Season Long Incidence of Pepper Weevil in Santa Clara and San Benito Counties

Elisa Mineo[1], Aparna Gazula[1], Shimat Joseph[2,3], and Richard Smith[2]

1. UCCE Santa Clara County, 1553 Berger Drive, San Jose, CA 95112, 2. UCCE Monterey County, 1432 Abbott Street, Salinas CA 93901,

3. Current address: Department of Entomology, University of Georgia, 1109 Experiment Street, Griffin, GA 30223.

Background

California is the leading bell pepper producer in the US, grown on 19,900 acres and valued about US$ 400 million in 2016 (USDA-NASS, 2016). The Santa Clara and San Benito counties are amongst the major pepper producing regions in California. Pepper weevils *(Anthonomus eugenii* Cano, Fig.1) are a serious threat to pepper production and can cause significant economic losses. This pest has been active in S. California for several years, but has recently been observed consistently in fields in Santa Clara and San Benito counties.

The pepper weevil feeds, develops and reproduces in nearly all the fruits and flowers of *Capsicum* family (peppers) (Fig. 2). Female weevils lay eggs in a cavity beneath the surface of flower buds or fruits. Generation time varies from 12 to 17 days at temperatures ranging from 23.9 to 30 °C [1]. The larval feeding and excrements that accumulate inside the fruits make the fruits unmarketable (Fig. 3). Also, adult and larval feeding cause premature fruit drop which severely reduces yields.

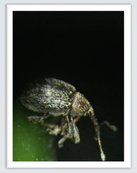

Figure 1: Adult pepper weevil. Size: 3mm

Figure 2: Larva feeding inside a pepper fruit

Figure 3: Decay and excrements in peppers

Objectives & Method

1) Determine the season-long incidence and abundance of pepper weevil in pepper fields of Santa Clara-San Benito counties.
2) Determine if pepper weevil elicit any preference to pepper type, planting date (early versus late) based on its natural infestation in the field.

Method

- Sixty fields were monitored from May to November in 2016 and 2017 in Santa Clara and San Benito counties.
- Six pheromone-baited yellow sticky traps were deployed on the perimeter of each field to detect weevil migration into the field.
- The height of the traps was adjusted with plant growth (Fig. 4).
- The traps were collected and replaced weekly.
- The traps were inspected for adult pepper weevils (Fig. 5).
- Fruits were randomly inspected for pepper weevil infestation.

Figure 4: Pheromone-baited yellow sticky trap in pepper field

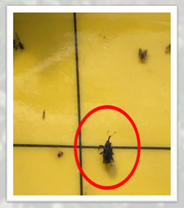

Figure 5: Adult weevil on trap

Results

- The infestation was more severe in 2017. In total, 1,106 and 3,100 adult weevils were captured in 2016 and 2017, respectively.
- The peak of pest infestation was later and lasted longer in 2017 (Fig. 6).
- In 2016 and 2017, planting date did not have a significant effect on the level of weevil infestation in fields (Fig. 6).
- In 2017, immature fruit drops were observed in several fields at the end of the season (Fig. 7).
- Several dropped fruits had weevil larvae at various stages, pupae, and adults (Fig. 8).

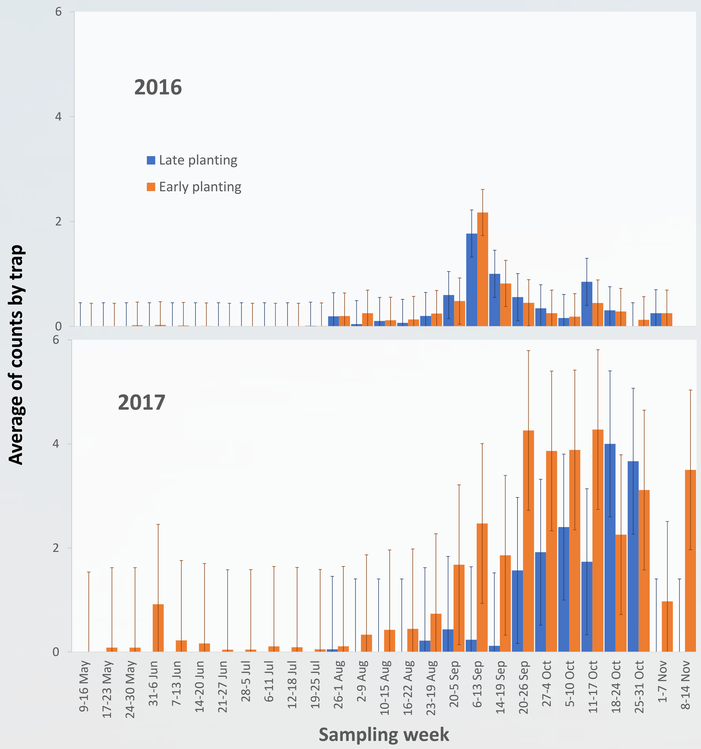

Figure 6: Seasonal levels of pepper weevil in Santa Clara and San Benito counties in 2016 and 2017

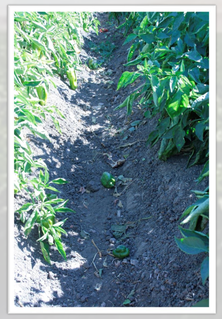

Figure 7: Dropped peppers in an infested field

Figure 8: Dropped fruit infested with weevil

Results (continued)

- In both 2016 and 2017, pepper type did not have a significant effect on the level of weevil infestation in the field (Fig. 9).

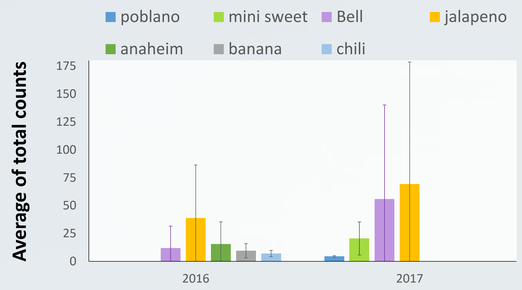

Figure 9: Weevil infestation in the bell, chili and mini sweet pepper types in 2016 and 2017

Discussion

Weevil management sprays kept infestation levels low until August after which levels started to increase. Rate of pepper weevil development increased with an increase in air temperatures. Monthly average temperatures in the Santa Clara production area are favorable for the development of the weevil from April to November (between 15 °C (59 °F) and 33 °C (91.4 °F) [2]). The increase in infestation levels in the last three months of the season can be partially explained by a decrease in insecticide use and an increase population size of pepper weevil. Analyzing pesticides used in this region over the last three years and mapping the changes would give information on the extent of the problem at a larger scale.

Conclusion

- Pepper weevil infestations in the region started in 2015 and their severity increased over the last two years.
- Growers should follow current UC IPM pepper weevil management guidelines [3] to limit infestations.
- Monitoring should be continued for another year to better understand the incidence of the pepper weevil in this region.

References

1. Addesso, K.M. 2007. Host location and utilization by the pepper weevil, *Anthonomus eugenii* CANO. Univ. of Florida, Gainesville, PhD Diss.
2. Toapanta, M.A., et al. 2005. Development and life history of *Anthonomus eugenii* (Coleoptera: Curculionidae) at constant temperatures. Environ. Entomol. 34(5): 999-1008.
3. UC IPM, 2012, http://ipm.ucanr.edu/

UC CE University of California Agriculture and Natural Resources Cooperative Extension