

USDA Vegetable Pest Research Insect and Pathogen Pests on Legumes



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Pea Weevil *Bruchus pisorum*



Photo: S. Van Vleet



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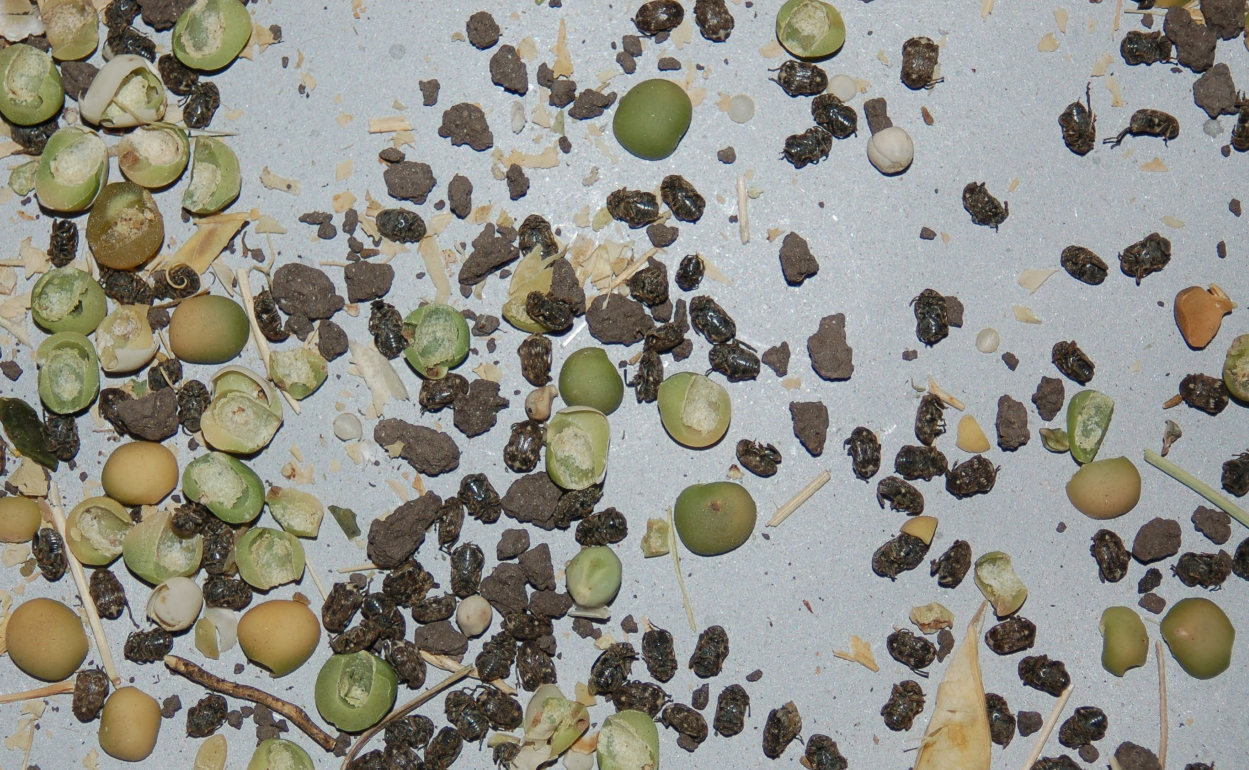
Top side



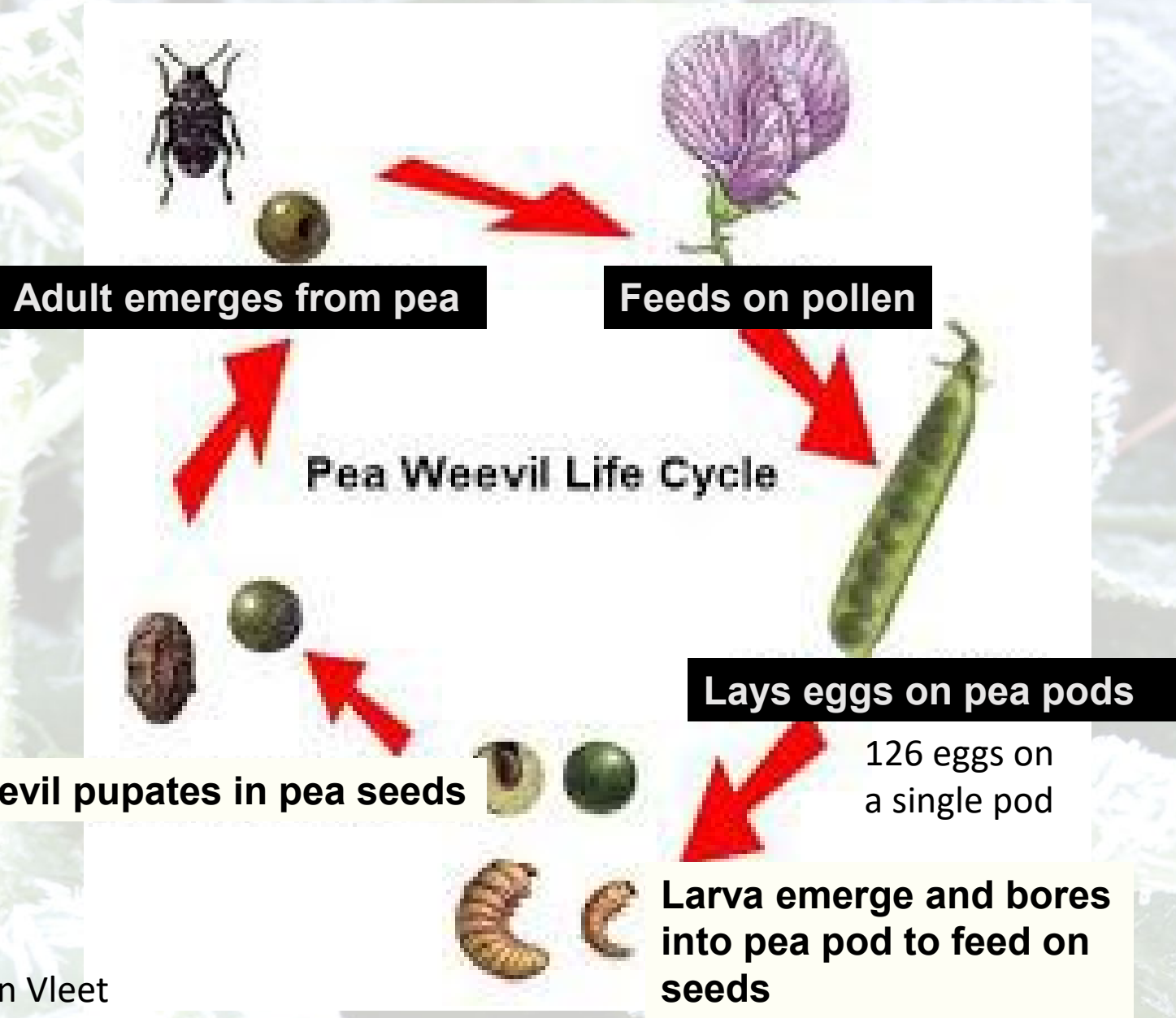
Bottom side



Damaged pea due to weevil



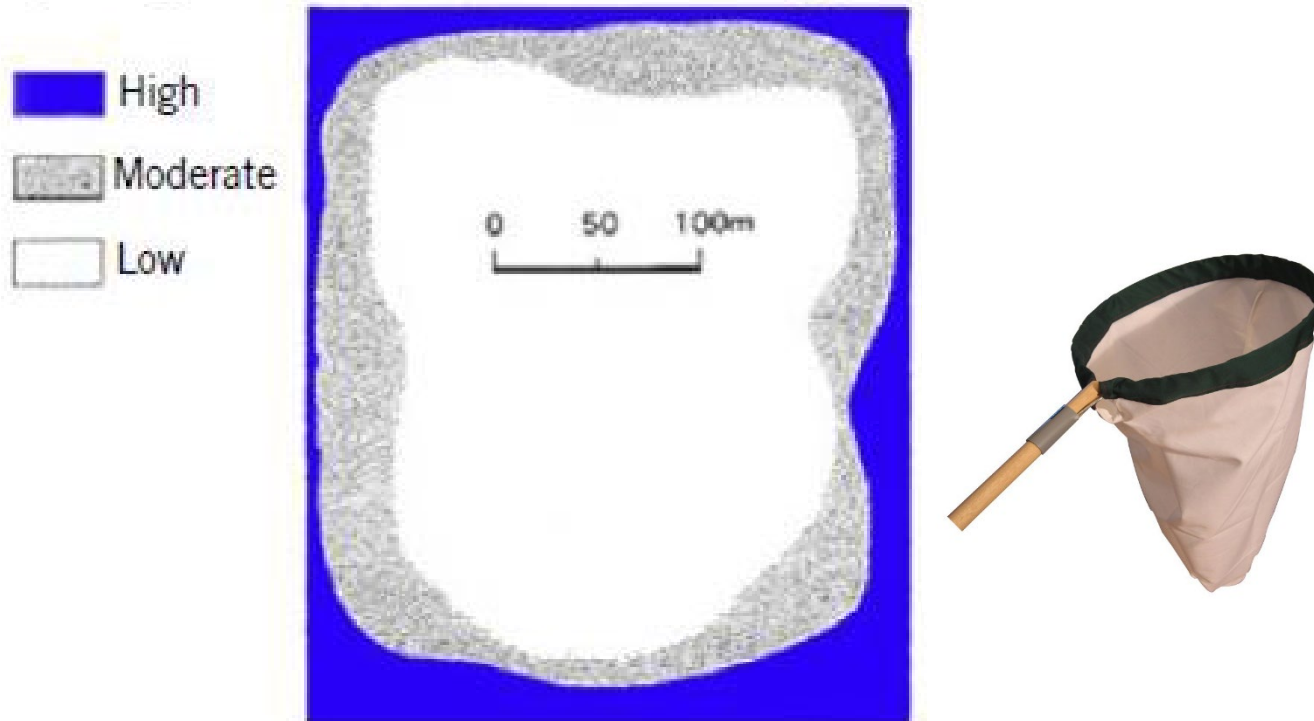
Pea Weevil Life Cycle



How Can It Be Monitored?

- Adult pea weevil found in spring at flowering
- Use sweep net at borders every 5-7 days beginning at flowering **and** when average temperatures are above 68 F when they are active

Figure 3: Typical distribution of Pea weevil in a large pea field.



Sampling: 100 Sweeps. Treatment Threshold is (1 in 25).

Insecticide Options for Pea Weevil



- Insecticide Modes of Action
 - Group 3. 3A. Sodium channel modulators Nerve action. Pyrethroids/Pyrethrins
 - LAMBDA-CYHALOTHRIN = LAMDA-CY, WARRIOR II, SILENCER, etc...
 - BIFENTHRIN = BIFENTHRIN 2EC, DISCIPLINE 2EC, Fanfare 2EC etc...,
 - CYHALOTHRIN GAMMA = DECLARE
 - ALFA-CYPERMETHRIN = FASTAC EC
 - ZETA-CYPERMETHRIN = MUSTANG MAXX or HERO
 - CYFLUTHRIN = TOMBSTONE HELIOS
 - Group 1. Acetylcholinesterase (AChE) inhibitors. 1A Carbamates
 - CARBARYL = CARBARYL 4L, DREXEL 4L, SEVIN
 - MALATHION = CHEMNOVA
 - PHOSMET = IMIDAN 70W
 - Group 28. Ryanodine receptor modulators. Diamides
 - (CHLORANTRANILIPROLE = BESIEGE)
 - Group 4A. Nicotinic acetylcholine receptor (nAChR) competitive modulators. Neonicotinoids
 - (IMIDACLOPRID = MALICE 75WSP, RESONATE 600 ST)

Pea Weevil Control

- Spray out border areas to catch overwintering adults
- Spray just after first flower
- Once they hatch and burrow into pod, they are safe from most applications

Cultural Control

- Harvest before adults emerge
- Destroy overwintering sites
- 1°F storage overnight can kill weevil (If planting own seed)
- Graze out crop residues

Biological Control

Parasitic wasp (*Triaspis thoracicus*),
Canada and Aust.



Pea Leaf Weevil Damage



Pea leaf weevil
Sitona lineatus

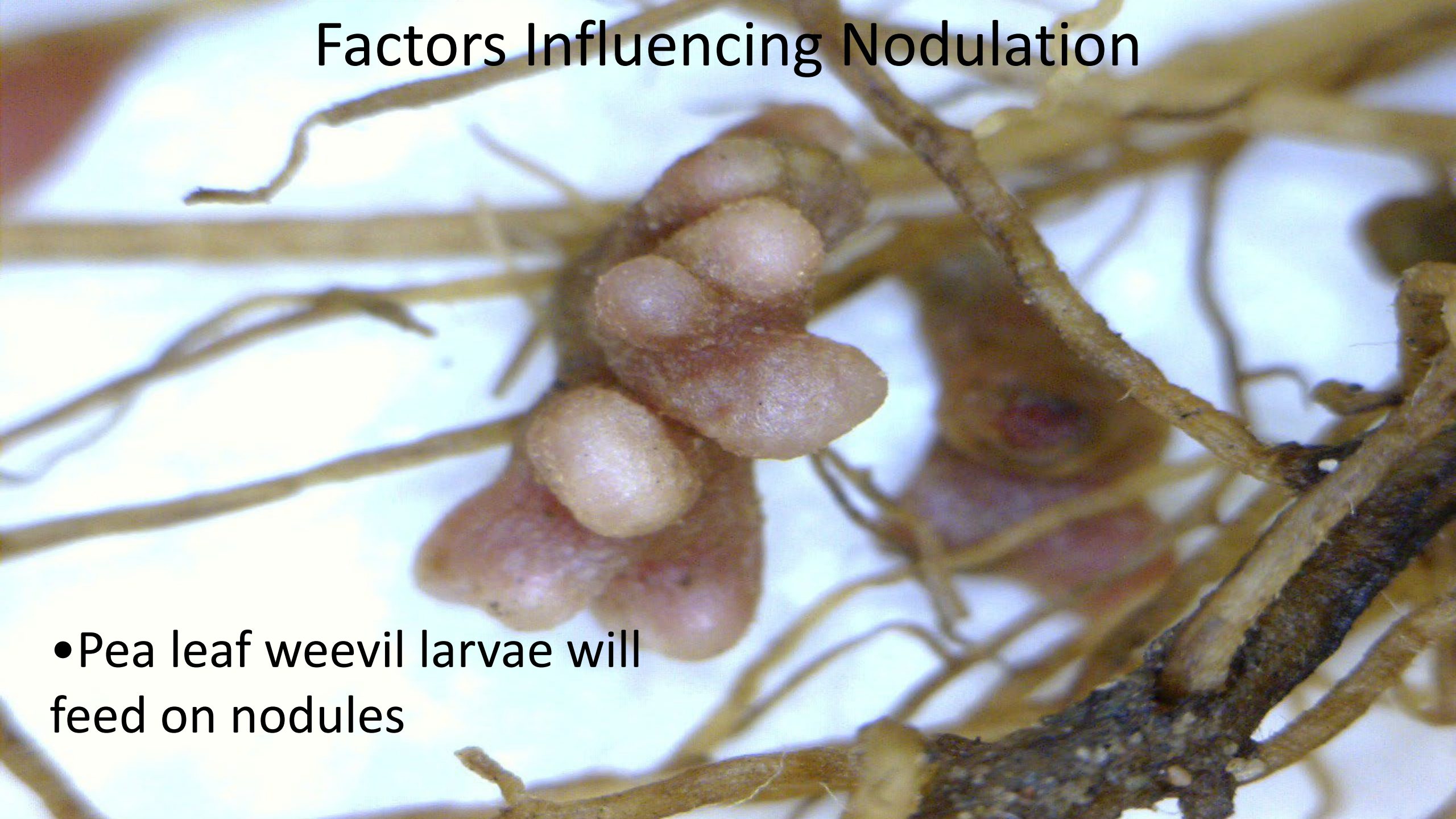
Three
parallel lines
on the
thorax

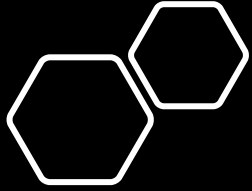


Photo: S. Van Vleet

Factors Influencing Nodulation

- Pea leaf weevil larvae will feed on nodules





Chemical Management (pea leaf weevil)

- Fantac EC (alpha-cypermethrin)
- Carbaryl 4L (carbaryl)
- Tombstone Helios (cyfluthrin)
- Imidan 70W (phosmet)
- Cruiser Maxx (thiamethoxam)

Spray when there are as few as 0.3 weevil per seedling.

Wireworms
Limonius spp.









Wireworm on lentil





Wireworm infesting pea seed

Management

- * Seed treatments (Cruiser, spinosad)
- * Seeding date favoring rapid emergence
- * Optimal seeding depth
- Soil at plant (Capture LFR = bifenthrin, Mustang = zeta-cypermethrin)

Click Beetle



Click Beetle Picture: WSU
Entomology Dept.



Pea aphid
Acyrtosiphon pisum



Pea Aphid



Aphid epidemics in the Pacific Northwest
pulse growing regions



Aphid Epidemics



Natural Biological Control Ladybird beetles

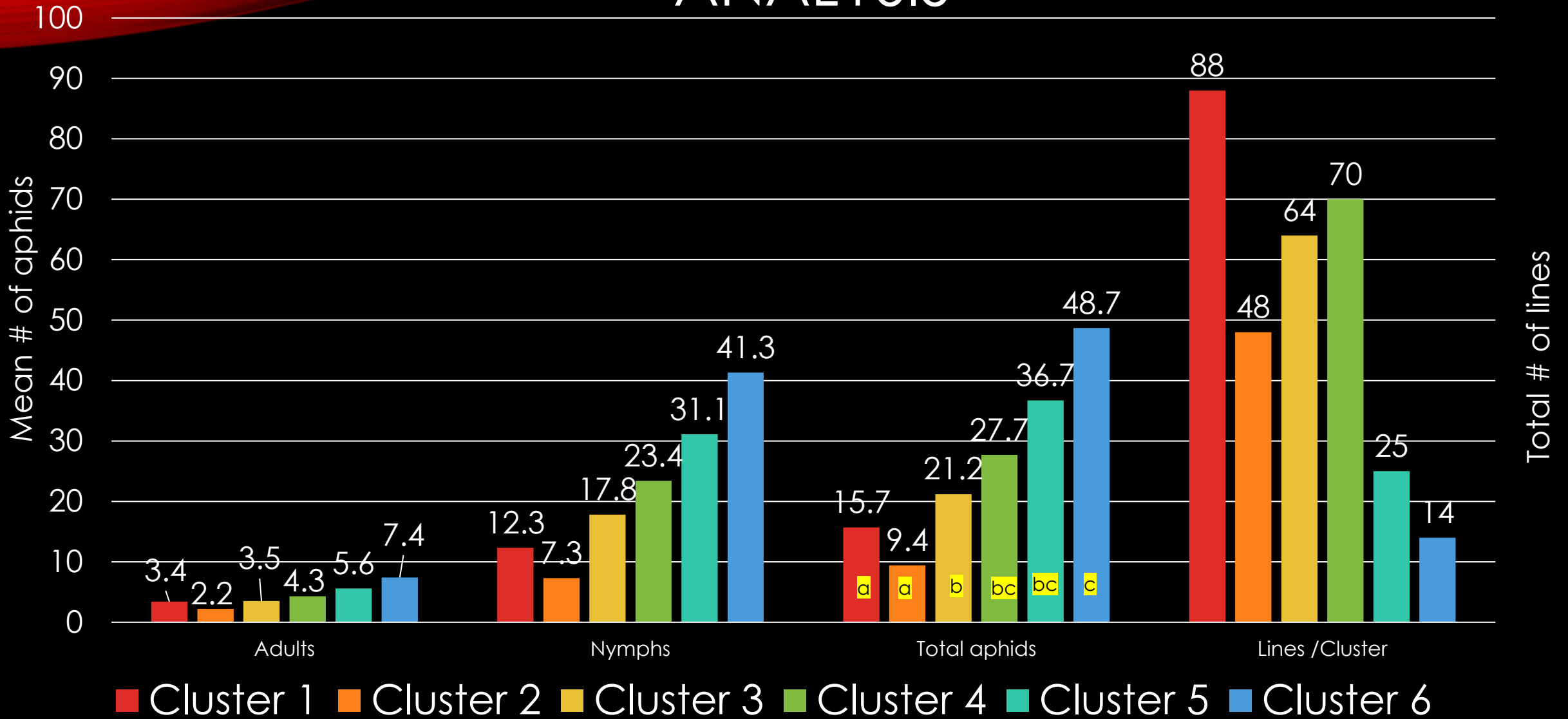




Aphid Chemical/Biological Control

- alpha-cypermethrin (Fastac EC)
- azadirachtin (Neemix 4.5)
- cyfluthrin (Tombstone Helios)
- dimethoate (Dimethoate LV4, Drexel)
- malathion (Fyfanon)
- zeta-cypermethrin (Mustang Maxx)
- Thiamethoxam, (Cruiser 5FS)
- Biological control: *Beauveria bassiana* (Mycotrol ESO)

WARD'S MINIMUM CLUSTER ANALYSIS

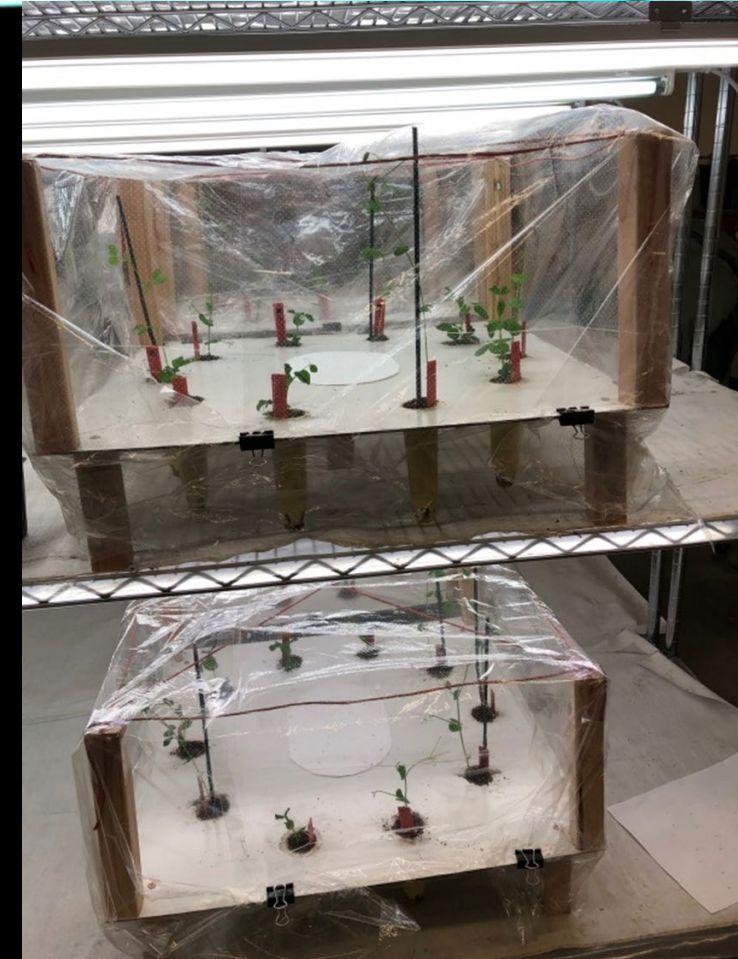
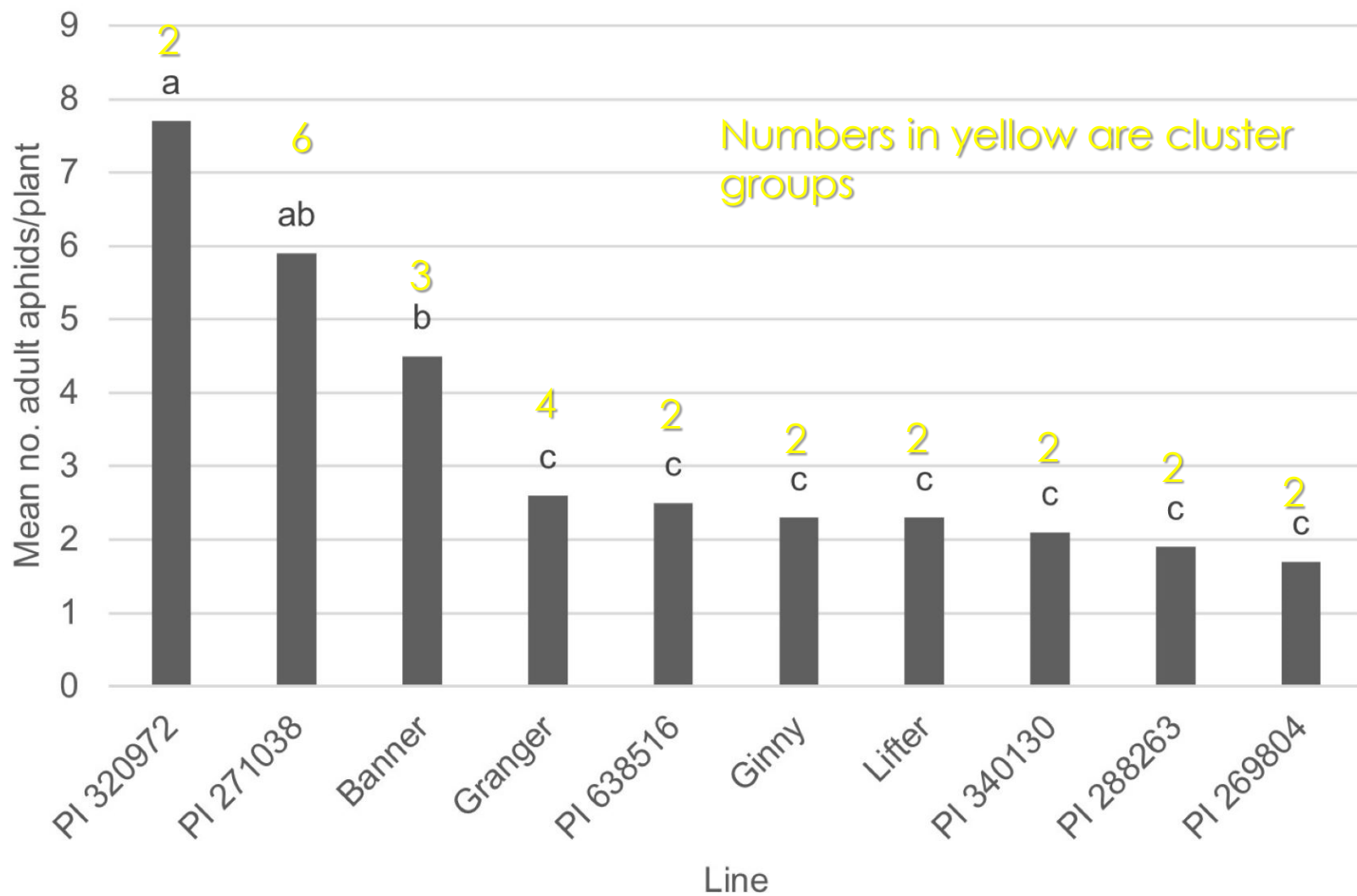


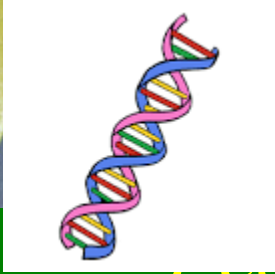
TOTAL APHIDS PRODUCED

(10 DAYS AFTER SINGLE APHID INFESTED)

<u>Pea line</u>	<u>Mean # of Aphids</u>
PI 279827	9.3
Lifter	10.7
PI 288263	11.5
PI 638516 PSP	12.5
PI 269804 PSP	13.8
Ginny	15.8
PI 340130 PSP	20.5
PI 324702 PSP	24.8
Banner	25.0
PI 308796	25.8

ANTIXENOTIC-RESISTANT PEAS





Gcn5-related N-acetyltransferase



*Pea enation
mosaic virus*



Pea seed-borne mosaic virus (PSbMV)

PSbMV is seed-borne and aphid-transmitted

PSbMV causes economic losses due to reduced seed quality and quantity

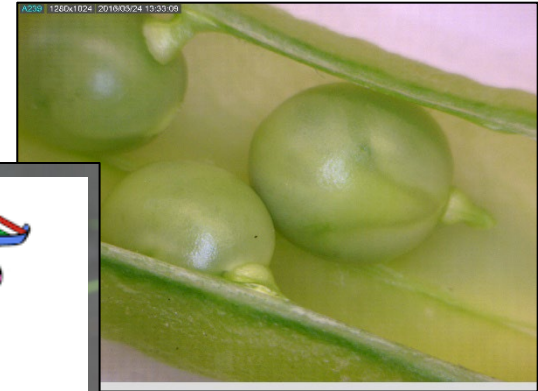


eIF4E Resistant Type 1 Gene

a reduced internode lengths

cracking of the pea seed coat

- Mosaic on the seed
- Seed abortion
- Leaf curling and mosaic
- Leaf distortion
- Terminal rosetting of the leaves



Strategies to Manage Root Rot in Legumes



Fusarium wilts



Pythium root and seed rot

Rhizoctonia root rot



Aphanomyces root rot



Fusarium root rot

MAY

Root Rot Management Strategies

► Chemical control

► Seed treatments



- Rhizoctonia: Sedaxane (Vibrance), fluxapyroxad/pyraclostrobin (Obvius), tolclophos-methyl (Rizolex)
- Fusarium: Pydiflumetofen (Trebuset), Obvius
- Metalaxyl-Resistant Pythium: (Ethaboxam (Intego Suite), Picarbutrazox (Vayantis), Thiram)
- Aphanomyces: no effective seed treatment available



Patches of Metalaxyl-resistant Pythium in a chickpea field



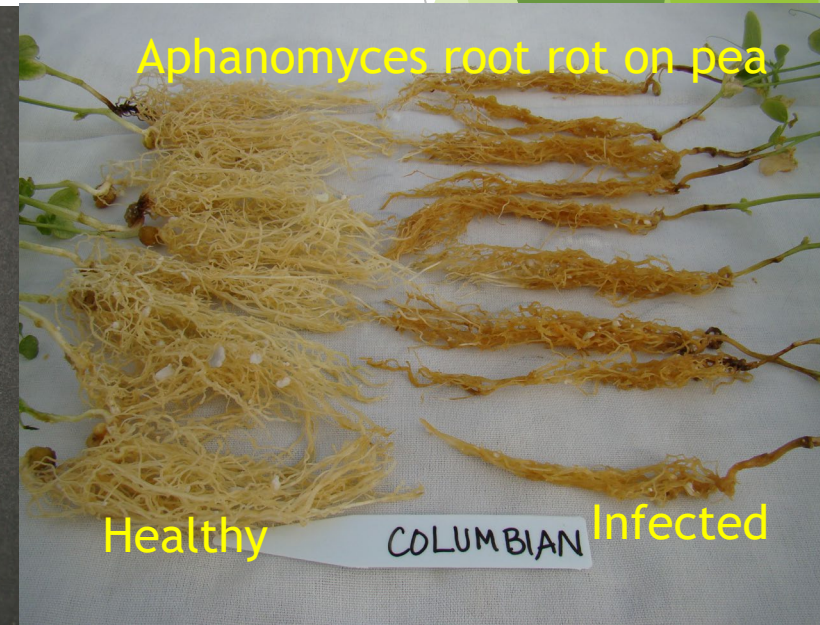
Rhizoctonia root rot on pea



Fusarium avenaceum root rot on lentil

Infected

Healthy



Aphanomyces root rot on pea

Healthy

COLUMBIAN

Infected



Mega-nodules



Mega-nodules



Normal nodule

Root rot Management Strategies
Biological control with *Rhizobium* and other endophytes

Questions?

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