Integrating Pest Management Practices in Eastern Oregon: the Potato Tuberworm Case Study

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Potato tuberworm (PTW), *Phthorimaea operculella* (Zeller), is one of the most important potato pests worldwide. Typically found in tropical and subtropical regions, PTW was first detected in OR in 2002. By 2005, PTW spread extensively across OR and WA and currently threatens about 200,000 acres of potatoes valued at more than $500 million. Because it is a new pest in this region, information on the distribution and biology in the Pacific Northwest is incomplete, hindering the development and implementation of effective control measures. Integrating management practices to control this pest is critical.

Adult PTW

Credits. O. Zegarra (IPC, Lima, Peru)

Egg

< 4/100 inch long

Larva

< 1/2 inch long

Pupa

< 1/2 inch long

Tuber damage

Distribution of the PTW (2005)

- First reported in the Hermiston area in 2002
- 2 years later, PTW range expanded 140 miles north of Hermiston
- In 2005, PTW was reported in western, south, central and eastern OR; southeast and central WA, and at least in three counties in western ID
- Was PTW present in the area before 2002? Phylogeography/DNA study

Biology

- Damaging stage: larva (mines and tuber)
- Time from egg to adult emergence for OR PTW populations at 50ºF (~158 days) and 90ºF (16 days)
- PTW developed at temperatures colder than 50ºF
- Males and females are dimorphic
- Overwintering stages in our area: not sure (in other areas: pupal stage)
- Host range: exclusive to Solanaceas (crops and weeds)

Female (left); male (right)

Comprehensive Research-Extension Program

- Trapping: OR, WA
- Biology: overwintering, low temperature thresholds
- Cultural practices: irrigation, senescence
- Biological control: survey of natural enemies, introductions?
- Chemical control: screening and timing
- Plant breeding: breeding for resistance

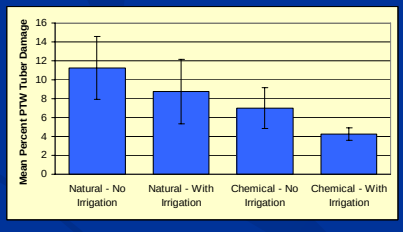
PTW larva parasitized

Parasitoid of PTW

Cultural and Chemical Practices

- We developed a program for PTW before desiccation
- Desiccant plus irrigation reduces tuber damage
- Use PTW active products. Good results in 2005 trials: Monitor, Guthion, Rimon, Avaunt, Furadan, Lannate, Success

Effect of irrigation and senescence on PTW damage



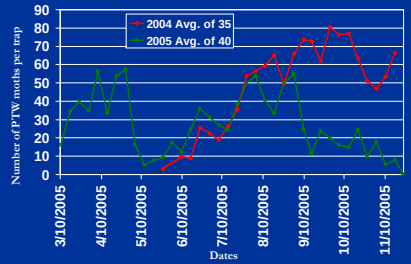
Trapping

Delta trap

Sticky trap/lure

PTW male captures

Population dynamic of the PTW in OR, 2004-05 (Umatilla & Morrow Counties)



- 36 delta traps were deployed in 2004-05 in OR
- They were checked on a weekly basis

Conclusions and Implications

- PTW is a damaging pest of potatoes worldwide
- The presence of PTW in potato growing areas in OR and WA threatens the potato industry in the region
- This is probably the furthest northern latitude where PTW can be found. Trapping efforts will continue
- Effective PTW control methods are being identified
- Interdisciplinary multistate efforts

For more information

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Visit our WebPages: http://www.oregonstate.edu/hermiston/; http://potatoes.com