Threecornered Alfalfa Hopper (*Spissistilus festinus*) in Vineyards

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Seasonal Ecology of TCAH in North Coast Vineyards

A recent greenhouse study demonstrated that threecornered alfalfa hopper (TCAH) is a vector of grapevine red blotch virus (GRBV), although field transmission has not yet been confirmed. TCAH is typically found in low abundance in and around North Coast vineyards. Aside from potential activity as a vector, it is not considered a major pest of grapevines. TCAH reproduce primarily on legumes and is more commonly known as a pest of peanut, soybean and alfalfa. In vineyards, TCAH populations are typically associated with leguminous ground covers (clovers, vetches, bell beans, etc.) rather than grapevines. Although TCAH may feed and oviposit on some non-legumes (including grapevine), they need leguminous hosts to complete development from egg to adult and cannot complete development on grapevine[1-4].

Adult TCAH overwinter in protected areas in and around vineyards, and lay eggs on leguminous ground covers in Feb – Mar. Nymphs developing on leguminous hosts pass through five juvenile stages[5] and complete development at temperatures between 65-95°F. Nymphs can begin to develop above 55°F, so in warm springs first generation adults may be found as early as May[6]. As ground covers dry down in late spring/early summer and nymphs complete development, adult TCAH will opportunistically feed on grapevines. This feeding typically results in girdling damage to petioles, lateral shoots, or clusters (Fig. 2). Adults have been observed in vineyards until as late as leaf fall, after which overwintering adults seek shelter in protected areas near vineyards[7-9]. TCAH likely complete 1-2 generations per year under North Coast conditions, although occurrence of a second generation is dependent on climate and availability of food resources.

Generalized TCAH life cycle in the North Coast

Sep/Oct-Jan	Feb-Mar	Mar-early May	Jun-Sep	Leaf fall
Overwintering (Adult)	Egg laying	Nymph development	Migration to grapevines (Adult)	Overwintering (Adult)
Habitat includes leaf litter, bunch grasses, perennial shrubs	Eggs laid on leguminous ground covers	Eggs hatch and nymphs develop on leguminous hosts	Groundcovers dry down, driving adult TCAH into grapevines	Migration to overwintering habitat in & around vineyards

Monitoring groundcovers and vine canopy with sweep net and yellow sticky-traps

To establish whether TCAH is active in your vineyard, **sample ground covers** with a sweep net in the spring (Mar-May) by taking five sets of 30 sweeps using a 15" diameter sweep-net. And/or **sample the vine canopy** with yellow sticky-traps (YST) in June-September by placing five yellow-sticky traps (4x7 inch) in the lower canopy. Traps should be placed between nodes 2-5, positioned such that the bottom of the trap is above the fruiting cane or spur. All sampling should occur in areas broadly representative of the vineyard block. Conduct each sweep-net sample and/or place YSTs at least 100 feet apart. To properly identify TCAH, refer to the UC ANR handout: http://ucanr.edu/treehoppers

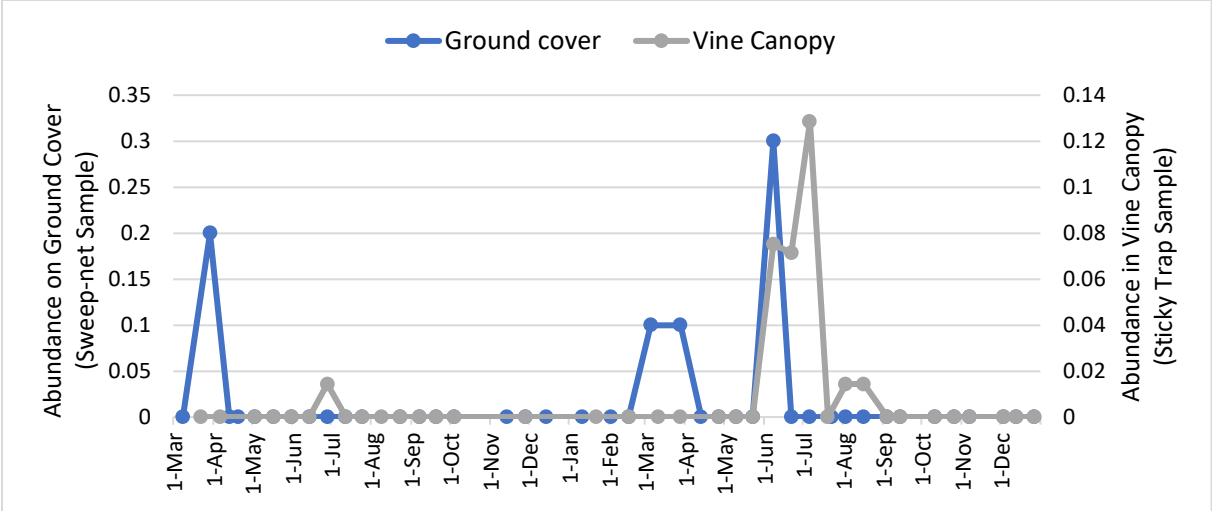
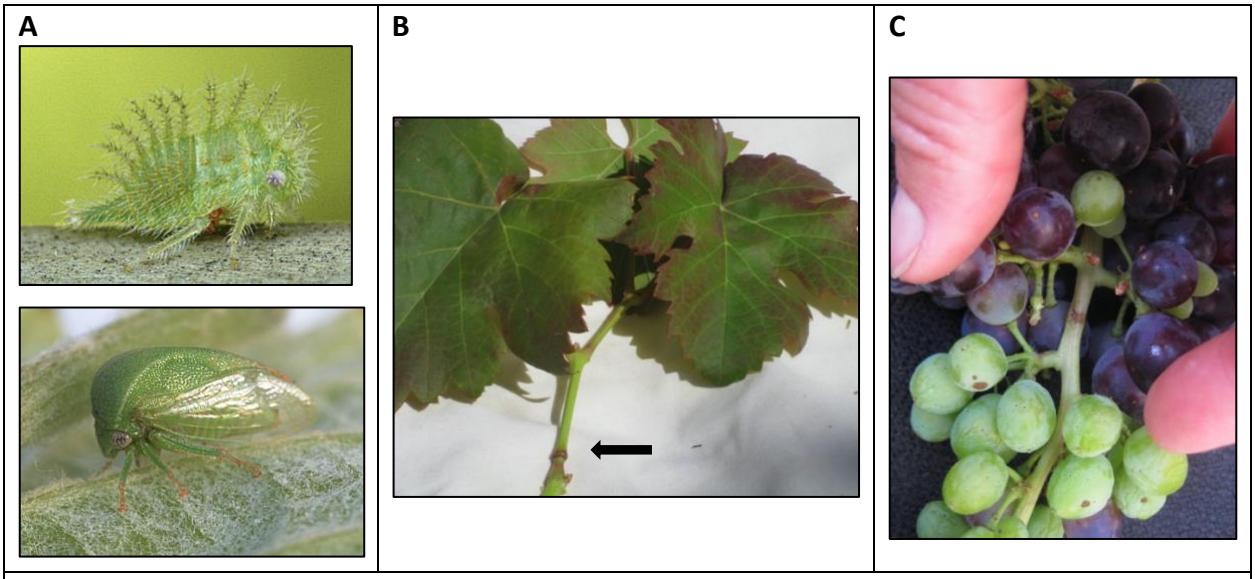


Figure 1. TCAH adults can be found on ground covers in Feb-Apr and late May (blue line) and in the vine canopy in Jun-Sep (grey line).

Management

Currently there are no thresholds or management recommendations for TCAH in vineyards, and it remains to be shown whether this insect transmits GRBV under field conditions. Regardless, TCAH monitoring (sweep & YST) combined with disease mapping can build a picture of annual changes in pest density and disease incidence within a vineyard block.



(A) Nymph (top) and adult (bottom) threecornered alfalfa hopper; (B) TCAH feeding results in characteristic girdling of lateral shoot, accompanied by reddened leaves distal to the girdle; (C) characteristic girdling damage to a rachis, resulting in uneven ripening. (nymph photo: Charles Lewallan)

References

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