Can insecticide seed treatments protect carrots from damage by carrot weevil and carrot rust fly?

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Two major insect pests of carrots in Ontario and Quebec, Canada

Carrot rust fly (*Psila rosea* (Fabricius))
Diptera

Carrot weevil
(*Listronotus oregonensis* (LeConte))
Coleoptera
Carrot rust fly damage

Carrot weevil damage
Carrot rust fly may be the most important of the two because the damage is harder to grade out.
Both can cause major crop losses and cause fields to be abandoned and not harvested.
Carrot rust fly

Overwinters as pupae in the soil. Adults emerge after 329 day degrees at base 3 C. Deposit eggs at the base of the carrot plant, larvae tunnel into the root.

Two generations a year
Second generation of adults emerges at 1399 DD
Monitoring and insecticide application
Carrot rust fly management

Monitoring and insecticide application.

10 yellow/orange sticky traps per field, scouted 2x week

Spray threshold is very low:
0.1 fly/trap/day for fresh market carrots
0.2 for processing carrots
Carrot rust fly management

Recommended insecticides:

Diazinon

Ripcord and Upcyde (cypermethrin)

Matador (lamda cyhalothrin) – new minor use in 2009

Foliar sprays may not be effective for control
Carrot weevil

One generation a year – mostly

Overwinters as adults in vegetation at the edge of fields.

Deposit eggs, starting at 138 DD at base 7, in overwintering carrots and carrot seedlings. 90% egg deposition at 455 DD.
Carrot weevil

One generation a year – mostly, a second generation has been identified in Quebec

Monitoring with bait or baited traps

1 or 2 sprays at 4 leaf stage

Imidan (phosmet) and (recently) Matador are registered
Insecticides for control of carrot insects 2007-2009

**Entrust** (spinosad 80%, 2.5, 3.75, or 7.5 g a.i.),

**Cruiser** (thiamethoxam 47.6%, 2.5 or 3.75 g a.i.)

**Sepresto** (clothianidin 56.25% plus imidaclorpid 18.75%, 5.63 or 11.25 g a.i.)

Seed treatments applied with film coat at Prof. Alan Taylor’s seed technology lab, Cornell University, Geneva, N.Y.
Insecticides for control of carrot insects 2009

Seed treatments Entrust, Cruiser and Sepresto

plus

Ripcord (cypermethrin)
Perma Guard (diatomaceous earth)
and Movento (spirotetramat)

were sprayed 4 times, starting 8 Aug, to look at control of second generation carrot rust fly

Movento was sprayed twice in combination with seed treatments Entrust and Cruiser
Insecticide seed treatments for control of carrot weevil 2007

Low levels of weevil damage, but some differences
Insecticide seed treatments for carrot insects

2008

Percent damage

High rust fly damage, low weevil damage
Total insect damage, early assessment Sept 2, 2009

Total damage at early assessment, carrot weevil and first generation rust fly
High weevil damage, but also rust fly damage, no differences
Insecticides for carrot insects 2009

No significant differences in 2009

Check, En+Movento, Cruiser 3.7, Cruiser 2.5, Movento, Entrust 3.7, Cr+Movento, Entrust 7.5, Sepresto 5.6, Sepresto 11, PermaGuard, Ripcord

Weevil, Rust fly
Insecticides for carrot insects 2009

No significant differences in 2009

Rust fly
Marketable yield in relation to insecticide application, Oct 20, 2009

Marketable Yield

Tonnes/ha
Summary: Insecticides for control of carrot insects

- Damage from carrot insects varies greatly from year to year
- The high rate of Sepresto (11 g/kg seed) provided most consistent control
- High rates of Cruiser and Entrust should be tested further.
- It may not be possible to find one seed treatment that is effective for both insect pests.
  - Entrust and Sepresto for weevils, Sepresto, Entrust? and Cruiser for rust fly

Perma Guard (diatomaceous earth) looks promising, but only one year of trials.
2010 Trials
Seed treatments alone and in combination with foliar sprays for second generation rust fly

Seed treatments:
Entrust + Cruiser
Sepresto
cyantraniliprole (HGW86)
Chlorantraniliprole (Dermacor X-100)

Foliar sprays:
Imidan - early
Matador - early and late
Movento - late

Combinations: Sepresto + Movento
Sepresto + diatomaceous earth
Can insecticide seed treatments protect carrots from damage by carrot weevil and carrot rust fly?

Yes, some of the time
Because of the low rates per acre, it would be worth using these every year.

May have to be supplemented with sprays for 2nd generation rust flies.
All research trials are summarized in the Annual Report.

Download at the Muck Station web site:

www.uoguelph.ca/muckcrop

The report will also be on the web site of the Ontario Ministry of Agriculture, Food and Rural Affairs.
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Questions?