

**MANAGEMENT OF THE CABBAGE MAGGOT, *DELIA RADICUM* L., IN
BRASSICA ROOT CROP PRODUCTION IN WESTERN OREGON**

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Brassica growers are highly dependent on the use of chlorpyrifos (organophosphate; Lorsban) as the single control method for managing cabbage maggots (*Delia radicum* (L.); Diptera: Anthomyiidae). The threat of chlorpyrifos loss, resistance build-up, and environmental scrutiny has increased grower willingness to test and adopt new management strategies. An integrated pest management plan is being developed from data collected over years 2001 through 2005, which includes: predicting spring fly emergence and seasonal flight (degree-day modeling); monitoring for egg-laying and crop damage; altering planting and harvesting dates; reducing overwintering pupae by spring and fall cultivation; using row covers, exclusion fences, and trap crops; and testing of alternative chemistries and application methods.

Some Conclusions:

- ✱ Bimodal emergence pattern in the spring: 70% early-emergers (249 DD – Mar 23) and 30% late-emergers (715 DD - May 24); 2 months between early- and late- emerging flies.
- ✱ Emergence was initiated at ~200 DD (Mar 8).
- ✱ Flight started at ~300 DD (March 31); Spring flight ends ~900 DD (Jun 15).
- ✱ Flight increased again in the Fall at ~2138 DD (Aug 28).
- ✱ Flight lagged behind emergence by 5 days to 3 weeks.
- ✱ Lowest damage occurred when crop was seeded after spring flight (>900 DD), but harvested before fall flight (< 2100 DD).
- ✱ Low fly catch numbers (<100 flies / 6 weekly totals) \approx < 20% CM damage.
- ✱ Oviposition incidence was highest at older plant growth stages (> 7- 9 leaves, ¼ inch root; growth stage #2) than at young plants.
- ✱ Plants were most vulnerable to fly oviposition at 4 weeks after planting.
- ✱ Low fly catch numbers (< 100 flies / 6 weekly totals) \approx < 20% CM damage.
- ✱ Oviposition incidence was highest at older plant growth stages (> 7-9 leaves, ¼ inch root) than young plants.
- ✱ Plants were most vulnerable to fly oviposition at 4 weeks after planting, however a delay in egg-laying occurred in some fields.
- ✱ Fall and spring cultivation reduced overwintering pupae in harvested fields.
- ✱ Exclusion fences and trap crops proved to decrease the maggot load in fields.
- ✱ In-furrow application and seed-treatments have shown promise. Spinosad and Fipronil treatments were efficacious.

High levels of slug mortality were observed within 1-3 days in plots treated with the standard treatments including Metarex 4%. Mortality of slugs in containers treated with iron-phosphate pellet formulations did not occur until 5 DAT, however feeding on pellets and carrot pieces greatly declined after day 1. Greater than 80% slug mortality was reported within 7-10 days of application in all treatments. Factors such as earthworms, collembolans, temperature, rain, and wind could affect bait performance.

