

Systemic Trials for Root Weevil on Blueberry and Strawberry, 2008

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Greenhouse trial.

Bayer Environmental Science's landscape insecticides shown in Table 1 were tested for root weevil adult and larval control on blueberry and strawberry. Two-year old 'Duke' blueberry (Fig. 1) and one-year old 'Totem' strawberry were used as examples of a woody landscape shrub and ornamental plant, respectively. Both of these plants are known to be preferred host plants of the rough strawberry root weevil, *Otiorhynchus rugosostriatus*. Damage by adults is characterized by notches along the margin of leaves while the subterranean larvae kills woody ornamentals by girdling roots, stems or grazing the rootlets of ornamental plants or groundcover species.

Table 1. Treatments for blueberry (3 gal) and strawberry (1 gal).

1. CoreTect FXT (imidacloprid) @ 1 tablet in transplant hole (pink tag)
2. CoreTect FXT (imidacloprid) @ 2 tablets in transplant hole (red)
3. Merit 2F in transplant hole 0.2 fl oz/ft shrub height (yellow)
4. Merit 2F drench (0.2 fl oz/ft (6 ml/foot shrub height) as drench post plant (blue)
5. Allectus SC at (0.9 fl oz/ft), drench (orange)
6. Movento (BY108330) @ 4 fl oz/100 gal, drench (yellow-green)
7. Movento (BY108330) @ 8 fl oz/100 gal, drench (green)
8. UTC (white)

Five blueberry and 5 strawberry plants were used for each treatment. Blueberries were replanted and treated with CoreTect tablets on 31 July 2008 (Fig. 2) and all drench treatments applied in 32 fl oz water after planting. Strawberries were replanted and treated with CoreTect tablets and Merit 2F drench in planting hole on 28 August, 2008. Post plant drenches on strawberry were applied on 4 September in 32 fl. oz of water. Five identically treated plants of strawberry and blueberry were placed together in 4 foot diameter wading pools, lined along the upper 2-3 inches of the pool's rim with fluon (Fig. 3). Twenty-five or more field collected rough strawberry root weevils and black vine weevils, *O. sulcatus* at 5:1 were released in each pool arena on 28 August with the expectation that these females would seek ovipositional sites in the soil-plant medium of

each plant species. Strawberry planting medium consisted of ½ field soil and ½ Sunshine Mix #1; whereas the blueberry medium consisted of Sunshine Mix #1 for the bottom of the 3 gallon pots and peat placed on top and sides of the plant ball.

During late winter or early spring, plants will be destructively sampled for presence or absence of root weevil larvae or pupae and compared with the untreated checks in March, 2009. A visual check of adult foliage feeding/notching on leaf margins revealed feeding damage only on the untreated check blueberry and strawberry plants on 19 September 2008 (Figs. 4-5).

Leaf bioassay.

Five field collected rough strawberry root weevil adults were placed in 5 inch diameter disposable Petri dishes on 12 September. Each dish contained a three-leaf terminal from a blueberry plant treated with 2 CoreTect™ tablets, Allectus, high rate of Movento and untreated check at 43 DAT. After 3 days of feeding, CoreTect and Allectus showed 5 moribund adults while Movento showed 2 dead and 3 moribund and 5 alive on the untreated foliage. At 7 DAT, all adult weevils were found dead in all 3 treatments compared with 100% alive in the untreated check. Foliar feeding was very light for both imidacloprid products, moderate ingestion for spirotetramat treated foliage and very heavy for the untreated check. The systemicity of the imidacloprid and new



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4. Feeding notches, strawberry.



Fig. 5. Feeding notches, blueberry.

systemic foliar insecticide, Movento, is very impressive, especially used as a posttreatment drench for the woody blueberry plant (Figs. 6-9).

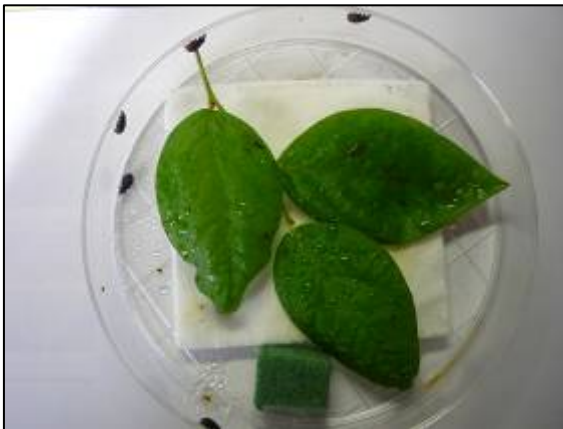


Fig. 6. CoreTect™



Fig. 7. Allectus



Fig. 8. Spirotetramat



Fig. 9. UTC

Results.

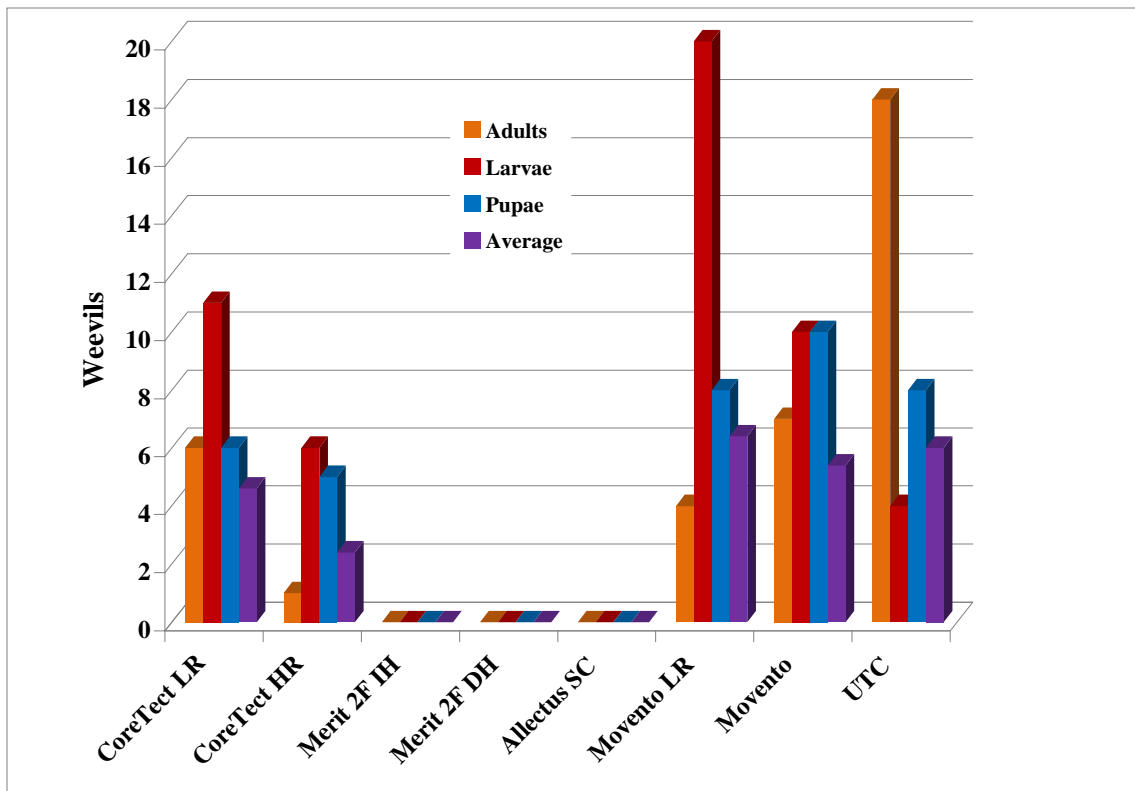
Blueberry. The forty ‘Duke’ blueberries planted on 31 July, 2008 were removed from their 5 gallon pots and their roots and potting mixture examined for root weevil larvae and pupae from 9 to 17 March 2008 (Fig. 10). Figure 11 presents mean data for adults, pupae, larvae, and average life stages per pot for each of the treatments. Drench



Fig. 10

treatments of Merit 2F (imidacloprid) and Allectus SC (imidacloprid + bifenthrin) resulted in root weevil free blueberries, though 1 and 10 adults were found in the respective wading pool arenas. Merit applied as a transplant treatment resulted in comparable results with the two drench applications of imidacloprid other than the unexplained reason for and average of 3 adult root weevils per pot. The average of 4.5 adults root weevils in the untreated checks suggests that all of the root weevils counted probably were surviving, overwintered adults from the original introductions the preceding fall. For the 2nd year blueberry, the 2 tablets of CoreTect probably were not adequate for significant root uptake and root protection from developing larvae beginning in late fall and through the winter months. Both rates of Movento were equally non-toxic to chewing root weevil larvae as expected.

Fig. 11.



Strawberry. Forty ‘Totem’ strawberries replanted on 28 August 2008 were removed from their 1-gallon pots and examined along with their potting media for the presence of root weevil life stages from 26 February to 4 March 2009. Figure 12 shows the number of developing larvae and pupae after being overwintered in a greenhouse maintained over the past 7 months at 45 °F at night and 55-60 °F during the day. The results rendered for a perennial ornamental type plant were very similar to those observed in Figure 11 for a landscape woody ornamental shrub. Drench applications of Merit 2F and Allectus SC were significantly different from the untreated check. For this trial, Merit, when applied as a transplant application seemingly was not readily translocated to the strawberry root hairs in significant levels to provide protection from root weevil browsing. The average number of live immatures was comparable with results obtained from both rates of CoreTect and low rate of Movento. Under the conditions of this study, average immature mortality for the high rate of Movento was intermediate to all of the treatments. The untreated check provided another indicator that our system, after two mistrials, was a valid indicator of natural oviposition and development of a greenhouse generation of mostly black vine weevils.

Figure 12.

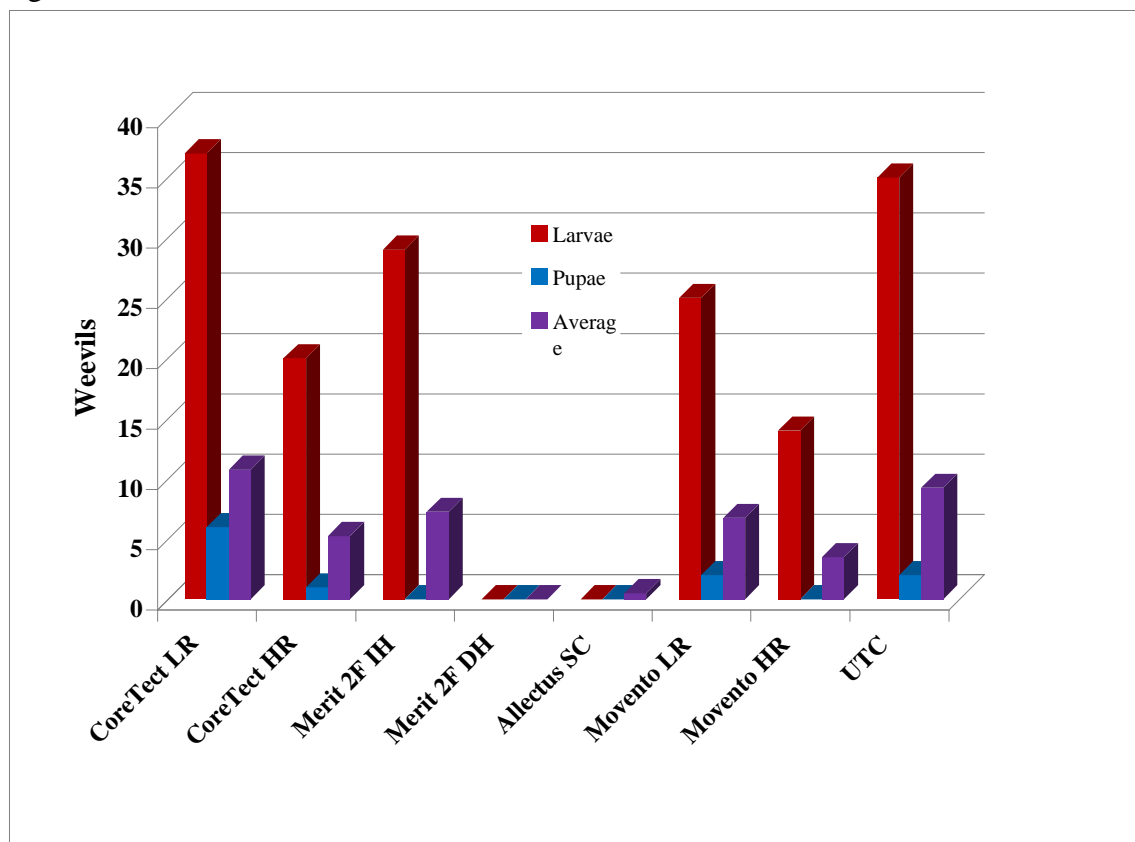


Figure 13 compares typical root feeding injury for all of the treatments compared with the untreated check shown by the white tag. Note the excellent root hair development for Merit drench (blue), Allectus drench (orange) and even for the 2 tablet rate of CoreTect

(Fig. 14-15) which shows some compensatory affect from its 80% blend of nutrients and inerts (Fig. 16).

Fig. 13.



Fig. 14. Shows remnants of the CoreTect tablet's outer wall.



Fig. 15. Excellent root formation in the Merit 2F drench treatment at 0.2 fl oz/ft.



Fig. 16. Overview of typical strawberry foliage growth between the 8 treatment regimens.

