Garden Mastery Tips
from Clark County Master Gardeners

April 2004

Reducing Carrot Rust Fly Damage in Your Garden

Background Information on the Carrot Rust Fly (CRF)

A native of Europe, the carrot rust fly (*Psila rosae*) is most common in the cooler regions of North America north of the 40th parallel (from Northern California and Nevada across to Philadelphia, Pennsylvania). In the United States, the Northeast and West Coast have bothersome populations of the fly, whose larvae can be destructive to plants in the carrot family, Apiaceae. Damaged plants often appear yellow and stunted above ground and may die. (Photo showing damage to carrot)

Some members of the Apiaceae are: angelica, caraway, carrot, celeriac, celery, coriander, dill, fennel, parsley, parsnip and the weeds Queen Anne's Lace and hemlock. You're not likely to notice the adult carrot rust fly, as it is only about a fourth of an inch long. In case you need to know, the CRF has a shiny dark green body, iridescent wings, and yellow legs, eyes and antennae.
(Photo of adult carrot rust fly)

The CRF Life Cycle

Knowing when carrot rust flies and their larvae are active helps gardeners reduce CRF damage. In the Pacific Northwest, the first CRF generation emerges from early April through mid-June. Females lay their eggs on or near young plants where the stem and root meet the soil. Dark rich organic soil is preferable. Tiny larvae hatch from the eggs (which are less than an eighth of an inch long) and move below ground to feed on root hairs for two weeks. (Photo of immagure carrot rust fly)

Mature larvae, not much longer than the previous stage of growth, are straw-colored, legless and maggot-like; they are often referred to as carrot maggots. They eat into plant roots, leaving reddish-brown excrement ("rust") in their tunnels, for another two weeks. The larvae pupate in the soil for a month and a second generation of CRF adults emerges mid-July.

Pupae are developing insects enclosed in cocoons... In the Pacific Northwest, this cycle occurs a total of three times during a growing season. The second generation larvae are present during August; they pupate from mid-August to late September and emerge as flies from late September to mid-October. The offspring of those flies feed during October and November and overwinter as larvae or pupae in infested roots or in the soil.

Timing Plantings to Avoid Peak CRF Egg-Laying Periods

Understanding the CRF life cycle enables you to plant strategically. Aim to avoid having young host plants exposed during the egg-laying periods of the fly. One way to avoid having plants such as carrots, celery and parsnips damaged by CRF larvae is to sow seeds after mid-May. If there are no suitable hosts on which the first brood adult flies may lay their eggs, there should be little or no damage to your crop. Maximize chances that the crop will mature quickly, so you can harvest before the summer brood flies emerge (late June through mid-August) and begin laying eggs. If you cannot harvest early, harvest in blocks rather than selectively.

Crop Rotation

Crop rotation helps prevent CRF larvae damage by starving the maggots. Don't grow members of the carrot family in the same location two years in a row. If possible, wait even longer before planting them in the same place again. Select a portion of the garden where the soil has not been previously infested with carrot maggots and is as far as possible from any part of the garden where there has been an infestation during the past year. This strategy may not be totally effective if there are CRF pupae inhabiting weeds or other host plants near your chosen plot. If young plants are available during the egg-laying period of the fly, they may be targeted. So, besides rotating crops, be sure to get rid of plants that could be sources of infestation.

Cages and Row Covers

The most effective strategy against CRF is to install floating row covers or screen cages immediately after planting seeds in a part of the garden where there has been no recent infestation. The barriers effectively deny the flies access to plants on which they lay eggs. Cover all edges of floating row cover with soil so that there is no chance of flies entering the planted area. If you are re-using a piece of row cover, make sure that it has no holes in it. Leave the floating row cover in place until every last carrot (or parsnip, or head of celery) has been harvested.

Using barriers is time-consuming and expensive. You must purchase floating row cover or build a cage. Weeding is even more tedious when one has to lift a floating row cover or cage and then be sure to secure the cover immediately after finishing. In growing areas where there are many overcast days, using a row cover means even less light gets to the plants. Some cats think row covers exist to amuse them; unfortunately, their play can render the cover useless.

Planting Special Varieties of Carrot; Succession Planting of Small Patches

Try planting a variety of carrot that contains less of the plant chemical that attracts carrot rust flies. West Coast Seeds sells Flyaway, a Nantes variety which was bred to be unattractive to carrot rust flies.

Disposing of Infested Roots; Storing Harvested Roots; Tilling

If you have maggot-infested vegetables, get them out of your garden. If the damage is not too serious, you may be able to salvage some parts for eating or preservation. Don't put the damaged parts in the compost or anywhere near your vegetable patch, as CRF pupae overwinter and hatch into next season's carrot rust flies. Harvest carrots promptly, storing them in containers of damp sand rather than leaving them in the ground. Till infested patches deeply in the fall or early spring to expose any maggots or pupae to weather and predators.

References

Carrots-Carrot Rust Fly. Chapter: Home Garden. Section: Vegetables - Carrots to Collards and Kale. PNW Insect Management Handbook, 2003. Retrieved January 30, 2004.

Carrot Rust Fly. Chapter: Supplement 2: Rust Fly to Garden Symphylan. Section: Carrot Rust Flyl. PNW Insect Management Handbook, 2003. Retrieved February 8, 2004.

Land, Leslie. "Welcome to the wonderful world of the carrot rust fly, a very common pest." New York Times. (Late Edition (East Coast)). New York: Oct 28, 1999, pg. F.

“Naughty? Nice? Or Neutral?: Carrot Rust Fly (Psila rosae).” Organic Gardening. Emmaus: Sep/Oct 1996. Vol. 43, Iss. 7; pg.22.

Robson, Mary. *Gardening in Western Washington*, Presented by WSU Cooperative Extension. (Mary answers the question “My carrots were “grubby” last year. What can I do?” Retrieved January 31, 2004, from http://gardening.wsu.edu/text/faqvege.htm

West Coast Seeds, (604) 952-8828, 3925—64th Street, RR #1, Delta, BC V4K 3N2.