Response of Adult Pear Psylla to Plant-Derived Volatiles

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Pear psylla is a major pest of pear trees. They secrete large amounts of honeydew which grows a black fungus, making the fruit unmarketable. When this pest is present in high enough densities it can lead to additional types of damage such as tree stunting or reduced fruit size. Due to the fact that they are widely distributed and have overlapping generations, pear psylla can be hard to control. Typically this pest has typically been controlled with oil sprays and conventional insecticides (like pyrethroids). While pesticides can provide good control, pear psylla has developed resistance to some key chemistries and the potential future loss of some chemistries due to insecticide resistance is always a concern.

One of the cornerstones of IPM is pest monitoring. Current pear psylla monitoring recommendations include the use of an 18-inch-square tray with a white cloth cover one foot below a 0.75 to 1.5-inch diameter limb (Washington State University). Growers need to tap the limb firmly three times with a stiff rubber hose. Then, the adults jarred from the limb onto the tray are counted. Thirty trays at random through the sampling area is standard for a pear block of ten to twenty acres. Monitoring options for pear psylla that make use of attractants are not available.

Here, we sought to investigate the attractiveness of benzaldehyde and methyl salicylate (common name: wintergreen oil) to overwintered and summer-generation pear psylla adults. These two plant-derived volatiles have previously been evaluated by UMass researchers over multiple years as attractants for plum curculio.

Materials and Methods

The field studies were conducted in 2023 at two commercial fruit farms that have pear blocks, Bashista Orchards (Southampton, MA), and Park Hill Orchard (Easthampton, MA). The trees at Park Hill Orchard were about 8-10 feet tall, with relatively more dense branches whereas Bashista has a mix of trees ranging from 5 feet to 9 feet tall.

For the evaluations, we used experimental formulations of benzaldehyde and wintergreen oil, both manufactured by Trécé Inc. (Adair, OK). The lures were attached to white sticky cards using binder clips. Unbaited sticky cards were used as a control. All white sticky cards were stapled horizontally to branches located from knee to chest height, along the perimeter of the blocks. Each treatment was replicated 5 times at Bashista and 6 times at Park Hill.

At Bashista, traps were deployed on 5 April whereas at Park Hill traps were installed on 10 May. All traps were inspected once a week, and the pear psylla (adults and nymphs) captured were counted and removed from the traps. The results are being presented according to month: April-June for Bashista, and May-June for Park Hill.

Results

As shown in figure 1, during the month of April at Bashista (the only location evaluated during April), white traps with methyl salicylate captured nearly twice as many overwintered pear psylla adults as did benzaldehyde-baited traps, and nearly three times the number of pear psylla adults recorded in unbaited traps. While the samples were not statistically different due to high variability among samples, the trend was toward increased pear psylla captures in methyl salicylate-baited traps.

During the month of May, a period in which pear psylla captures decreased substantially due to gradual

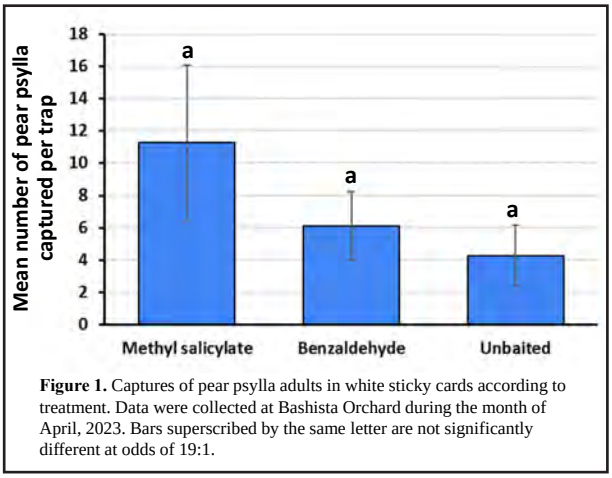

Figure 1. Captures of pear psylla adults in white sticky cards according to treatment. Data were collected at Bashista Orchard during the month of April, 2023. Bars superscribed by the same letter are not significantly different at odds of 19:1.

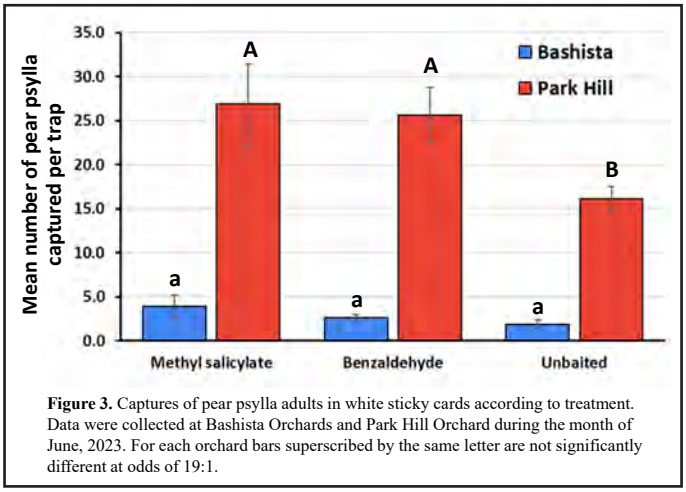

Figure 3. Captures of pear psylla adults in white sticky cards according to treatment. Data were collected at Bashista Orchards and Park Hill Orchard during the month of June, 2023. For each orchard bars superscribed by the same letter are not significantly different at odds of 19:1.

elimination of the overwintered adults, methyl salicylate clearly showed to be attractive to pear psylla when compared to unbaited traps at Bashista (Fig. 2). Benzaldehyde showed to be as attractive to pear psylla adults as methyl salicylate at Park Hill but not at Bashista.

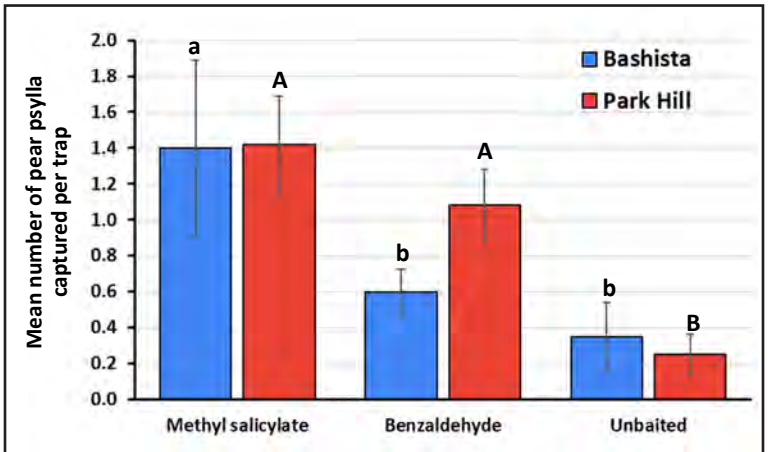

Figure 2. Captures of pear psylla adults in white sticky cards according to treatment. Data were collected at Bashista Orchards and Park Hill Orchard during the month of May, 2023. For each orchard bars superscribed by the same letter are not significantly different at odds of 19:1.

Figure 3 shows trap captures during the month of June, when the summer-generation adults were developing. At Park Hill, both benzaldehyde and methyl salicylate were attractive to pear psylla when compared to unbaited traps. At Bashista, no statistically significant differences were noted between baited and unbaited traps (Fig. 3).

Conclusions

Overall, methyl salicylate seemed to perform better than benzaldehyde in attracting pear psylla to white sticky cards. Further field research ought to be conducted at multiple orchards to validate our findings, before firm recommendations could be made to growers.

Acknowledgments

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