the varieties that they normally purchase. Planting and selling new apple varieties may be a unique opportunity for New England growers to increase apple sales in their retail stands.

Acknowledgements

The author is grateful to the Massachusetts Fruit Growers' Association for their support of the NE-183 research trials.

* * * * *

Penetration of Overwintered Plum Curculio into Commercial Apple Blocks of Differing Tree Size

Jaime Piñero, Isabel Jácome, Daniel Cooley, and Ronald Prokopy
Department of Plant, Soil, & Insect Science, University of Massachusetts

To confirm findings from our 2003 Hatch-funded studies, in 2004 we continued to study the extent to which overwintered plum curculio (PC) adults penetrate into interior rows of sprayed sections of commercial apple orchards before petal fall. In 2004, however, we were also interested in determining the influence of tree size on the outcome. In 2004, 160 Circle traps, made of aluminum screen with a PC-capturing device integrated on top, were used for this study. For each of the 12 blocks used, 20 Circle traps, distributed in four transects of five traps each, were deployed on perimeter-row and interior-row trees. One block was located at the UMass Cold Spring Orchard Research & Education Center (CSOREC). Figure 1 shows that, by petal fall, for blocks having large trees (M.7 rootstock) most PCs were found on perimeter-row trees compared to interior-row trees; however, PCs were more likely to be found inside orchard blocks rather on perimeter-row trees if trees were small in size (M.9 rootstock). Regardless of tree size, at least a few PCs were found up to 40 m inside of blocks.

Our second study, conducted in two unsprayed sections of the UMass Cold Spring Orchard, sought to quantify the extent to which PCs are able to overwinter beneath perimeter-row trees, with respect to type of

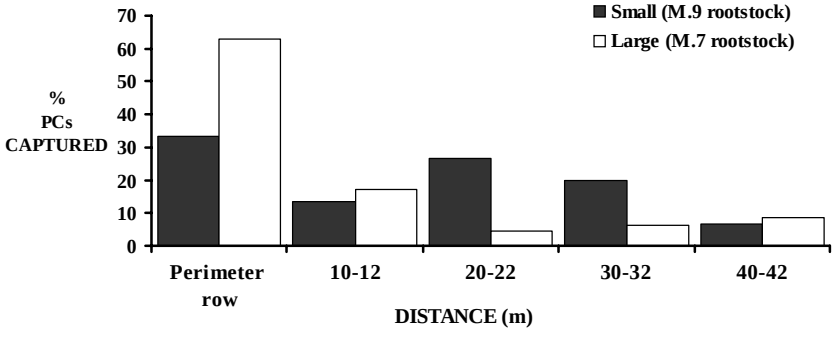

Figure 1. Effects of tree size on penetration of plum curculio into orchard blocks by petal fall.

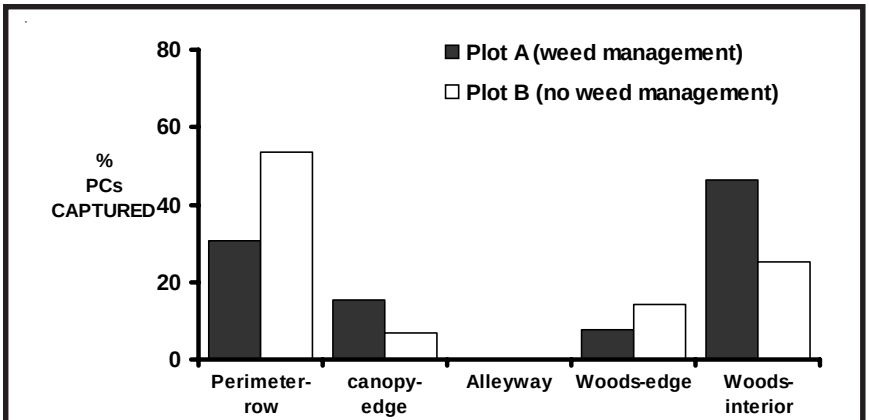

Figure 2. Effects of weed management approach on overwintering plum curculios.

weed control. One of the plots used was subjected to weed management by application of herbicide and mechanical removal of weeds, whereas the second plot was unmanaged (i.e., there was tall grass and other vegetation growing beneath tree canopies). As in 2003, our approach involved placement of 60 emergence traps (1m x 1m) per plot to capture PCs that had overwintered within the area covered by each trap. Traps were arranged in 12 transects of five traps each. We determined that, under Massachusetts conditions, adult PCs not only were capable of overwintering inside orchard blocks in substantial numbers, but also the amount of overwintering beneath perimeter-row trees was higher in the plot that remained weedy than in the plot subjected to weed management (Figure 2).

Our 2004 results, when combined with our 2003 findings, reveal that presence of PCs within orchard blocks can be explained by both successful overwintering as well as by penetration of adults into interior trees, in particular if trees are small in size. These findings suggest that more injury by PC can be expected in interior-row in those orchard blocks having small trees.

Acknowledgements

We thank Joseph Sincuk, Marina Blanco, and Paul Appleton for technical assistance. This work was funded by Hatch Grant: Toward Bio-based Management of Key Apple Pests, MAS00838 0186529, R. J. Prokopy, 10/1/2000 to 9/30/2005.

* * * * *