Strawberry Rootworm Biology and Control

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Nature of Work: The strawberry rootworm (SRW), *Paria fragariae* Wilcox (Coleoptera: Chrysomelidae), is proving to be a threat to profitable azalea production. Stephenson (1983) reported an outbreak of the strawberry rootworm in container-produced azaleas in 1982. However, only in the past several years have reports of damage by this pest become widespread in azalea production within the Southeast. This nocturnal beetle damages plants by feeding on the foliage. Symptoms of an infestation are small circular to elongated feeding holes in the foliage generally not more than 1/16 inch in diameter or width. The beetles are a little over 1/8 inch long, oval, and shiny dark brown with four black markings on their wings. During the day, beetles hide within foliage or in plant debris at the base of the plant. They can be found by vigorously shaking infested plants over a clean ground cover or by striking infested plants with a blunt instrument over a net, such as a sweep net, and collecting plant debris and beetles. Initially, dislodged beetles will stop moving (i.e., play dead), but within a minute the dislodged beetles will scurry or fly for cover.

The majority of information about the life history of this insect has been collected in strawberry production (Smith and Kido 1949, Bennett and Fulton 1953). However, some of the earliest literature describes it as a pest of greenhouse grown roses (Weigel 1926). The life history information from these authors can be summarized as follows: 1) the adult beetles feed on warm days periodically throughout the winter, 2) adult beetles emerge from hibernation in mild climates from early February to early March and begin laying eggs approximately one month after spring emergence, 3) eggs are laid in the lower canopy or in media and debris at the base of the plant, 4) larvae (tiny white grubs up to 1/5 inch long) burrow into the soil (media) and feed on root tissue, and 5) beetles can complete their life cycle (egg to adult) in about 41 days at 85ºF and 82 days at 70ºF.

Results and Discussion: Current research at the Alabama Ornamental Horticulture Research Center, Mobile, AL and the USDA, ARS Small Fruit Research Station, Poplarville, MS is looking at the biology and control of the SRW in ornamental container production. This research shows some discrepancies with earlier work on SRW biology suggesting that the beetle infesting plants in nursery production may be a different species than the one described in earlier papers. While Smith and Kido (1949) report that SRW populations consist only of females, current work has observed male and female insects mating. Also, SRW is reported to have a single generation per year or possibly a partial second generation (Smith and Kido 1949, Bennett and Fulton 1953), but current studies have found evidence of up to four generations per year in the gulf-states region. The SRW completes its life cycle in containerized evergreen azaleas; that is, all life stages (egg, larvae, pupae and adult) can be

found thriving in infested azalea plants, and the insects do not need another host plant or environment to complete their life cycle. Virginia sweetspire (*Itea virginica* L.) is another acceptable host that can suffer considerable damage by the SRW. Even though SRW larvae can be observed in heavily infested azaleas, the larvae do not appear to exist in high enough numbers in the media to inflict serious plant damage. Monitoring SRW adult beetles can be accomplished by placing a sweep net under infested foliage and knocking or sweeping beetles into that net with a sturdy blunt instrument.

Studies regarding pesticide efficacy for control of SRW are ongoing at the Ornamental Horticulture Research Center, Mobile, Alabama. In a greenhouse spray trial conducted last year, the insecticides Talstar N (active ingredient [a.i.] bifenthrin at 7.5 fl oz Talstar N / 100 gal), Conserve SC (a.i. spinosad at 6 fl oz Conserve SC/ 100 gal), DuraGuard ME (a.i. chlorpyrifos at 50 fl oz DuraGurard ME/ 100 gal), Orthene 97 (a.i. acephate at16 oz Orthene 97/ 100 gal), and Sevin 80 WSP (a.i. carbaryl at10 oz Seven 80 WSP/ 100 gal) were tested. Among these pesticides, Sevin 80 WSP and DuraGuard ME were the most effective materials. DuraGuard ME provided at least some residual control three weeks after the initial treatment. A shorter residual control in outdoor container nursery production would be expected, because this trial was conducted in the greenhouse with hand watering. Stephenson (1983) reported that sprays of chlorpyrifos, bendiocarb, carbaryl, and acephate all reduced SRW populations by more than 85%. Collins (2002) reported that SpinTor 2 SC (a.i. spinosad) was effective for controlling SRW in blueberries. In contrast, our studies showed that neither acephate nor spinosad treatments were effective for controlling SRW. No differences in spray timing (i.e., morning [9:00 A.M.] versus night [9:00 P.M.]) could be detected ($P \leq 0.05$) for SRW control. However, since this experiment was conducted in a greenhouse, the results may not be directly translatable to outdoor nursery conditions where pesticide weathering from UV light, overhead irrigation, and precipitation would be more severe. In particular, weathering of pesticide products could reduce the efficacy of sprays applied when SRW adults were inactive (i.e., daytime sprays). Anecdotally, growers have reported greater efficacy from nighttime over daytime applications. Trials currently underway are showing promise for the pesticides Deltagard (a.i. deltamethrin), Scimitar (a.i. lambda-cyhalothrin), and Decathlon (a.i. cyfluthrin).

Significance to Industry: Growers and purchasers of evergreen azaleas need to be aware of a new or resurgent beetle pest, the strawberry rootworm. The SRW damages plants primarily by the foliar feeding of the adult beetle stage, which creates numerous small (1/16 inch diameter) holes. The SRW larvae are tiny (less than 1/5 inch long) and complete their lifecycle in container media, while adults are nocturnal and hide in foliage and debris during the day. The cryptic nature of larvae and adults makes detection of the SRW somewhat problematic. Adult beetles can be killed with currently labeled insecticides. However, more work is needed, especially in regards to managing larval populations in the media. With more detailed knowledge of SRW biology and susceptibility to currently labeled insect control products, growers will be able to economically manage SRW populations.

Literature Cited:

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