

# Legume Diseases



Cultural Practices



Seed treatments



Foliar chemical or  
biological applications



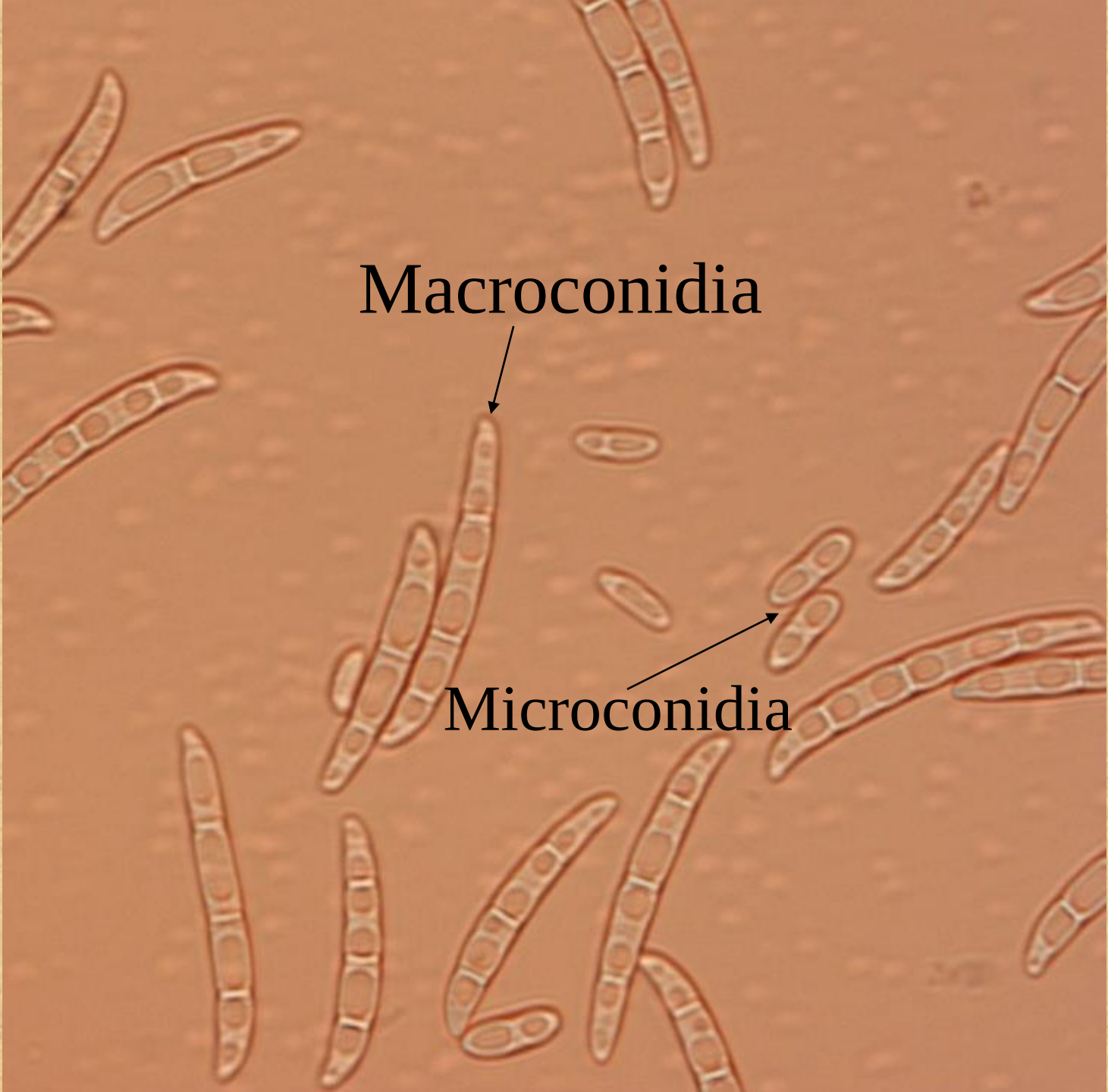
Genetic resistance



# Fusarium Root Rot on Dry Pea





A microscopic image showing numerous elongated, multi-segmented fungal spores (conidia) against a reddish-brown background. The spores are arranged in various orientations, some singly and some in small groups. Two labels with arrows point to specific spores: 'Macroconidia' points to a long, multi-segmented spore, and 'Microconidia' points to a shorter, multi-segmented spore.

Macroconidia

Microconidia





Minimize soil compaction



# Impacts of Soil Compaction on Plant Health

- Reduces or slows plant emergence
- Restricts root development and growth
- Lowers oxygen in root zone
- Restricts water percolation
- Favors Fusarium and Pythium root rot and other soil diseases
- May promote build up of pathogens over time



# Seed Treatments

- Apron Maxx seed treatment improved plant health that reduced Fusarium root rot (North Dakota field trials).



# Pea Cultivars Screened for Resistance to *Fusarium solani* and *Fusarium avenaceum*

| Green Dry   |          | Yellow Dry | Austrian Winter | Green Fresh | Yellow Winter |
|-------------|----------|------------|-----------------|-------------|---------------|
| Aragorn     | Ariel    | DS Admiral | Granger         | Bolero      | Specter       |
| Banner      | Cruiser  | Carneval   | Melrose         | DSP         | Windham       |
| Franklin    | K-2      | Carousel   |                 |             |               |
| Lifter      | Marjoret | Marquee    |                 |             |               |
| Matrix      | Monarch  | Midas      |                 |             |               |
| Nitouche    | Pacifica | Universal  |                 |             |               |
| Prodigy     | Stirling |            |                 |             |               |
| CDC Striker | Toledo   |            |                 |             |               |

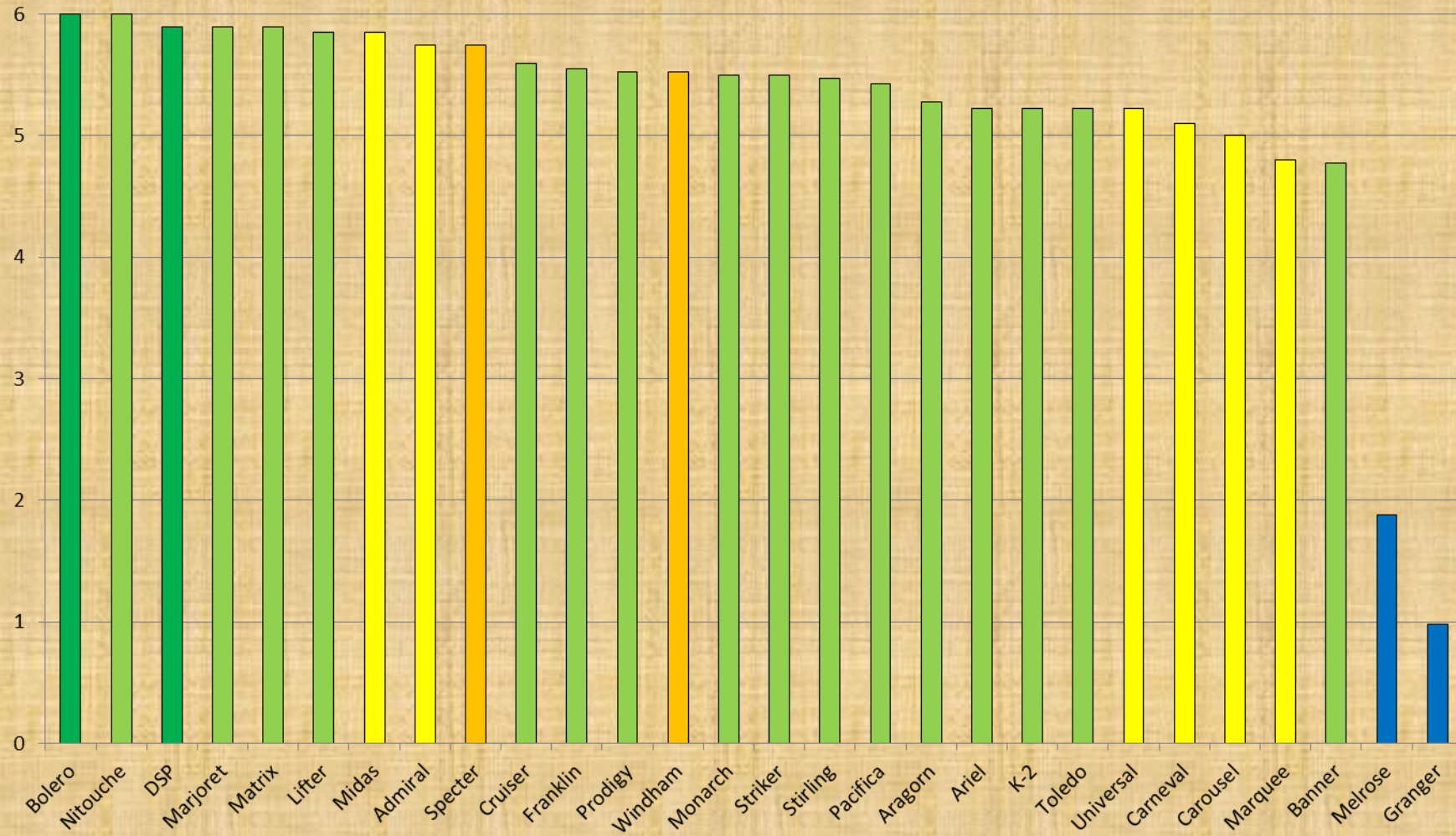


# Root Rot Severity of Pea Seed Inoculated with *Fusarium solani* (Scale 0 to 6)





# Root Rot Severity of Pea Seed Inoculated with *Fusarium avenaceum* (Scale 0 to 6)

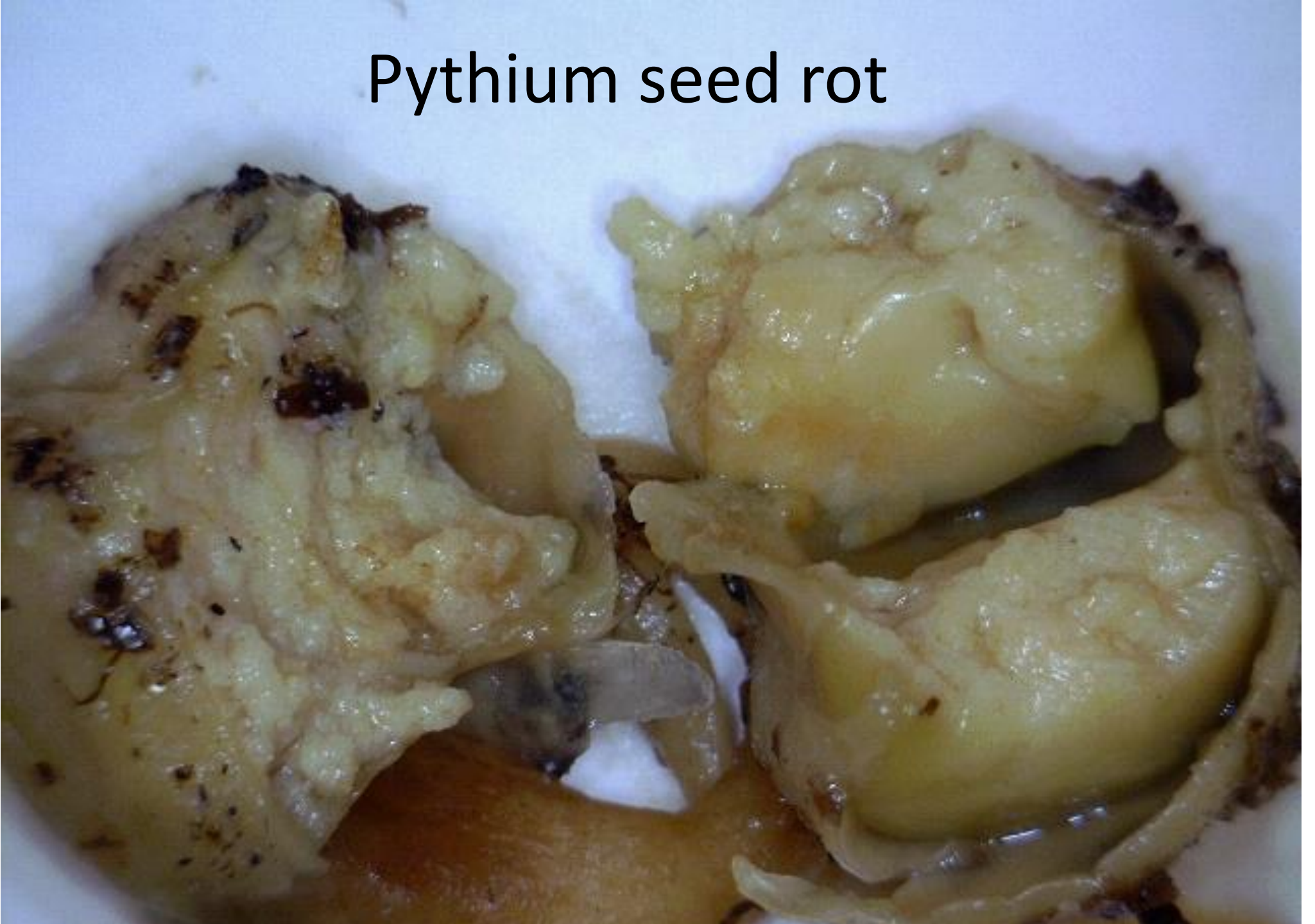




Pythium Seed Rot



Pythium seed rot





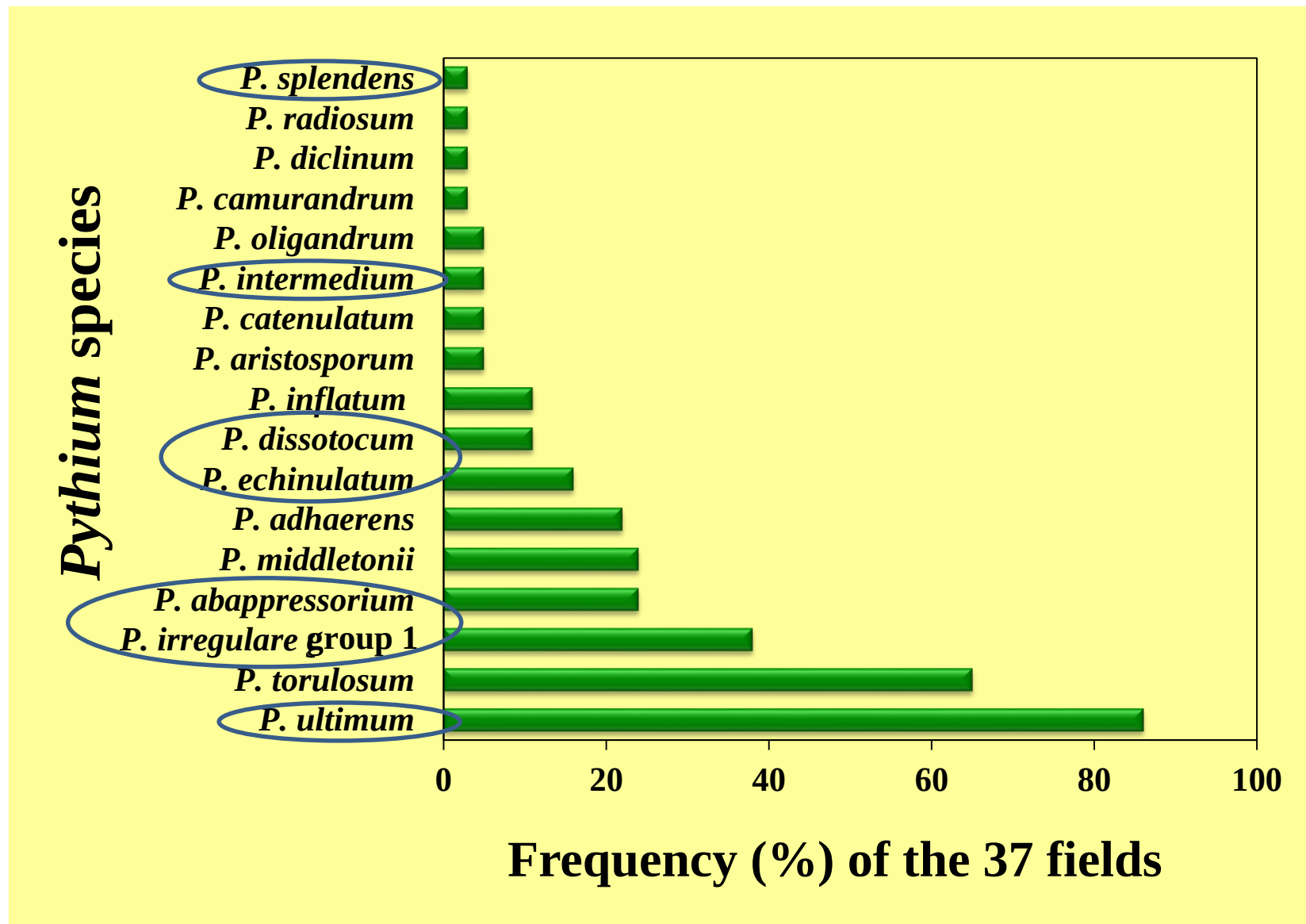


Pythium seedling rot

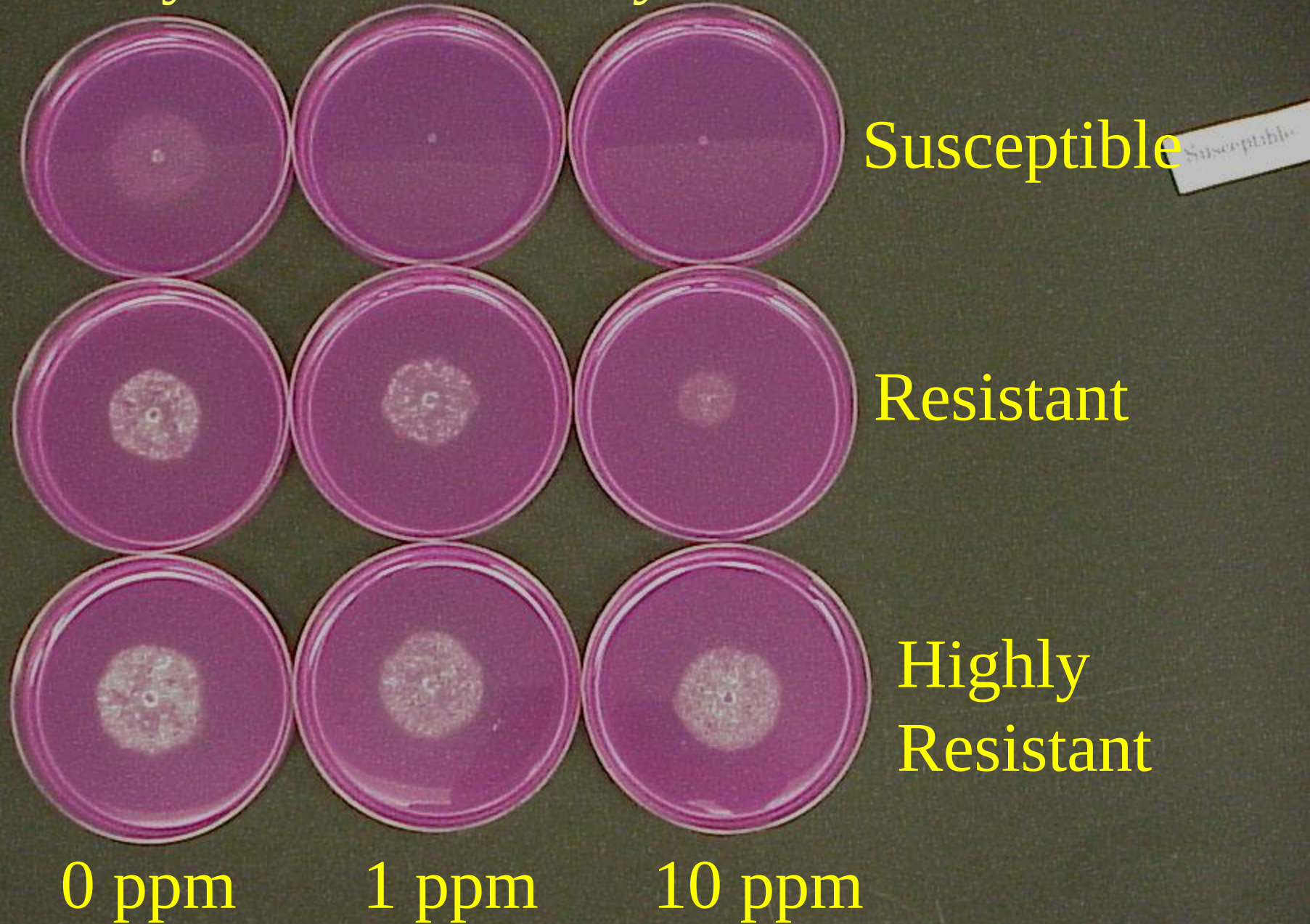
Picture courtesy  
of Avi Alcalde



# *Pythium* Survey of Organic Fields

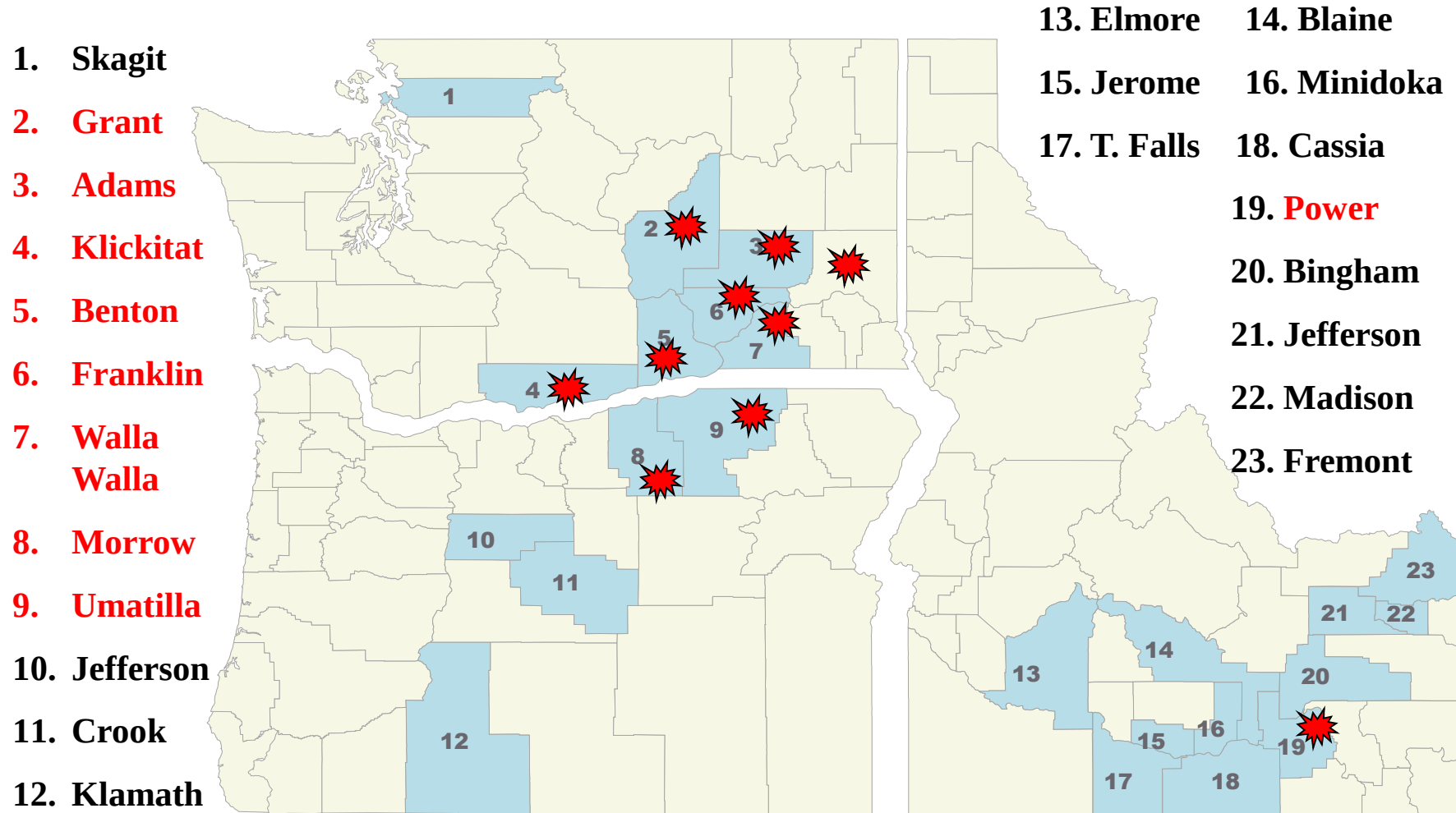


# Metalaxyl resistance in *Pythium ultimum*





# Results: Incidence of metalaxyl-resistant *Pythium* in the Pacific Northwest



# Management of Pythium seed rot

- ▣ Rapid emergence from soil will help avoid Pythium seed rot (Warm soil temperatures, shallow planting, adequate soil moisture levels at planting.)
- ▣ Once plants start to photosynthesize, threat of seed and seedling rot is greatly reduced.
- ▣ Seed treated with metalaxyl (Apron/Allegiance) or a combination of metalaxyl and ethaboxam (Intego) is highly effective.
- ▣ Biological seed treatments have been inconsistent for cool season plantings of peas. (*Bacillus subtilis*).

Pythium seedling rot



# Aphanomyces Root Rot on Pea





# Aphanomyces Root Rot on Dry Pea

The image shows two sets of pea roots on a white background. On the left, a large, dense mass of roots is labeled 'Healthy'. These roots are light yellow, fibrous, and appear to have a healthy texture. On the right, several individual roots are labeled 'Infected'. These roots are also light yellow but appear much thinner, more brittle, and have a more irregular, shriveled appearance compared to the healthy roots. Some of the infected roots show small, dark brown spots, likely indicating areas of rot or fungal growth.

Healthy

Infected





Susceptible

Lentil



Resistant

Faba bean



Resistant

Chickpea

## Crop Rotations (Susceptibility to Aphanomyces root rot)



Susceptible

Spring pea



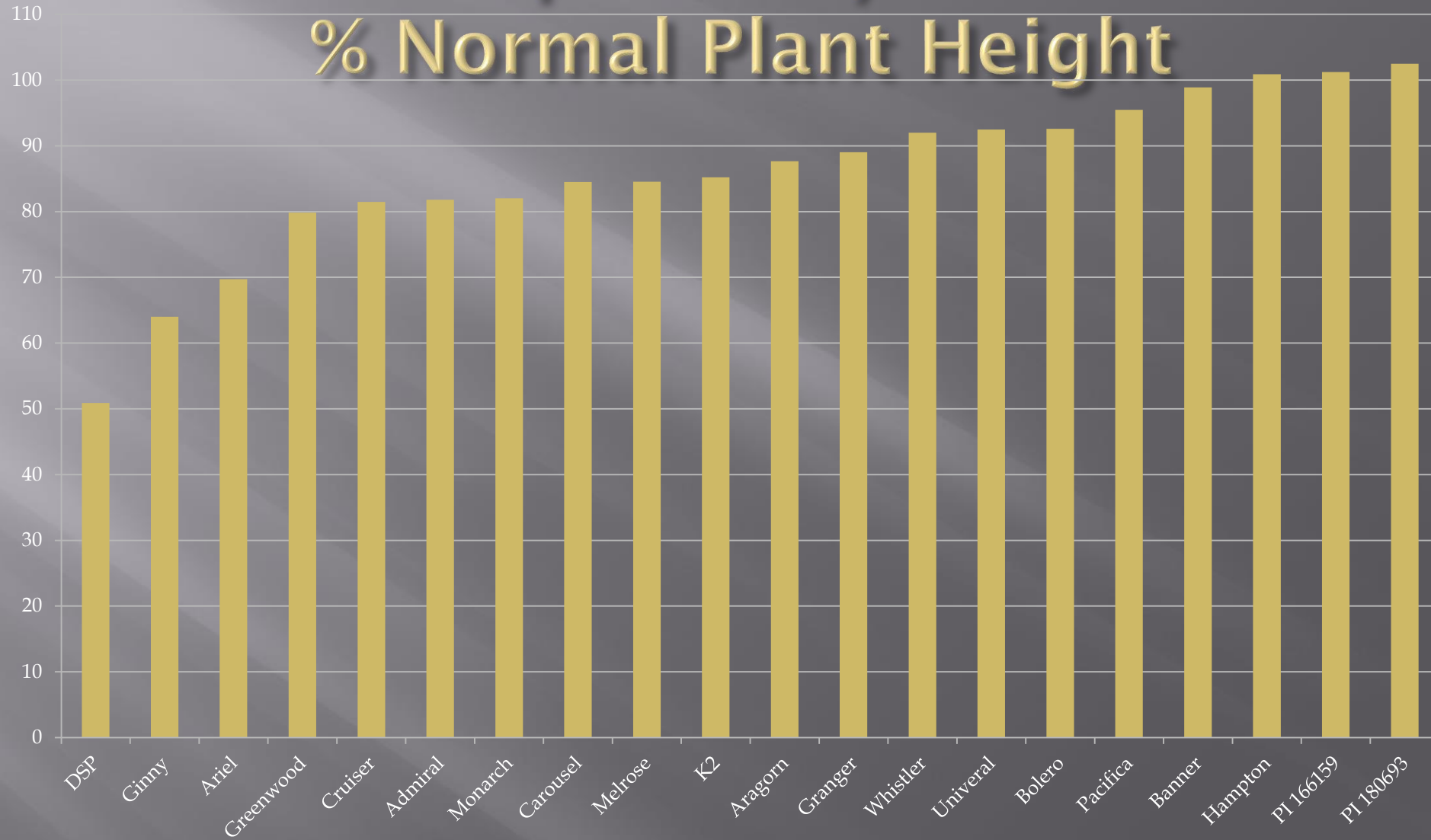
Susceptible

Winter pea



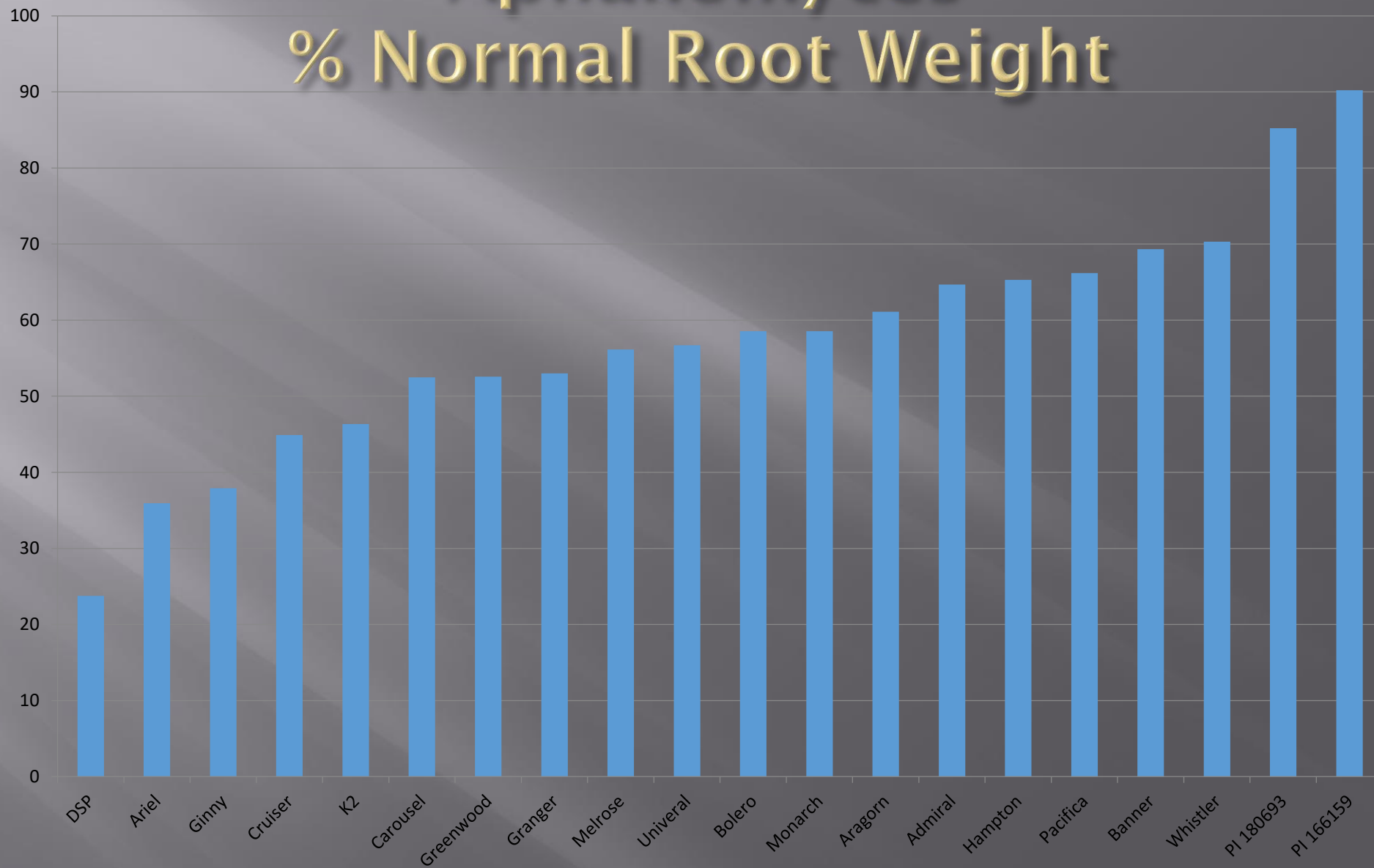
# Pea Cultivar Resistance to *Aphanomyces*

% Normal Plant Height





# Pea Cultivar Resistance to *Aphanomyces* % Normal Root Weight





Lentil  
resistance to  
Aphanomyces  
root rot

| Lentil Cultivar | Mean Disease Severity | 0 to 5 Scale |
|-----------------|-----------------------|--------------|
| Richlea         | 3.80                  |              |
| Crimson         | 3.90                  |              |
| Pardina         | 4.30                  |              |
| Brewer          | 4.40                  |              |
| Palouse         | 4.60                  |              |
| Riveland        | 4.70                  |              |
| Easton          | 4.80                  |              |
| Cedar           | 5.00                  |              |
| Essex           | 5.00                  |              |
| Greenland       | 5.00                  |              |
| Laird           | 5.00                  |              |
| Lemay           | 5.00                  |              |
| Mason           | 5.00                  |              |
| Merrit          | 5.00                  |              |
| Morena          | 5.00                  |              |
| Redberry        | 5.00                  |              |
| Viceroy         | 5.00                  |              |



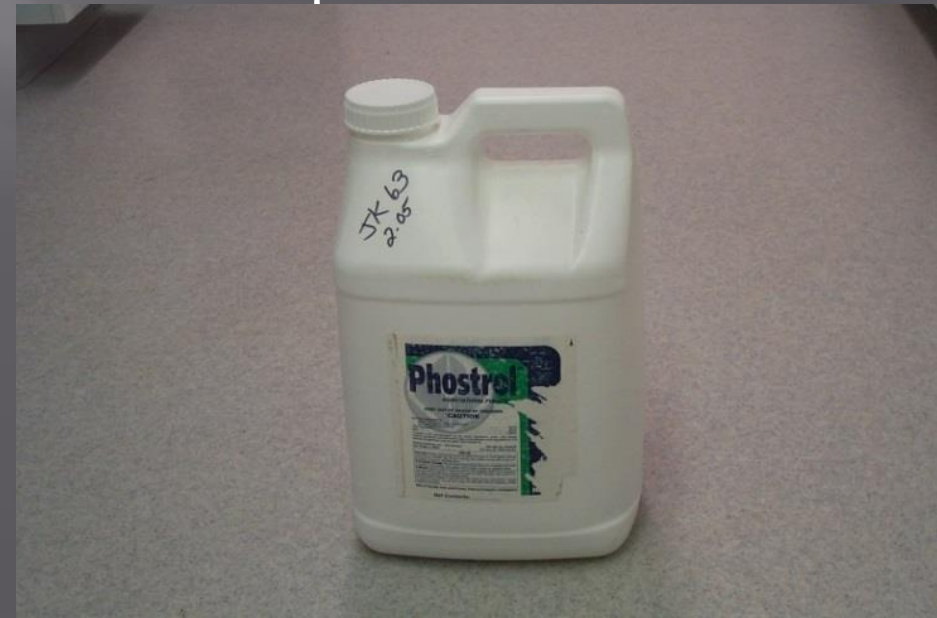
# Ethaboxam (Seed treatment)

- ▣ Intego Suite seed treatment (Valent)
  - Ethaboxam = Group 22 Fungicide
  - Metalaxyl = Group 4 Fungicide
  - Clothianidin = Insecticide
  - Ipconazole = Fungicide



# Phosphorous Acid (Foliar Treatment)

- ▣ Phostrol at 2.5 pints (1.2 liters) or 4 pints/acre/application
  - Mono- and dibasic sodium, potassium and ammonium phosphites (53.6%)
  - Other ingredients (46.4%)
  - Equivalent to 4.32 pounds phosphorous acid per gallon (35.6% by weight).





# Pea Aphid (*Acyrtosiphum pisum*)





# *Bean Leaf Roll Virus*













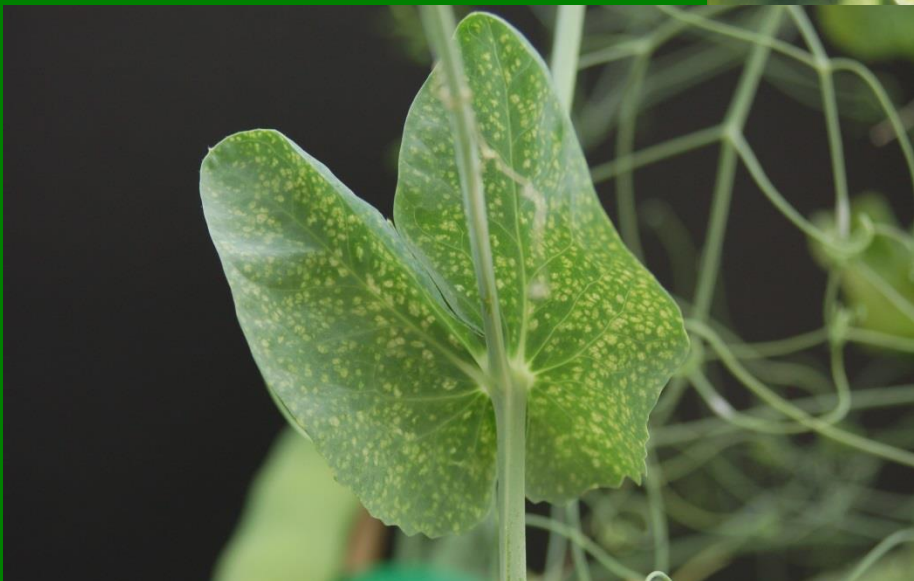
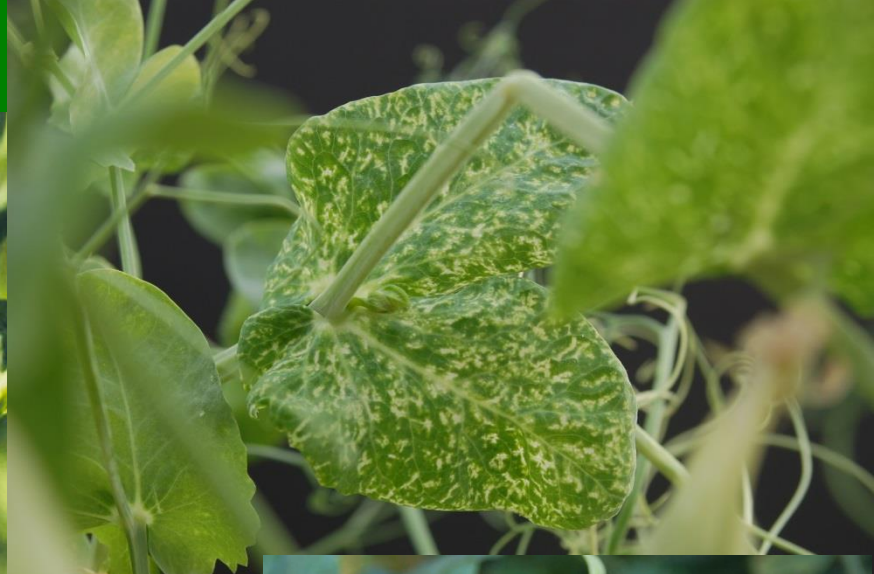








*Pea enation  
mosaic virus*





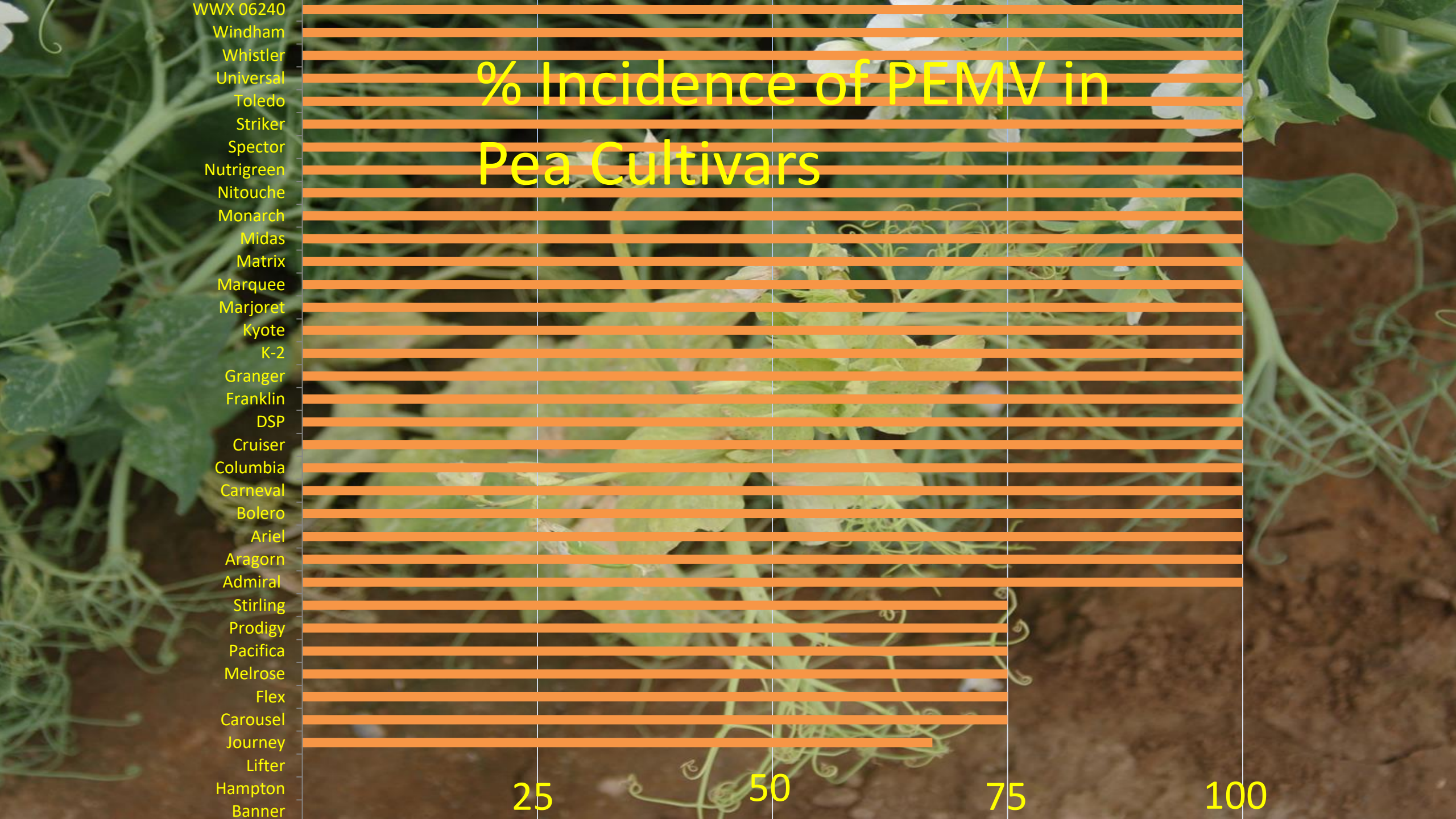
# Resistance in PI Lines to PEMV

- 314 lines screened
- W6 39729 resistant
  - Lifter
- PI 306591 resistant
  - Hungry
  - Pigmented flower



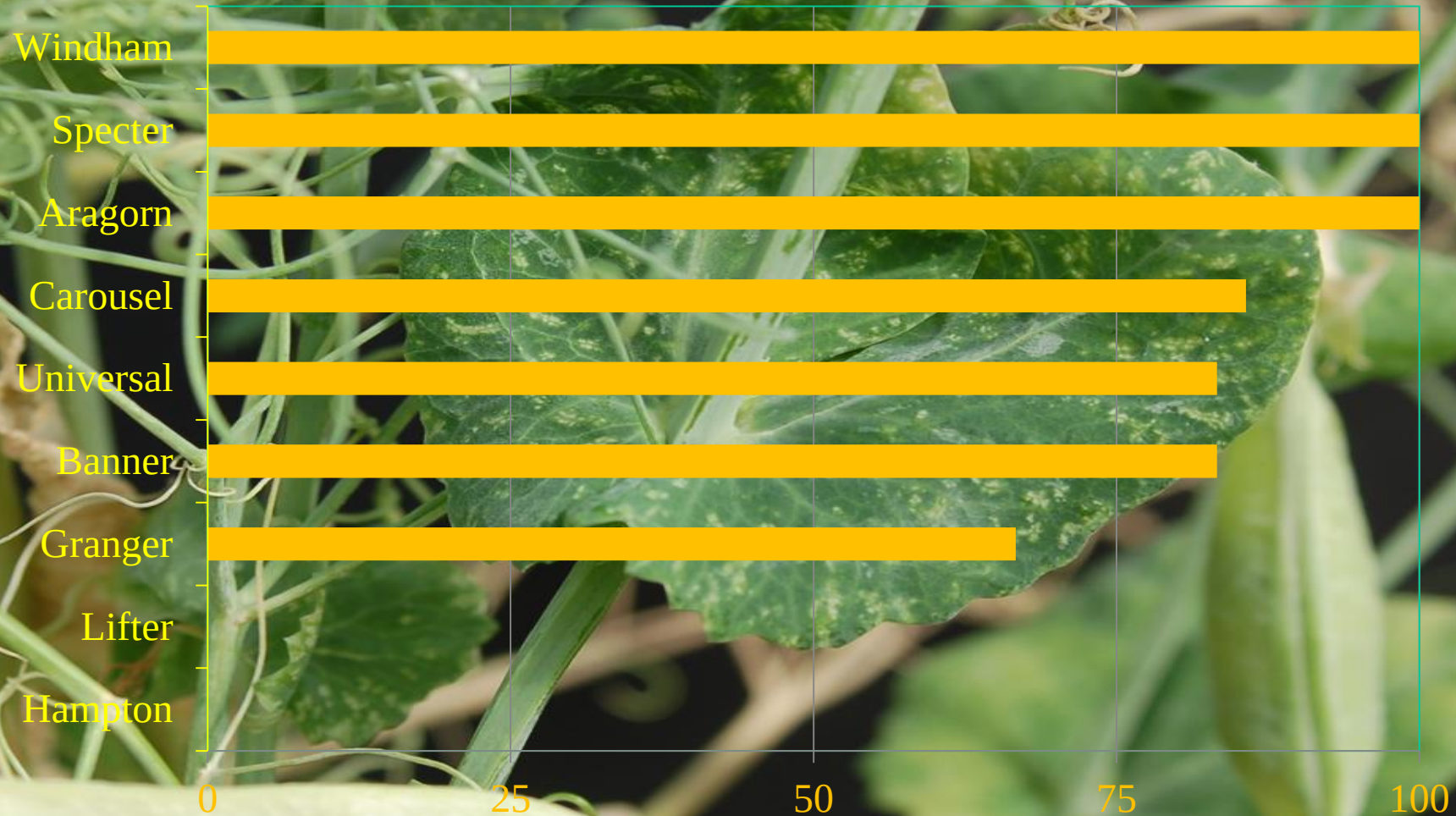
Photo by Clare Coyne







# Percent Incidence of PEMV in Pea Cultivars





# *Pea seed-borne mosaic virus (PSbMV)*

PSbMV is seed-borne and aphid-transmitted

PSbMV causes economic losses due to reduced seed quality and quantity

Symptoms of PSbMV in pea:

- Stunting and reduced internode lengths
- Splitting of the pea seed coat
- Mosaic on the seed
- Seed abortion
- Leaf curling and mosaic
- Leaf distortion
- Terminal rosetting of the leaves







Questions?

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