An Odor-baited "Trap-tree" Approach to Monitoring Plum Curculio

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As described in the preceding article, there are shortcomings associated with placement of plum curculio (PC) monitoring traps in commercial orchards for purposes of determining when a spray is needed to protect fruit against PC damage. Shortcomings are particularly evident during the middle and latter part of the PC season, when trap captures remain low irrespective of trap type or attractive odor, but damage increases. One of the principal shortcomings involves need for baiting traps with an increasing amount of synthetic attractive fruit odor as the PC season progresses in order that odor might compete effectively with the increasing amount of attractive odor emitted by developing fruit in the tree canopy. When used in association with traps, increasing amounts of synthetic fruit odor become repellent at close range.

One possible solution to this dilemma could be to create a "trap tree" where the tree canopy itself is baited with a high amount of attractive fruit odor. Rather than using amounts of PC's captured by traps as a potential but indirect indicator of level of PC egglaying activity, one would use amount of freshly injured fruit on the trap tree as a direct indicator. A few such trap trees per orchard could provide valuable information on sudden rises in PC damage and hence on the need to apply a protective spray. Placement of attractive odor directly on tree branches would eliminate problems of close-range repellency associated with placement of odor on or in traps.

In 2001, I conducted a preliminary trial of this new

Figure 1. Amount of fruit injured by plum curculio on baited perimeter-row trap trees and on unbaited trees midway between trap trees.

approach to monitoring PC's in a small block of apple trees in Clarkdale Fruit Farm in Deerfield.

Materials & Methods

The entire study was conducted along a 125-yard section of perimeter-row apple trees bordered by woods. The trees were mixed cultivars on M.26 rootstock. On May 2 (mid-pink), every sixth tree was baited with two dispensers of grandisoic acid (each releasing about 1 mg per day) and eight dispensers of benzaldehyde (each releasing about 10 mg per day). All dispensers were replaced with fresh ones on May 30.

One week after petal fall and weekly for 4 more weeks, 20 fruit were examined on each of the five trap trees and on each of four unbaited trees midway between trap trees. Fruit were counted as injured if a PC egglaying scar was evident. The trees received two applications of insecticide to control PC without use of fruit sampling information in guiding timing of spray.

Results

Figure 1 shows that fruit injury on the baited-trees averaged about eight times greater than on unbaited trees for samples taken at weeks 1 and 2 after petal fall and about five times greater than on unbaited trees for samples taken at weeks 3, 4, and 5 after petal fall. As the PC season progressed, some of the injured fruit on both types of trees fell to the ground, but total injury remained the same or increased owing to appearance of fresh injury.

Conclusions

The results of this preliminary test are very encouraging in that baiting perimeter-row trees with attractive odor acted to concentrate immigrating PC's on the "trap trees." Further research is necessary to optimize the composition and amount of attractive odor before this approach can be recommended for widespread use in monitoring PC's in commercial orchards. Conceivably, a few odor-baited "trap trees" along perimeter rows of an orchard might serve not only as focal trees for monitoring extent of fresh injury caused by PC but, if sufficiently attractive, might also serve to aggregate enough of the immigrating PC population to permit spraying only trap trees, allowing other trees to remain unsprayed against PC.

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