

# OSPUD - Insect Information

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### First year goals

1. Determine the main pest species present and their phenologies
2. Develop sampling and diagnostic methods
3. Assess extent of tuber damage by these species
4. Recommend and discuss management approach
  - diagnosis/management fact sheets
  - develop hypotheses and activities for year 2

### First year insect sampling activities

- 5 project farms sampled intensively for insect pests
- Flea beetles:
  - yellow sticky traps placed in 2006 potato field, field that had potatoes in 2005, and in between these fields
  - visual inspection and sweep netting in a grid of points in the 2006 potato fields
- Wireworms:
  - pitfall traps, white sticky traps and pheromone ground traps for adult beetles placed in 2006 potato field, and the field that had potatoes in 2005
  - germinating grain bait traps for wireworm larvae placed in 2006 potato field and field that had potatoes in 2005

# Main insect pest species found

## Flea beetles

1. Tuber flea beetle (*Epitrix tuberis*)
2. Tobacco flea beetle (*E. hirtipennis*)
3. Western potato flea beetle (*E. subcritina*)



## Wireworms/click beetles

1. *Agriotes lineatus*
  2. *A. obscurus*
- } Invasive European species
3. Many other less important species present



## Summary of sampling method assessment

- Sweep netting the most efficient for flea beetles, but yellow stickies may also be useful for assessing the first beetles emerging from overwintering sites
- Pitfall traps and white stickies not useful for the wireworm adults
- Underground bait traps useful and should be placed in greater numbers
- Pheromone traps for the 2 invasive wireworm species should be placed again to keep track of the spread of these species

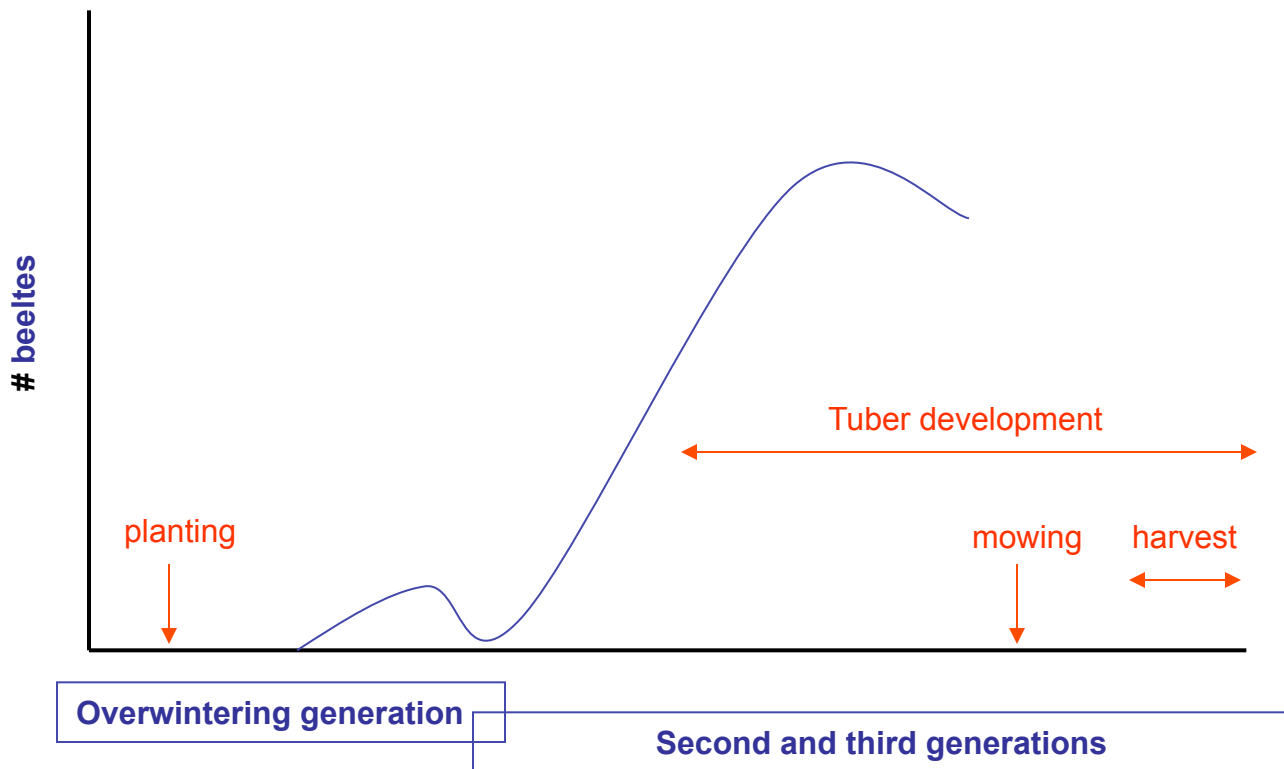
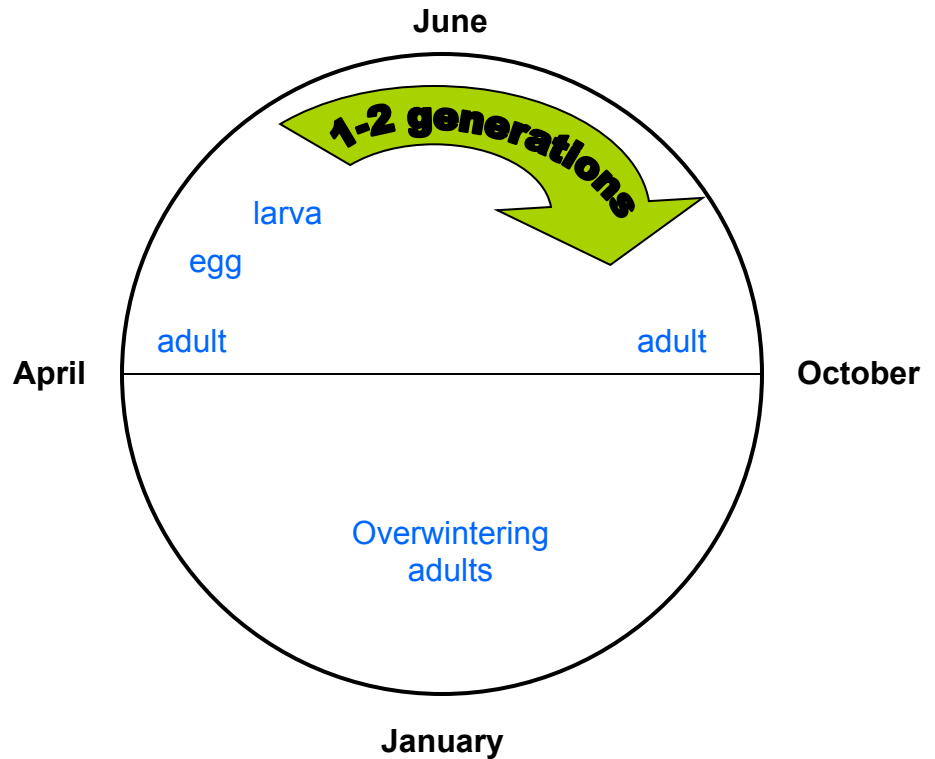
# Flea beetle biology

Adults emerge from overwintering sites after it becomes warm enough

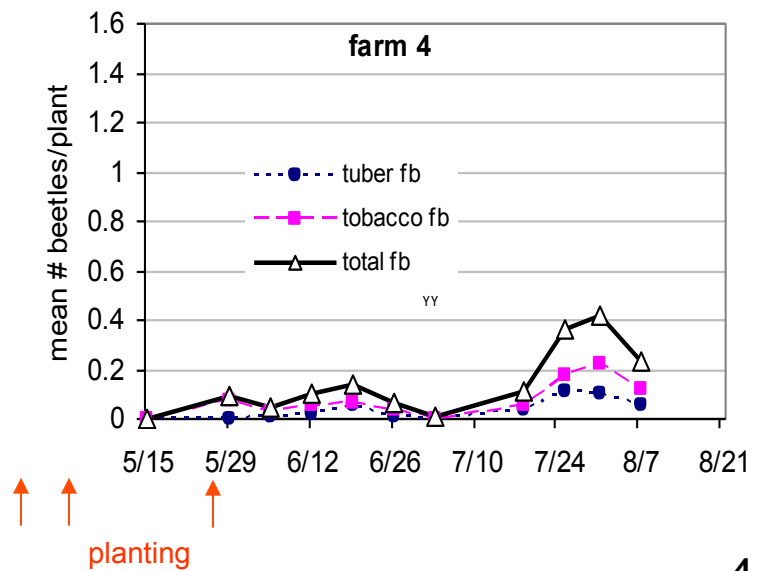
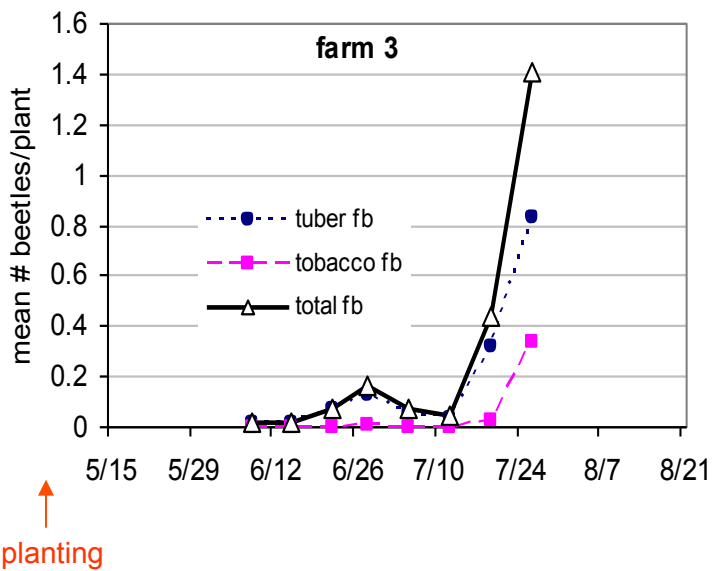
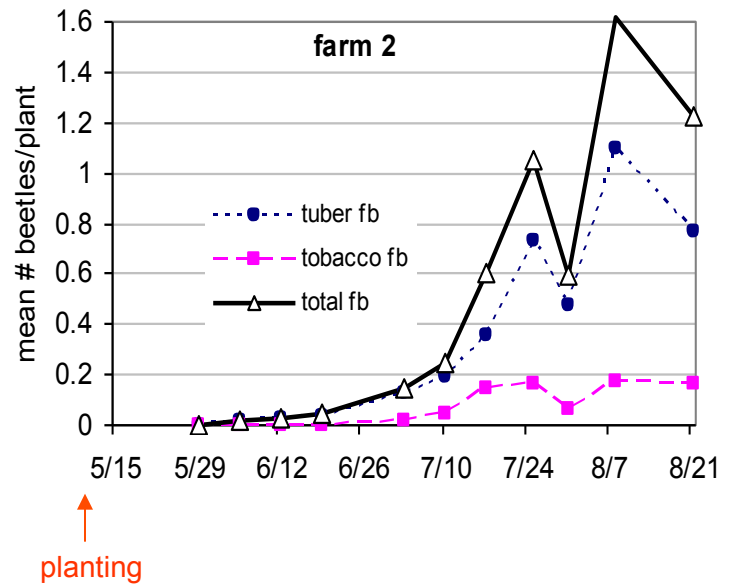
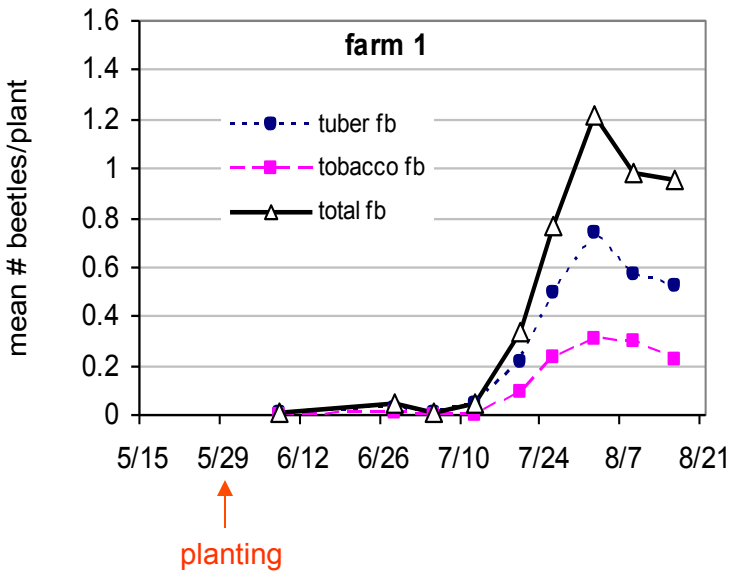
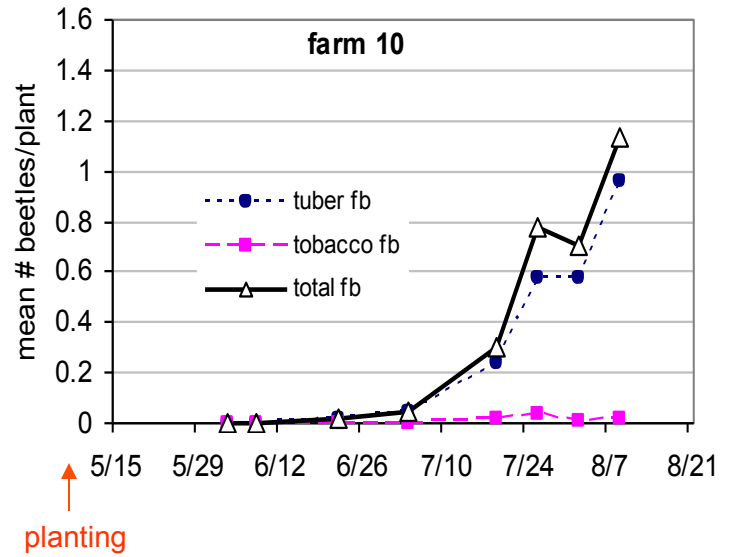
This overwintering generation then travels to potato fields to lay eggs

Can have either one or two more generations during crop season depending on climate

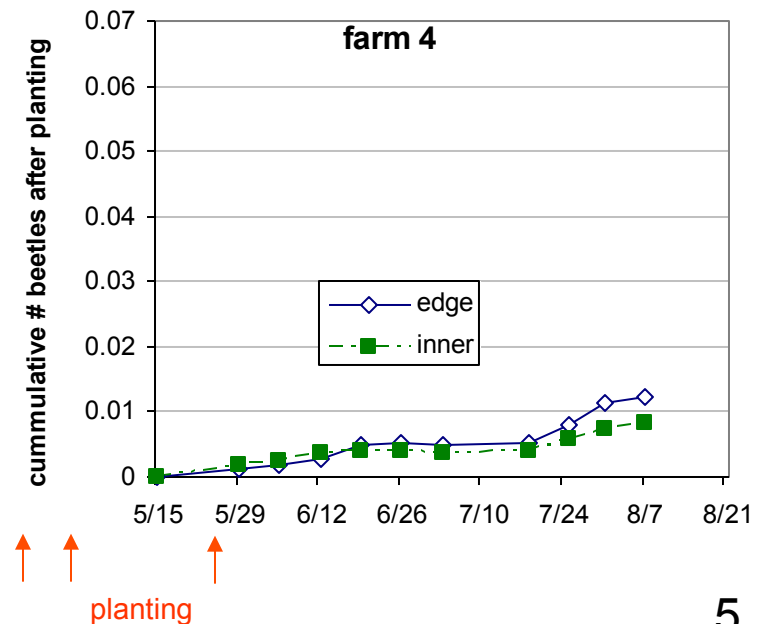
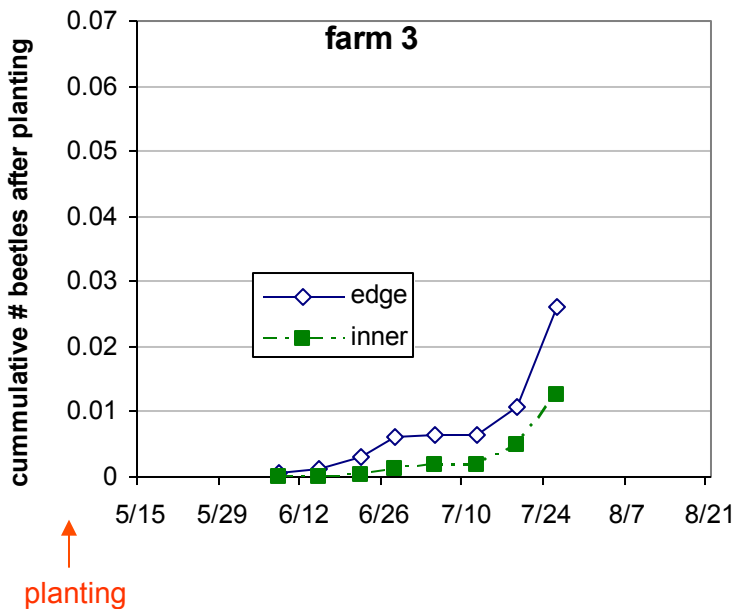
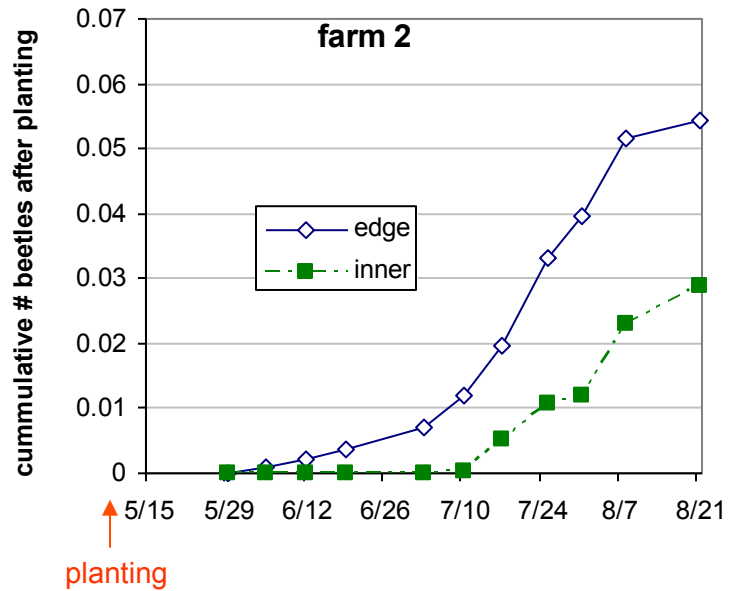
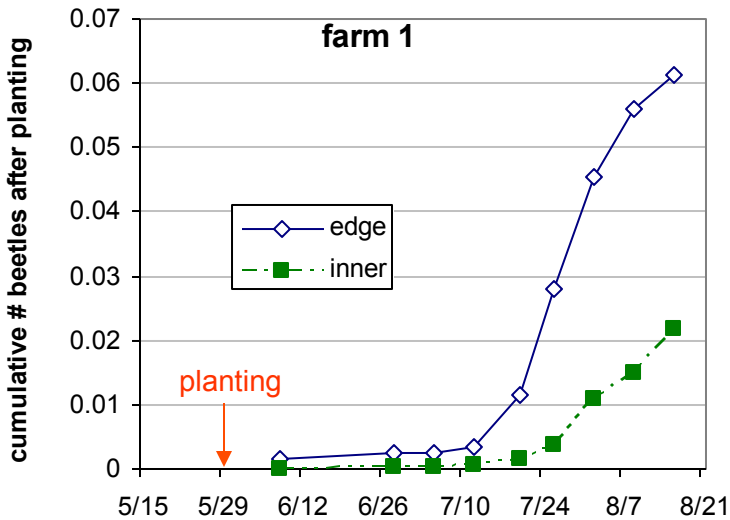
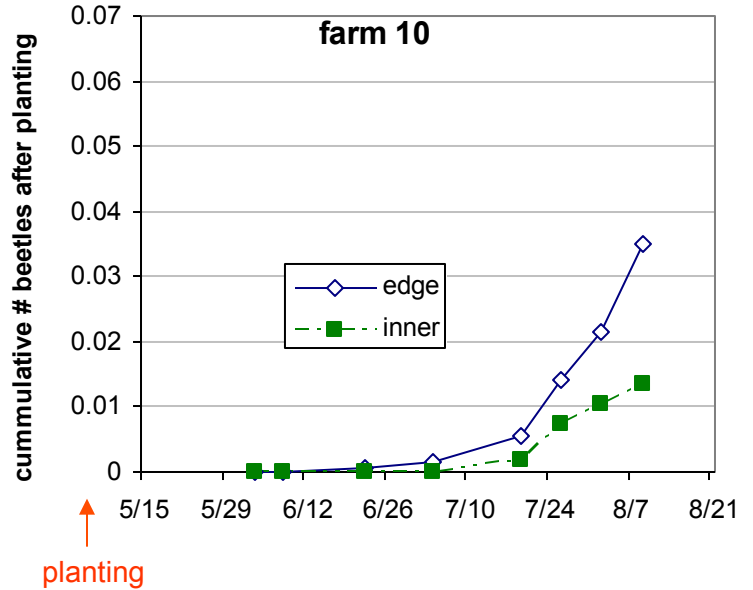
The chance for flea beetle damage to tubers increases as the tubers remain in the ground



# Flea beetle population growth of 2 species at each farm



# Cummulative flea beetle population growth at the edge and inside of fields



# Comparison of flea beetle populations to % damaged tubers

Farm #	Planted	1 <sup>st</sup> FB seen	# FB edge	# FB inner	Total % FB damage	% FB light	%FB med	% FB heavy
1	6/2	- 1 DAP	high	med	41.2	23.5	11.2	6.5
2	5/12	24 DAP	high	high	4.8	3.5	1.0	0.3
3	5/2	16 DAP	high	med	3.6	3.0	0.4	0.2
4	3/27, 4/12, 5/27	51 DAP	low	low	0.0	0.0	0.0	0.0
10	5/10	42 DAP	high	med	46.1	20.3	12.4	10.9

“FB edge” - flea beetle population at edge of field (high, medium, or low levels)

“FB inner” - flea beetle population toward middle of field (high, medium, or low levels)

“FB light” - insignificant damage, < 3 light strikes, 1 darker strike

“FB med” - low to moderate damage, still marketable, 2-3 light or moderate strikes, 2 dark strikes

“FB heavy” - moderate to severe damage, marketability affected, > 3 dark strikes

## Some of the flea beetle issues to discuss

- Population levels vs. tuber damage
- Timing of arrival vs. tuber damage
- Flea beetle dispersal from overwintering sites
- Pest management options
- Feasibility of monitoring

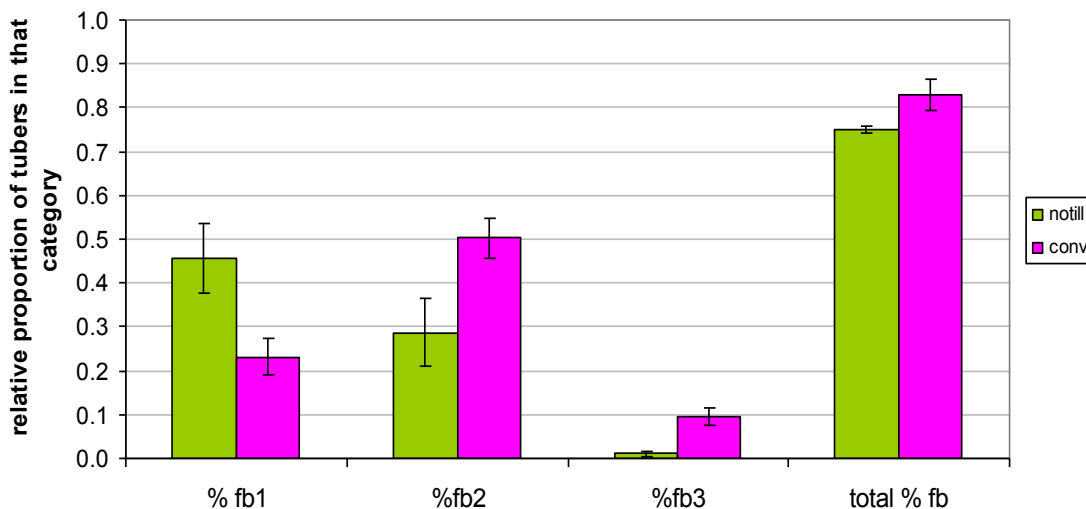
# 2005 Low-till trial: Insect Data



- rye, pea, vetch cover before potatoes
- ‘no-till’ treatment: rolled and ripped
- ‘conventional’ treatment: disced
- soil and canopy sampling methods compared (see next sheet)
- tuber damage assessed (see below)

## Tuber damage assessment

2005 Pretrial, Flea Beetle damage to harvested tubers

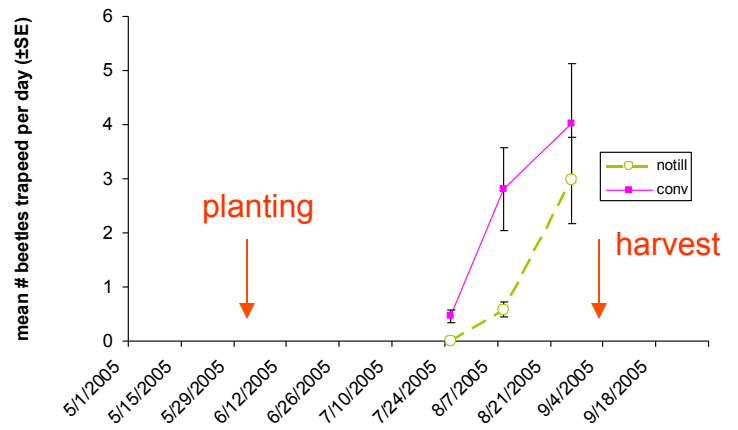


## Ways in which low-till may affect flea beetles

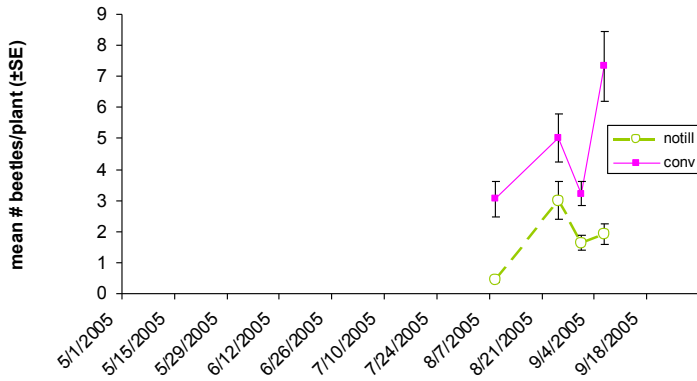
1. Masking the spots at the base of the plants where they lay eggs
2. Keeping the soil unfavorably cool for them
3. Making the potato plants more difficult to find
4. Providing habitat for predators of flea beetles

# Canopy sampling of flea beetles by 3 different methods

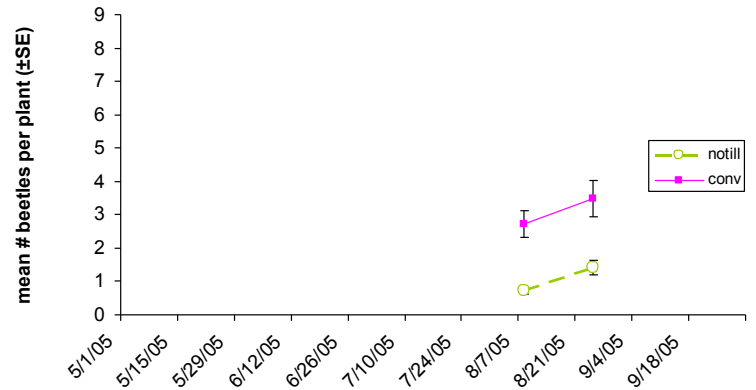
sticky traps, TUBER FLEA BEETLES



sweep netting, TUBER FLEA BEETLES

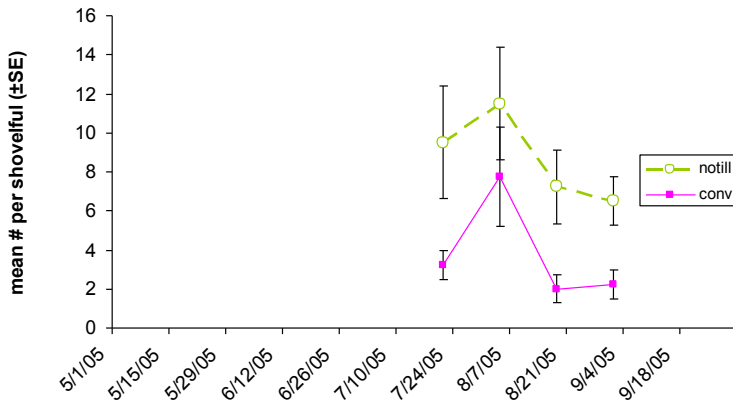


bucket beating, TUBER FLEA BEETLES

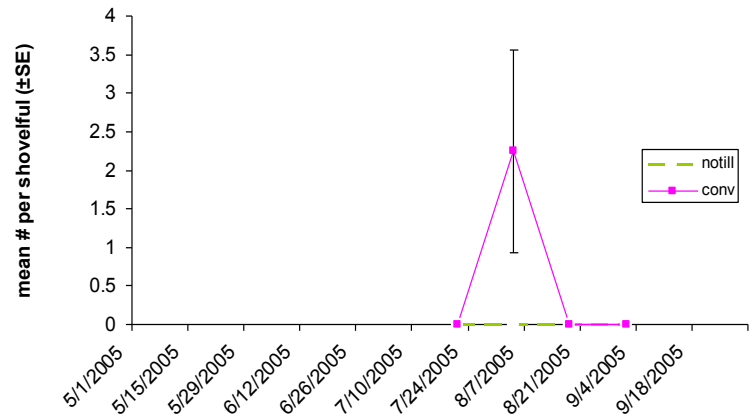


# Shovel soil sampling of natural enemies and pests

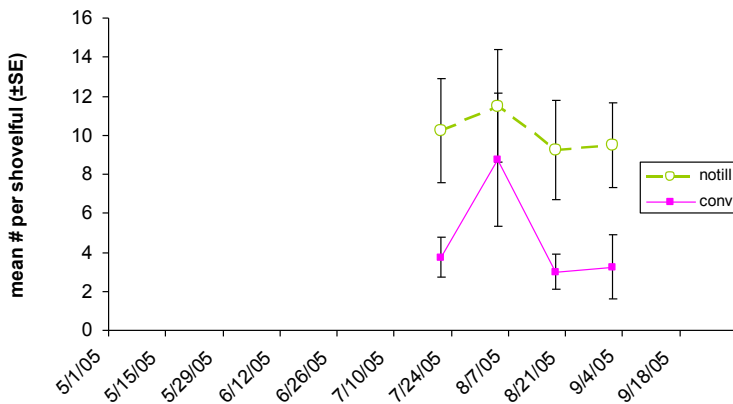
rootball shovels, ROVE BEETLES



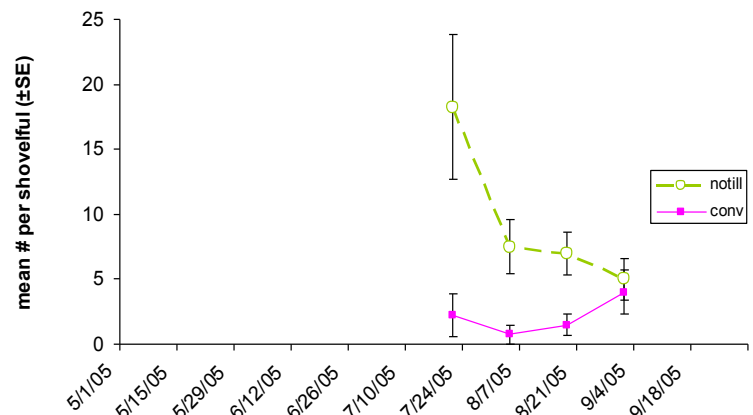
rootball shovels, FLEA BEETLE LARVAE



rootball shovels, TOTAL NATURAL ENEMIES

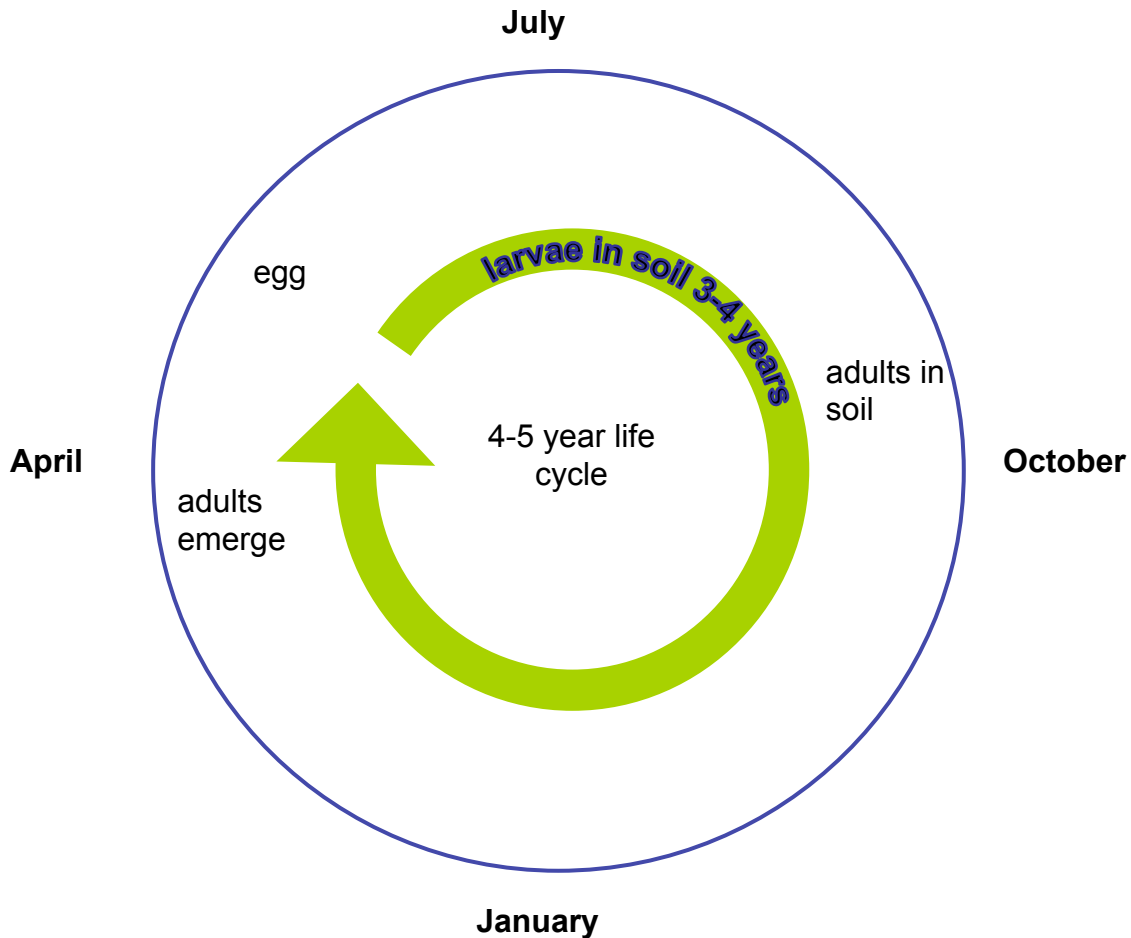


rootball shovels, SLUGS








# Wireworm / click beetle biology



- The wireworm larvae in a given field live in the soil for 3-4 years
- They can therefore become a problem in fields that are not rotated out of host plants at least every 4-5 years
- Root crops and grass fields are their favored host plants



# Invasive wireworm distributions



-  ODA, invasive WWs
-  OSPUD, invasive WWs
-  OSPUD, no invasive WWs

- New record of adults and larvae near Lake Oswego
- Confirmation of adults on Sauvies Is.
- 1<sup>st</sup> record of these species in a potato field in Oregon?

## Comparison of wireworm and click beetle populations to % damaged tubers

Farm #	larvae 2006 field	larvae 2005 field	adults 2006 field	adults 2005 field	Total % WW damage	% WW light	% WW mod	% WW heavy
1	0	high	low	low	17.2	6.9	6.7	3.6
 2	med	med	med	med	0.1	0.1	0	0
3	0	0	0	0	2.9	2.36	0.3	0.3
 4	low	low	low	0	0.6	0.6	0	0
10	0	0	low	0	12.6	5.4	5.2	1.9

“WW light” - one deep hole

“WW med” - 1 to 3 deep holes

“WW heavy” - > 3 deep holes

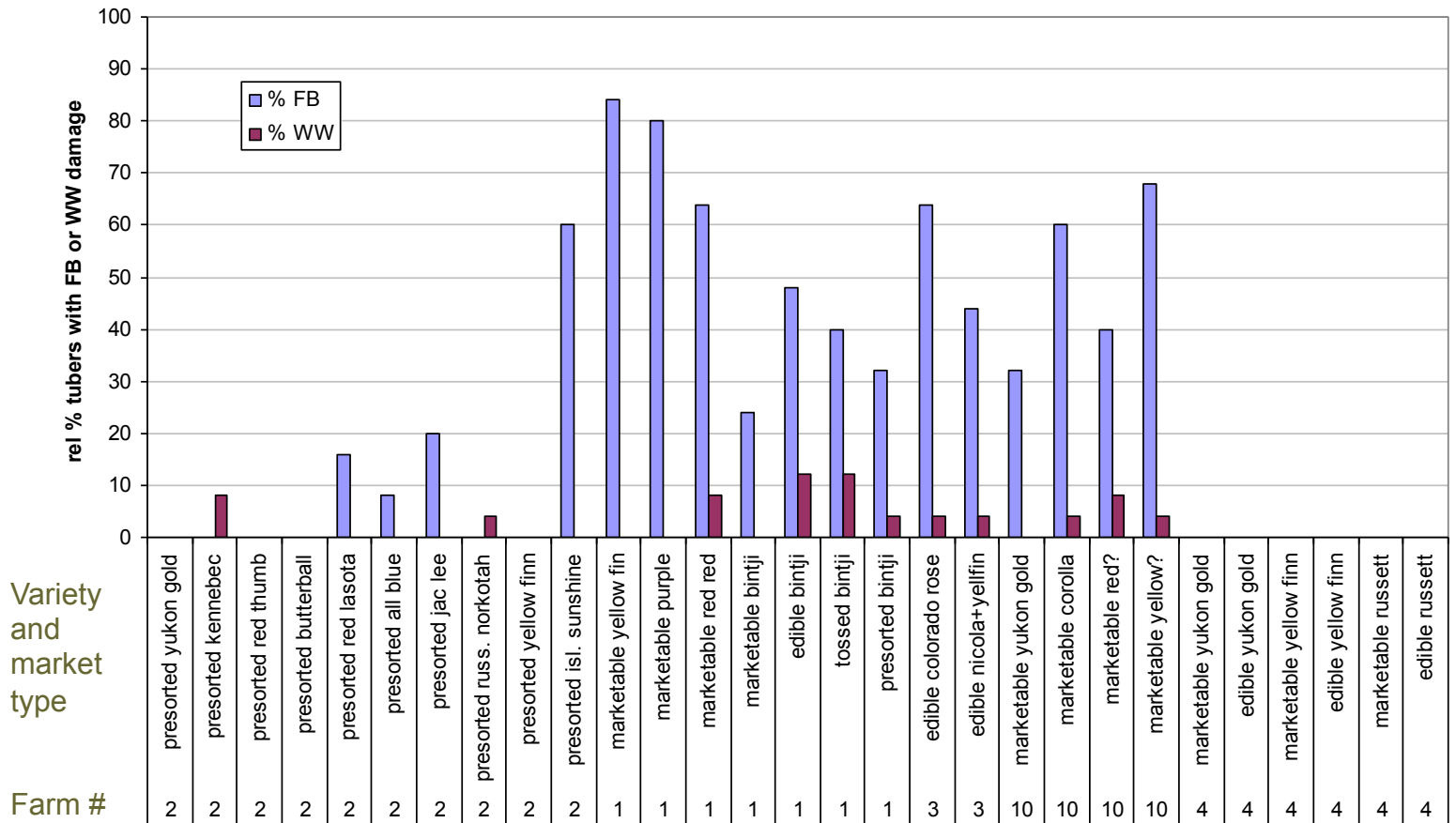


- Invasive European species present

## Some of the wireworm issues to discuss

- Population levels vs. tuber damage
- Pest management options
- Feasibility of monitoring

# Post-harvest insect damage assessment



# **OSPUD insect information that is needed**

- 1. Cropping history records on farm maps for all relevant fields from prior years**
- 2. Locations of solanaceous weeds on farm maps**
- 3. Relevant pest records from these years**
- 4. Records on operations that can affect the extent of flea beetle damage**