TSV was regularly transmitted to cotton test seedlings (15 days after sowing), when viruliferous adults of *T. palmi* were mixed with virus-carrying pollen from *P. hysterophorus* infected with TSV. The virus was also regularly transmitted when virus carrying pollen was placed on the leaves of cotton test seedlings and the thrips then introduced. Symptom expression on cotton leaves were observed 25 days of post inoculation and the transmission efficacy of *T. palmi* and parthenium pollen grains were recorded to be 48.88 %. TSV symptom expressed cotton leaves were further confirmed through DAS-ELISA and RT-PCR. Further, Y - arm olfactometer studies were conducted to investigate the chemical ecological interaction between *T. palmi* (25 No. of adult females), cotton and parthenium pollen grains. Higher attraction (Movement) of thrips was recorded towards TSV inoculated parthenium pollen grains compared to TSV inoculated cotton plants. Volatile profiling performed using GC-MS/MS recorded the unique volatile compounds of Germacrene D and Heptadecane was recorded in TSV inoculated parthenium with retention time of 18.39 and 17.85 minutes which attracted thrips towards parthenium and this facilitated the transmission of TSV in cotton. Our results clearly revealed that under natural condition the volatiles emanated from TSV inoculated parthenium attracts *T. palmi* towards parthenium and thereby facilitated the transmission of TSV in cotton.

Keywords: TSV, 'Y' arm olfactometer, GC-MS/MS, Thrips, *Parthenium hysterophorus*.