

Evaluation of Odor Combinations for Attracting Plum Curculios to Trap Trees

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In the preceding article, we presented data showing that apple trees whose branches were baited with a combination of benzaldehyde (BEN) plus grandisoic acid (GA) functioned as “trap trees” for plum curculios (PCs). Adult PCs aggregated preferentially on such trap trees, thereby paving the way for growers and consultants to sample only trap trees (rather than additional other trees) for signs of fresh PC injury to fruit.

Here, we report results of a 2002 study in commercial apple orchards in which we evaluated several different odor combinations in association with trap trees to determine if there might be a more attractive combination than BEN plus GA. The rationale underlying this study lay in the proposition that the more attractive the odor bait, the more attractive the trap tree and hence the fewer number of trap trees needed to acquire an accurate assessment of the seasonal course of PC injury to fruit.

Materials & Methods

We established nine treatment types in each of 11 commercial apple orchards. These included BEN plus GA plus one of five other host-derived odor sources known from previous studies (Fruit Notes 2000) to be at least somewhat attractive to PCs: ethyl isovalerate, limonene, hexyl acetate, Z-3 hexenyl acetate and E-2-hexenal. Also included as treatments were BEN plus GA, GA alone, BEN alone, and no odor (control). As described in the preceding article, BEN was released from polyethylene vials at a rate of 40 mg per day per tree and GA at a rate of 1 mg per day per tree. The other five odor sources likewise were deployed in polyethylene vials and likewise released odor at a rate

of about 40 mg per day per tree. None of the vials were replaced except ones with limonene, where vials were renewed after 4 weeks. Dispensers of GA were replaced after 5 weeks.

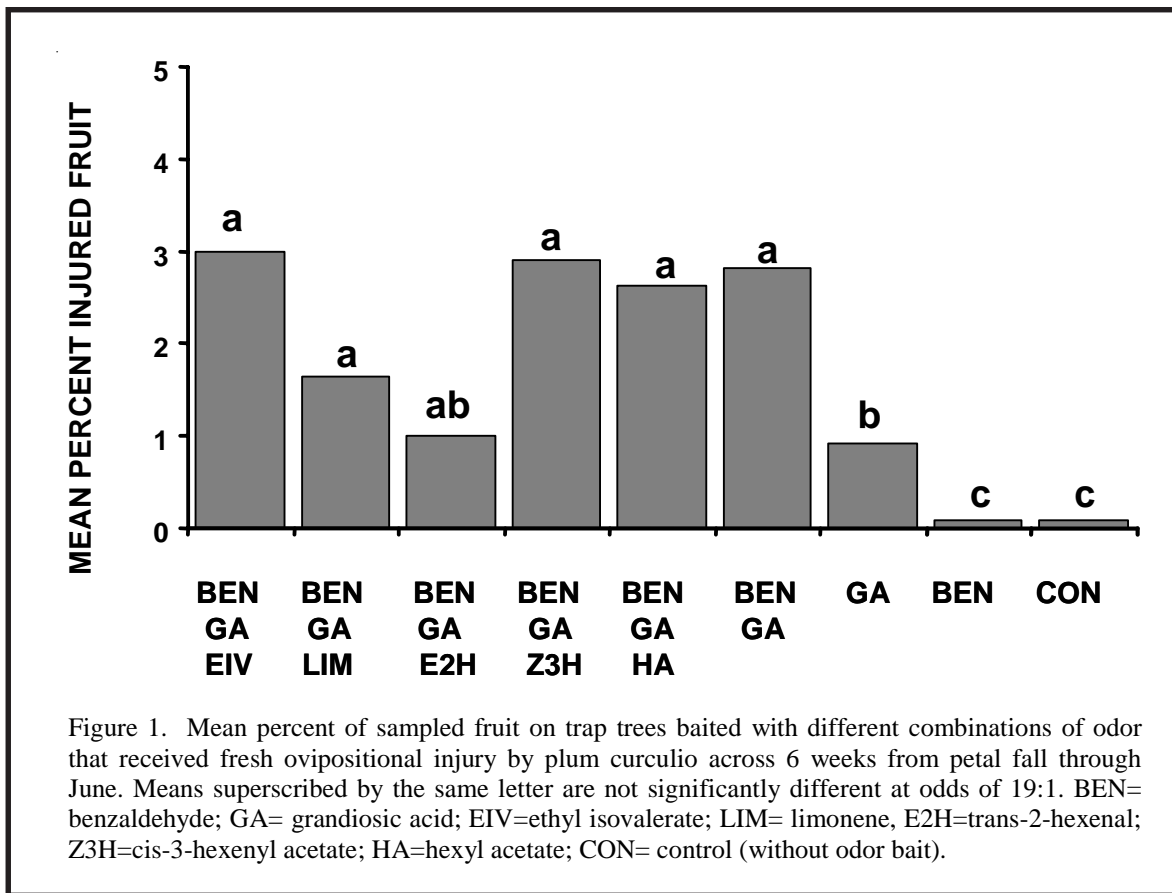
A continuous perimeter row of apple trees about 220 yards long was selected in each orchard. Treatment trees, all on the perimeter row, were about 30 yards apart in order to separate treatments. Odors were deployed on May 6-8 and remained until June 24-26. Weekly beginning at petal fall (May 13-15), 40 fruit were examined per tree for evidence of fresh PC egg-laying scars.

Results

Results (Figure 1) show that trees baited with BEN plus GA received significantly more fresh egg-laying injury than trees baited with GA alone, BEN alone or trees without odor bait. Addition of ethyl isovalerate, limonene, E-2-hexenal, Z-3-hexenyl acetate or hexyl acetate did not significantly enhance the attractiveness of BEN plus GA as an odor bait guiding PCs to trap trees. Trees baited with BEN plus GA received about 15 times more PC egg-laying scars than unbaited trees.

Conclusions

Our findings indicate that BEN plus GA represents a potent combination of attractive odors whose use, in both this study and the study reported in the preceding article, culminates in an aggregation of PC egg-laying injury about 15-fold greater than that which occurs on unbaited trees. Findings here further indicate that BEN plus GA represents a synergistic odor combination whose stimulating effects, as a combination,



substantially exceed the effects of adding PC response to BEN alone plus response GA alone. Finally, the findings here indicate that even though each of the other five fruit odor components has been found to be at least somewhat attractive when tested alone, none enhanced the potency of BEN plus GA when used in a blend.

Although use of trap trees baited with BEN plus GA appears to be a very promising new approach to monitoring PC, we can not yet recommend it for adoption by commercial growers until the following have been determined: (a) optimum amounts of BEN plus GA to deploy per trap tree, (b) optimum spacing of trap trees along perimeter rows, and (c) percent freshly damaged fruit on trap trees that would justify insecticide application to all peripheral-row trees. Also,

a commercial supplier of user-friendly BEN dispensers would have to come forward to complement the current commercial supplier of GA dispensers.

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