

Red-headed Flea Beetle Adult Observations and Larvae Management Research

Red-headed flea beetle (RHFB), *Systema frontalis*, a native insect east of the Rocky Mountains is an increasing problem for nursery growers. Adults chew holes in tender leaves or cause stippling in thicker leaves. The plants most damaged are Virginia sweetspire (*Itea virginica*), weigela (*Weigela florida*), panicle hydrangea (*Hydrangea paniculata*). Tender growth on many other deciduous, evergreen, woody, and herbaceous plants is damaged. Growers report damage on crapemyrtles (*Lagerstroemia spp.*), however, I see mostly Altica spp. flea beetles and rabbit tracks on them.

NC Biology Update

Adults are shiny black with a red head and are 1/10 - 1/4" long. The insect overwinters as eggs. First generation larvae hatch and feed on roots of container grown plants starting ~250 - 480 GDD50 (Growing Degree Day with a base temperature of 50 degrees Fahrenheit). I find larvae earlier in overwintering houses and later outdoors (my earliest outdoor, 360 GDD50). Larvae feeding doesn't reduce growth but controlling them prevents adults.

Larvae are creamy-white with red streaking, a brown head, 6 legs, and 2/10 - 4/10" long. They look like small roots and move inside root balls when in light. The key feature is a fleshy projection on top of the last abdomen section. Larvae pupate to become adults.

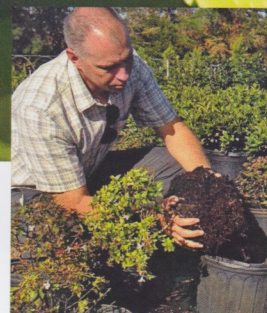
First generation adults start emerging ~520 GDD50 (overwintering house plants) - 1000 GDD50 (outdoors

when southern magnolia, *Magnolia grandiflora* and Virginia sweetspire start flowering). Second generation larvae begin ~1,500 - 1900 GDD50. Second generation adults start ~1,900 - 2,300 GDD50. By mid-summer you find all 4 life stages in containers as generations overlap. We may have as many as 4 generations in NC (I have found adults as late as November 20).

Grower concerns and NC Observations

Growers worry about movement from woods or crops into nurseries. My observations with flight interception traps placed around the perimeter of nurseries adjacent to swamps, ponds, dry woods, corn, soybeans, pocosins, and pine clear cuts indicate no major movement into nurseries. With 7 different trap locations over two summers and 18 weeks of collection time I only collected 1 adult.

I have observed adults move from struggling weigela plants to emerging soybeans then back to newly potted panicle hydrangea plants. Adults never maintained a population in soybeans (they were on tender foliage only when nothing else was desirable). The only weed I have seen adults feeding on is pigweed (*Amaranthus spp.*). I have seen adults feeding on small Virginia creeper (*Parthenocissus quinquefolia*) at the edge of heavily infested container waxmyrtles. Neighboring waxmyrtles in a windbreak were undamaged. Lush, tender growth is more desirable. This year I found a suspicious red-headed insect feeding on common dayflower at a nursery edge that



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Soon after emergence, mating begins and egg laying soon follows.

turned out to be *Oulema sayi*, a relative of cereal leaf beetle. This insect has a red head and thorax. I have never seen it in ornamentals. I rarely find RHFB feeding on anything but nursery grown ornamentals.

Management

First generation larvae scouting is important. Larva can be found on the edge of plant root balls starting ~250 - 480 GDD50. Scouting should be done when substrate is moist since larvae move inside when drying occurs. Documenting larvae populations can determine need for larvae treatments (drenches) or early adult systemic foliar applications prior to emergence. A second larvae scouting can be done starting ~1,500 - 1900 GDD50 to determine later season management. Scouting for larvae in purchased liners is also recommended.

Bifenthrin at rates incorporated for fire ant management is not effective at reducing larvae (based on my lab trials) or beetle populations (based on nursery observations). Research by Brian Kunkel (University of Delaware) has shown that drenching containers when first generation larvae are active with the entomopathogenic nematode *Steinernema carpocapsae* (I have also had excellent control with this nematode in 1 study), entomopathogenic fungi *Beauveria bassiana* or *Metarhizium anisopliae*, and azadiractin has reduced larvae and adult populations.

Dinotefuran (drench) and imidacloprid (drench, granular, or tablet) show promise for larvae control (applied before egg hatch).

Products for adult management from trials by Kunkel, Raymond Cloyd (Kansas University), grower observations, and IR-4 research by Kristine Braman (University of Georgia) and Steve Frank (NC State University) include acetamiprid, bifenthrin, carbaryl, cyfluthrin, cyfluthrin + imidacloprid, cyantraniliprole, diazinon, dinotefuran, imidacloprid, lambda-cyhalothrin, spinosad, spinetoram + sulfoxaflor, tau-fluvalinate, and thiamethoxam. Rotate active ingredient IRAC Group to prevent resistance and limit outbreaks of spider mites. (systemic products work best as foliar pretreatment targeting 1st or 2nd generation adults).

My work with acephate drenches has provided 92% - 100% 1st generation larvae control. I will have data ready at the Eastern NC Nursery Conference in Wilson, NC on February 12, 2019 related to other larvae control studies. (<http://go.ncsu.edu/2019ENCNC>). I've also started trials using incorporation and topdressing at potting. If you have ideas, interest in research, or need help managing this insect contact me at danny_lauderdale@ncsu.edu. 🌱