

## **Project title: Hot Spot-Virus and Insect Localized Survey 2009-10 Annual Report**

### **Investigators:**

Aziz Baameur, Farm Advisor Santa Clara County.

### **Correspondence:**

Aziz Baameur

azbaameur@ucdavis.edu

UC Cooperative Extension, Santa Clara County.

1553 Berger Dr., Bldg. 1

San Jose, CA 95112

Phone/Fax: (408) 282-3127 / (408) 298-5160

### **Objectives.**

Overall goal is to approximate the arrival time of insect vectors and the first appearance of virus diseases in pepper plants and present weeds in specific pepper fields that have historically shown virus presence.

1. Identify (2-3) areas of endemic virus presence.
2. Focus on sampling and trapping insects (thrips and aphids)
3. Test plants (immuno strips) for CMV, TSWV, and INVS

### **Materials and Methods.**

Yellow sticky cards or traps were placed in different location in two pepper fields. The fields were selected for their chronic virus presence. Six traps were placed in field one and seven in field two. Traps were placed on the periphery of each field. Traps were oriented either north/south or East/West, depending on the targeted source. Mid-way into the project, four self-supporting pot of petunia flower as indicator plants and flower tarps were added to the monitoring process. All traps were replaced weekly beginning June 24 and going and until crop termination.

Thrips were counted on each sticky card using a dissecting microscope. Traps flowers were washed in 80% alcohol and thrips were screened and counted under dissecting microscope.

Random samples of pepper plants were taken in the vicinity of the traps and analyzed for viruses (TSW, CMV, INVS) using immune strips from AGdia.

Field 1 ("south-field") was located south Gilroy East of 101 and near a creek, several oak trees on the northern and eastern boundaries. On the west side, there was an abandoned field full of wild mustard, few hundred feet from the border. On the south sidewere more bell pepper fieldsfield

Field 2 ("East-field") was located north East of Gilroy and was bordered by houses and a small cherry orchard. On the west side there were several greenhouses and at the north-west

corner, a sweet corn field. At the north end there were several oak trees, fruit bushes (black berries), fruit trees. On the east side there was a maturing brassica seed field over-run by weeds.

**Results.**

Field sampling for insect vectors was initiated June 24. Traps were collected a week later, June 29, 2009. First sampling indicated that thrips were already present in both fields. The abandoned mustard field was at full bloom and was heavily infested with thrips. It was a reservoir of insect and potential virus source. Field 1 sustained very high thrips presence (over 100-150 insects/square/trap) during the early phases of the project.

The wild mustard field was disked early July, which resulted in relative gradual decline of thrips numbers. However trap data indicate that thrips populations began increasing after the first week of July.

We began sampling plants suspected of infection and testing them using Agdia strips. 100% of all plants sampled showed positive presence of TSWV. All samples taken over 45 days (7/1-8/17/09) were positively infected with the virus. Note that field-based infection rate was estimated less than 5%. Tests of all plant samples collected from field 1 were negative to CMV and INVS presence.

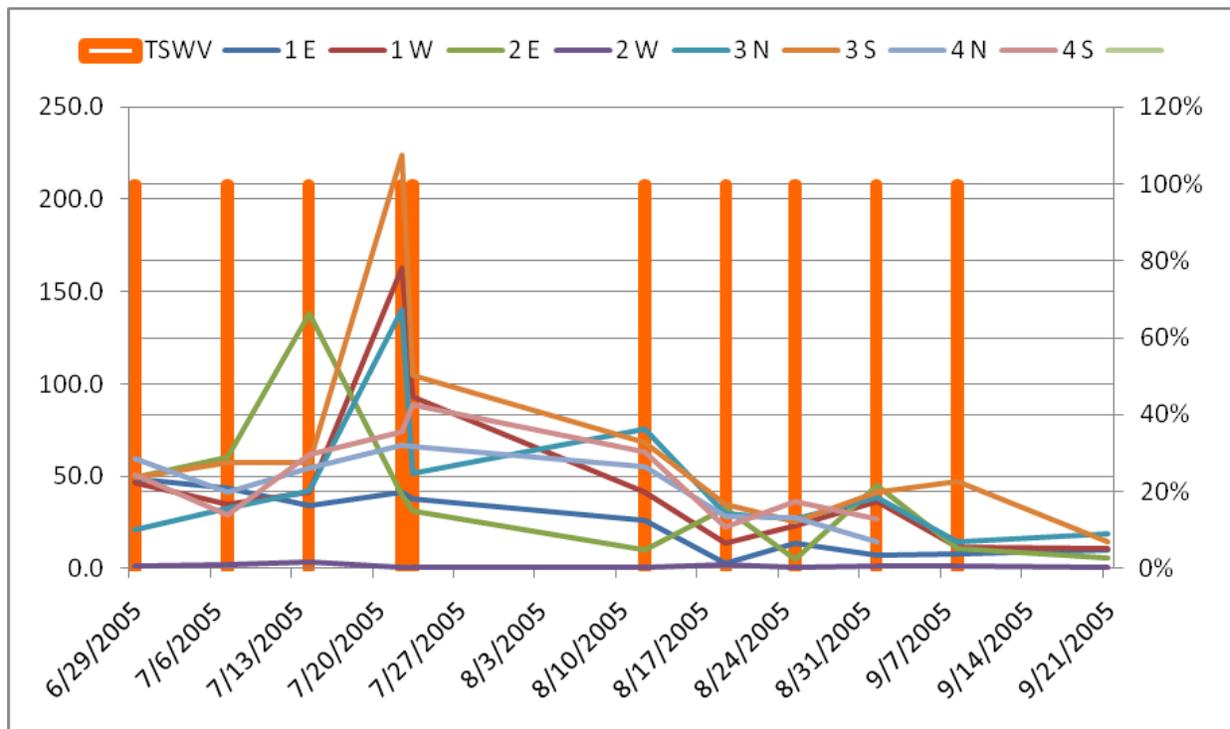


Figure 1. Weekly thrips and TSWV(Orange columns) presence in Field 1 by trap number and direction.

Field 2 had consistently lower thrips count. Averages per traps rarely exceeded 35 counts per square. These are still considerable numbers, but far less than field 1. However the number started rising early July but began declining by the end of the month. They never reached 40 thrips/square/trap. The exception was trap #3 western exposure, that was located at southeast corner of a sweet corn field. During the period of corn production, trap 3 had higher than average number of thrips count. After the sweet corn harvest and plants were mowed down, the numbers shot up to an exceptional level of 200 insects per square. They gradually decreased to 25 thrips/square/trap by early September.. Similar trend took place after the

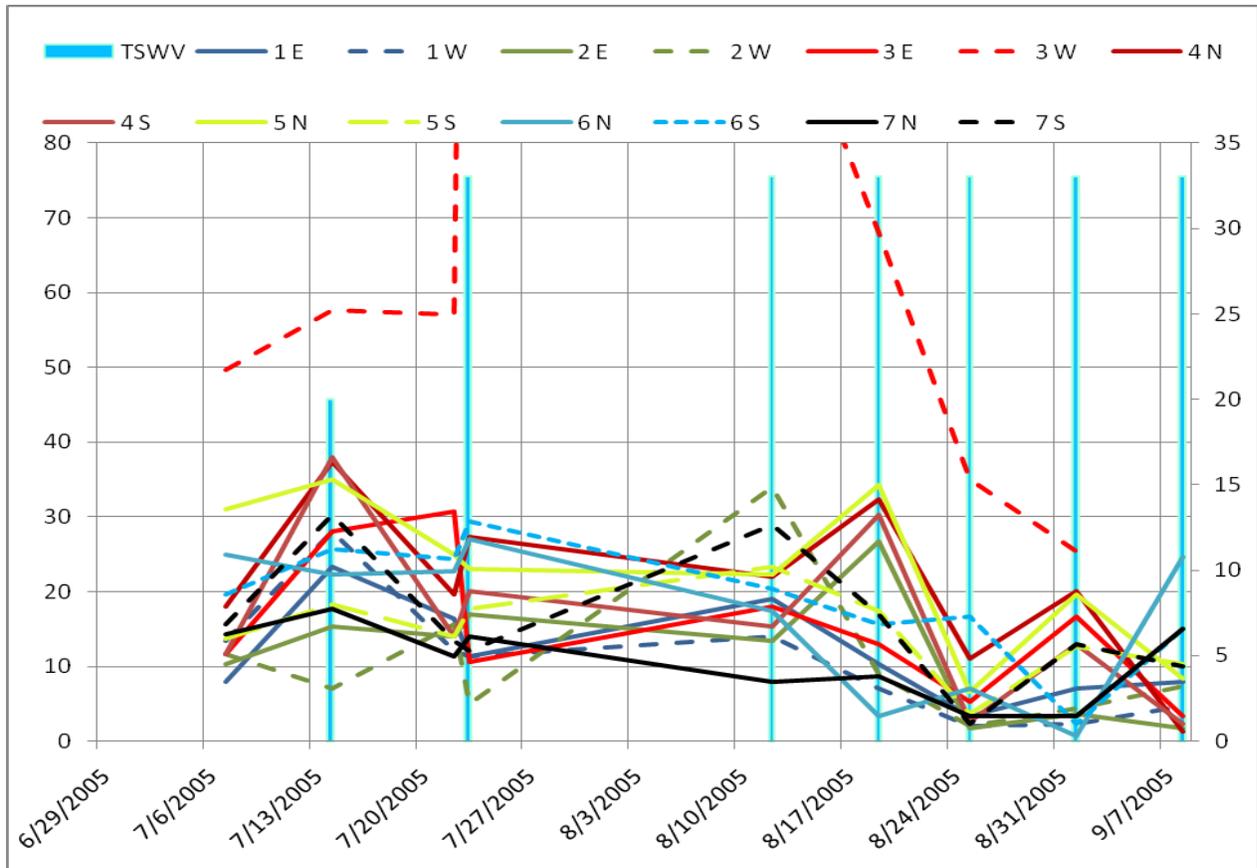


Figure 2. Weekly thrips and TSWV (light blue columns) presence in Field 2 by trap number and direction.

eastern side weedy field was disked under.

In field 2, neighboring greenhouses were important source of thrips as seen by the numbers of traps 1 and 2. However, contrary to prevailing expectations greenhouses were no more significant source of thrips than creeks, flowering trees and bushes in the northern vicinity of the field. The highest concentration of thrips was found in traps closest to trees, bushes, and lastly near corn.

in general, virus incidence was low in field 2. Of all the symptomatic plants sampled, only TSWV was detected. No more than 30% of the samples indicated the presence of the virus. And as

was the case for field 1, no CMV or INVS viruses were found. We estimated that no more than 2-3% of the field was affected by the virus.

### **Conclusions.**

Field 1 has been reported to have chronic presence of viruses. In this study, we confirmed that the high number of thrips presence was almost a sure precursor to (TSWV) occurrence.

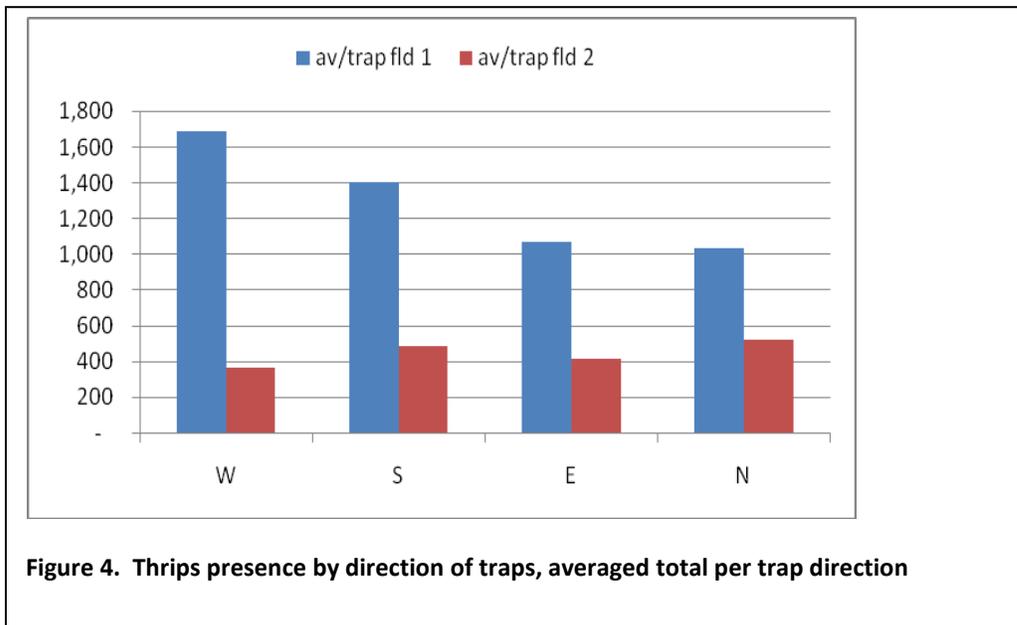
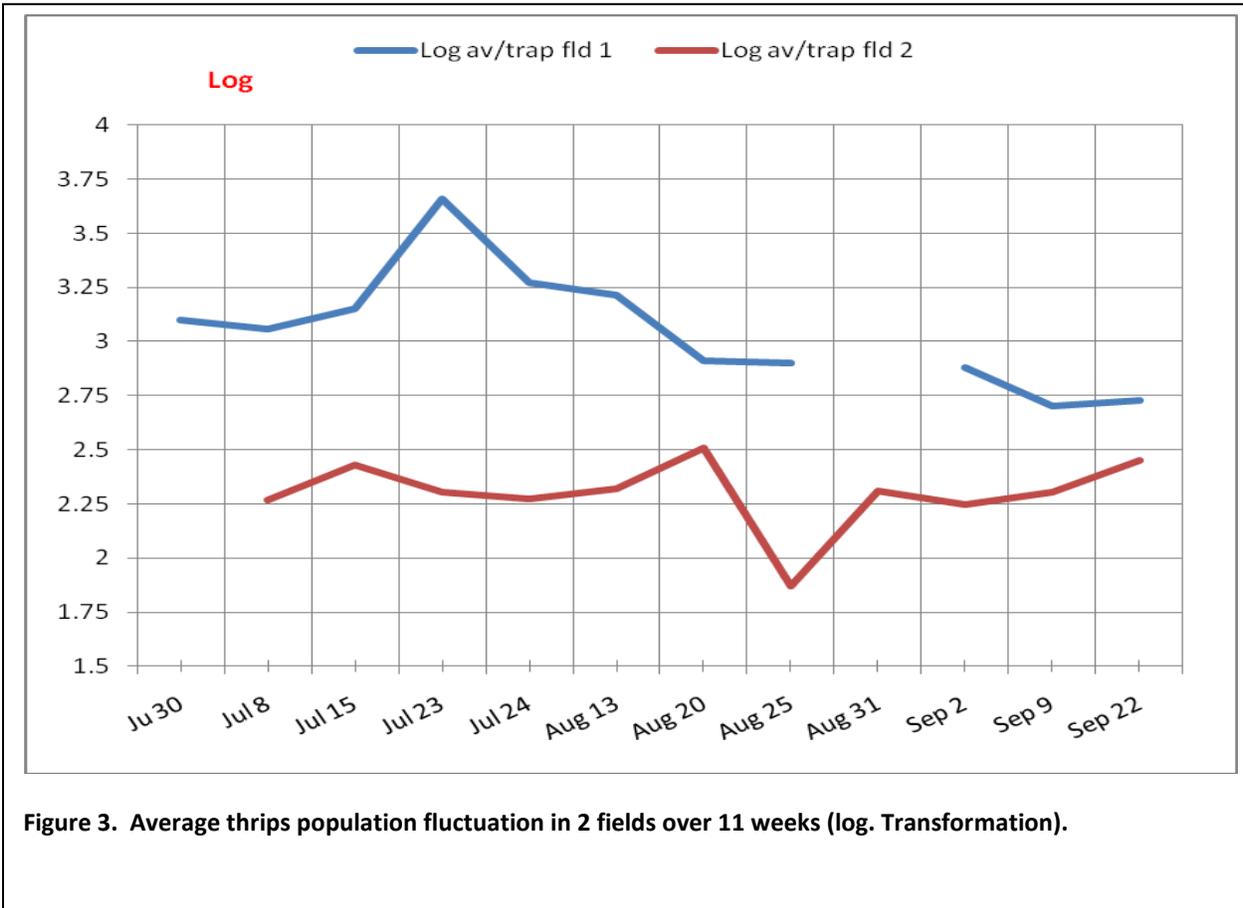
Sources of thrips in field 1, were opportunistic presence of weeds, especially flowering wild mustard, as well as other flowering trees, and bushes nearby. More over, the presence of creek and green vegetation and flowering in the early stages of pepper transplanting, serve as refuge and supply of flowers to attract and sustain thrips presence. This allows thrips to move into the field once pepper start flowering. High populations of thrips in field 2 were not directly correlated with TSWV presence in the field. A reverse relationship was detected in field 1 where lower thrips presence coincided with higher TSWV occurrence.

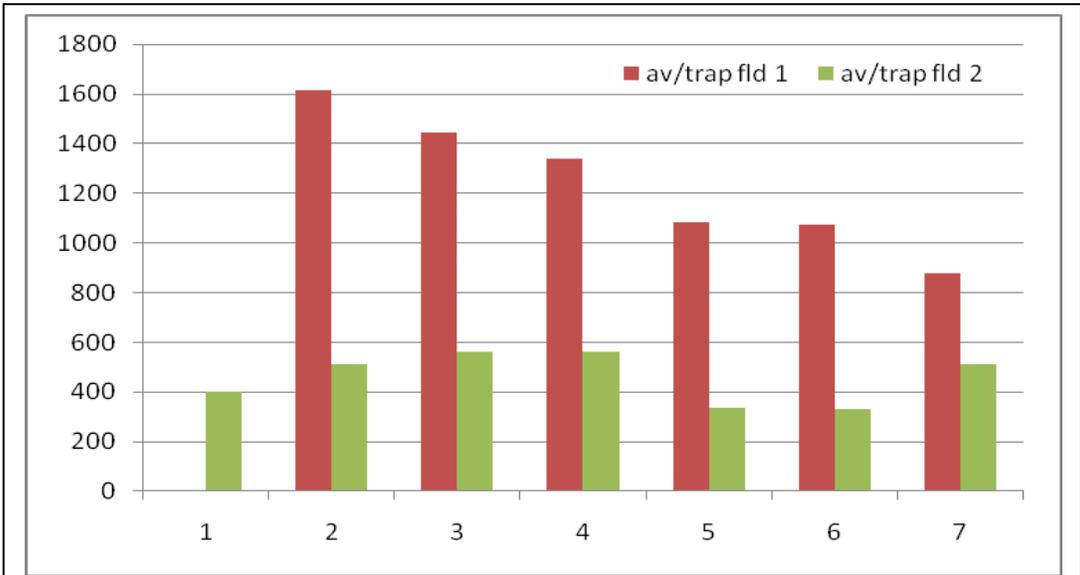
Neighboring greenhouses were less of threat to pepper fields than creeks side flowering weeds, trees and bushes.

Management strategies for pepper viruses (TSWV) need to take onto account virus vector sources in the surrounding fields. Suppression of these sources before pepper planting and flowering stage is of great value.

Trap data from this study showed no presence of aphids in the two monitored fields. It appears that aphid management has been successfully carried out by local growers. Aphids and resulting CMV were detected and identified in other fields and in the vicinity of uncontrolled growth of weeds in nearby creeks environment.

Appendices





**Figure 5. Comparison of traps by Field.**