Effectiveness of the Insecticides Verdepryn and Avaunt at Controlling Plum Curculio in Apple Orchards in Massachusetts and Rhode Island

Jaime C. Piñero, Prabina Regmi, Dorna Saadat, Ajay Giri, Jaelyn Kassoy, and Shawn McIntire
University of Massachusetts Amherst

Heather Faubert
University of Rhode Island

In eastern North America, most apple growers consider plum curculio as one of the most difficult insect pests to control. While there are many insecticides available for plum curculio control, their performance characteristics vary greatly compared to our traditional broad-spectrum chemistries. Conventional insecticides, such as organophosphates (active ingredient: Phosmet, IRC group 1B) work primarily as lethal contact poisons on plum curculio adults in the tree canopy. Imidan, a contact organophosphate, has been used for many years to kill plum curculios at petal fall. Other materials such as Avaunt (active ingredient: Indoxacarb, IRAC group 22) also work primarily by lethal activity, but ingestion is an important means for delivering the poison.

To manage plum curculio and other pests such as codling moth simultaneously, insecticides that contain active ingredients effective against multiple insects are critical. Diamide insecticides such as Exirel (active ingredient: cyantraniliprole, IRAC group 28) have been shown to provide fair to good plum curculio control, but ingestion by plum curculio adults is important for optimal insecticide performance. Verdepryn (active ingredient: Cyclaniliprole, IRAC group 28) is a new insecticide registered for use on several crops including pome fruit, grape, berries, and small fruit. It was registered in late 2019 and available for use starting in 2020. In pome fruit, Verdepryn is registered for control of a variety of insects, including lepidopteran pests, plum curculio, and for suppression of thrips, apple maggot, and stink bugs. More information on other insects and recommended use for certain species can be found on the label. Limited information is available on the effectiveness of this material at controlling plum curculio, particularly in New England apple orchards.

Here, we compared the performance of Verdepryn against that of Avaunt at controlling plum curculio at petal fall at the UMass Cold Spring Orchard. In addition, we report the effectiveness of Verdepryn applied against this pest in one commercial apple orchard in Rhode Island.

Materials & Methods

Study sites. This study took place at the University of Massachusetts Cold Spring Orchard (CSO), in Belchertown, MA, from 17-28 May, 2021. In advance of the insecticide sprays, multiple apple blocks comprising largely the cultivars McIntosh, Paula Red, Empire, Fuji, Golden Delicious, and Cortland, among others, were randomly assigned treatments using colored ribbon. In all, 22.8 acres were sprayed (14.9 acres received Avaunt [rate: 6 oz/A], and 7.9 acres received Verdepryn [rate: 11 oz/A). All blocks were sprayed on 17 May, 2021. The insecticide applications were made at a tractor speed of 2.5 mph at 100 gallons per acre. The block with alternate applications of Verdepryn and Avaunt were made spraying half of the rows so that both materials were represented similarly for habitat facing perimeter-row trees. Except for one block that received split-row applications of Avaunt and Verdepryn, blocks received a single material.

A second study took place at Rocky Brook Or-

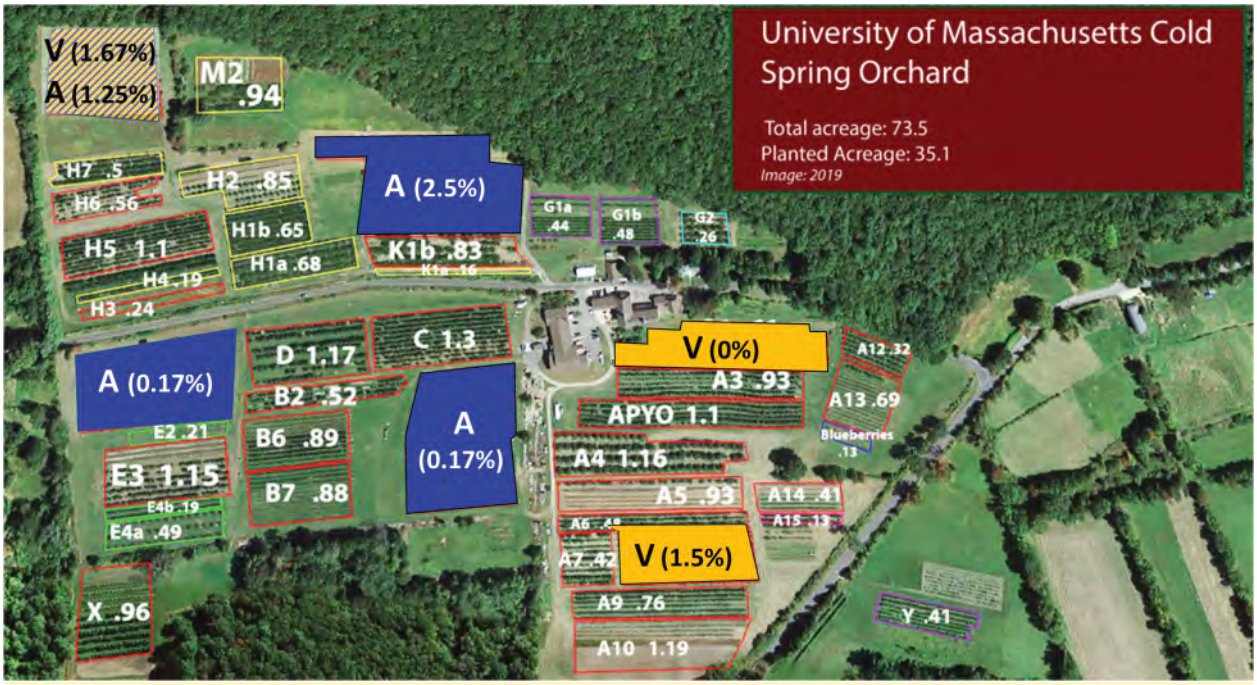


Figure 1. Partial view of the UMass Cold Spring Orchard showing the six sampled blocks. Blue boxes: Avaunt application. Yellow boxes: Verdepryn application. One block (shown on the top left using alternating diagonal stripes) received a split-row application of each material. Numbers in parenthesis indicate percent fruit injury by plum curculio in that block. Most of the other blocks were sprayed with either, Verdepryn or Avaunt, but they were not included in the fruit sampling,

chard in Middletown, RI. On May 22, 2021, Verdepryn was applied (rate: 8.5 oz/A) to apple trees (4.5 acres) at petal fall, targeting plum curculio. Pears (0.5 acres) were also sprayed against plum curculio, but infestation data were not recorded. Insecticide application was done using grower practices.

Fruit sampling. At CSO, non-destructive fruit sampling was conducted on May 28. For the sampling, we selected six representative blocks (2 for Verdepryn-only, 3 for Avaunt-only, and 1 for the split-row application of Verdepryn and Avaunt). Figure 1 shows the sampled blocks. A group of four people who received training on plum curculio injury assessment inspected 30 fruits for each of 20 trees throughout the block, for a total of 600 fruit sampled per block. In all 4,200 individual fruits were inspected for plum curculio damage in the six blocks. Results are presented as the percentage of sampled fruit that had plum curculio injury.

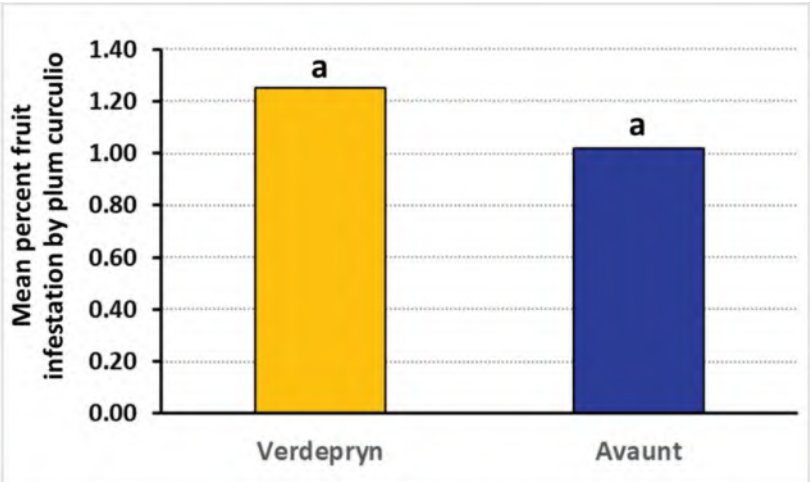


Figure 2. Across six sampled blocks at the UMass CSO, average level of plum curculio injury to sampled fruit according to insecticide type. Same letters above bars denote lack of statistically significant differences between treatments at odds of 19:1.

At Rocky Brook Orchard, fruit sampling was conducted on June 1, 2021. Because this orchard has over

80 apple cultivars, we focused on early- and mid-season ripening cultivars. For each of 25 trees, 30 fruits per tree were visually inspected for plum curculio injury. In all, 750 fruits were visually inspected.

Results

Cold Spring Orchard. Figure 1 shows the level of plum curculio injury on each of the six blocks that were sampled. Block-wide infestation levels ranged from 0% to 2.5%. Overall, the average level of injury recorded in blocks receiving a single application of Verdepryn (1.25% on average) at petal fall did not differ significantly from that recorded in blocks that received Avaunt (1.02% on average) (Figure 2). In the block that received split-row applications of either product (box with alternating diagonal stripes in Figure 1), sampled apple fruit in the area sprayed with Verdepryn received 1.67% injury whereas the level of injury by plum curculio recorded in the area that received Avaunt was 1.25%.

Rocky Brook Orchard. At this orchard, only one material (Verdepryn) was applied against plum curculio at petal fall. The level of injury recorded in the June 1 sampling was 0.26%, which means that nearly three apples per 1,000 showed plum curculio injury.

Conclusions

The results from this study indicated that Verdepryn is as effective at controlling plum curculio as Avaunt, when applied at petal fall. This study involved a single petal fall insecticide application instead of a season-long management program for plum curculio. Since according to the label the maximum number of applications of Verdepryn allowed is 3, then growers could accommodate one spray of Verdepryn against plum curculio and then the product would still be available against codling moth or other pests.

Acknowledgments

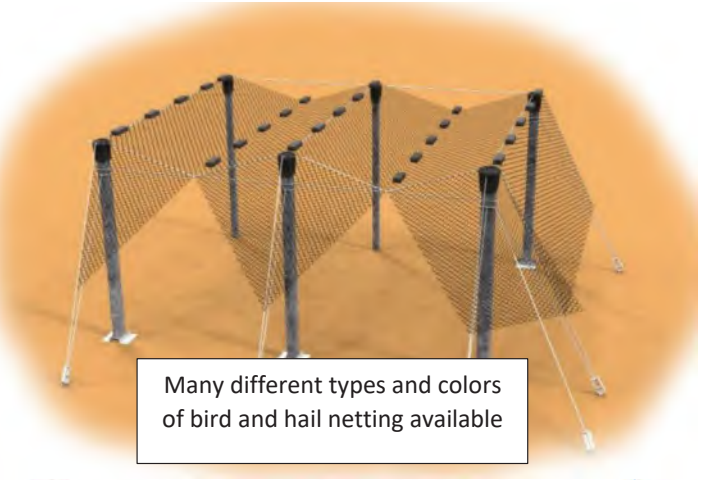
We thank Greg Ostheimer for allowing us to survey plum curculio at Rocky Brook Orchard. Dr. Eric Tedford (SummitAgro, USA) provided Verdepryn for the evaluations. Funding for this research was provided by the UMass Stockbridge School of Agriculture. We also gratefully acknowledge the support of the Center for Agriculture, Food, & the Environment Summer Scholars Program.

Brookdale Farm Supplies is pleased to announce distribution agreement with Valente corporation in the United States for apple and grape trellising systems

A competitive alternative to wood trellis systems

VALENTE
TECHNICAL SOLUTIONS FOR VINEYARDS AND ORCHARDS

Valente's concrete posts are prestressed reinforced posts that are trapezoidal shape with four smooth sides and no edges. This prevents wear on hail netting or other coverings. The Valente trellis system can be done three different ways; standard trellis support, tall trellis support for future installation of netting or the tall trellis with hail netting included. Many different types and colors of hail netting, as well as bird netting, available. 2.5 acres of apples at 12' row spacing fits in an overseas container. Container loads are delivered directly to your farm. Note: posts need to be vibrated in. Please contact us for information and a free estimate with trellis model.



Many different types and colors of bird and hail netting available

TORO Ag Irrigation

Toro's Blueline PC is a heavy wall drip tubing with pressure compensating integrated drippers that lasts 25 plus years. Designed for perennial crops such as apples, peaches, and blueberries; Blueline PC has an emitter built inside the tube. The flow path technology in the PC dripper uses a shark tooth design providing a turbulent flow path that is independent from the wall of the tubing. That flow path, along with the self-flushing diaphragm allows for a dripper system that is very resistant to clogging. This produces a uniformly watered field for a long duration of time.

BlueLine® PC
Premium Pressure Compensating Dripline

Brookdale Farm Supplies

38 Broad Street
Hollis, NH 03049
603-465-2240
tractortrv@aol.com
www.brookdalefruitfarm.com