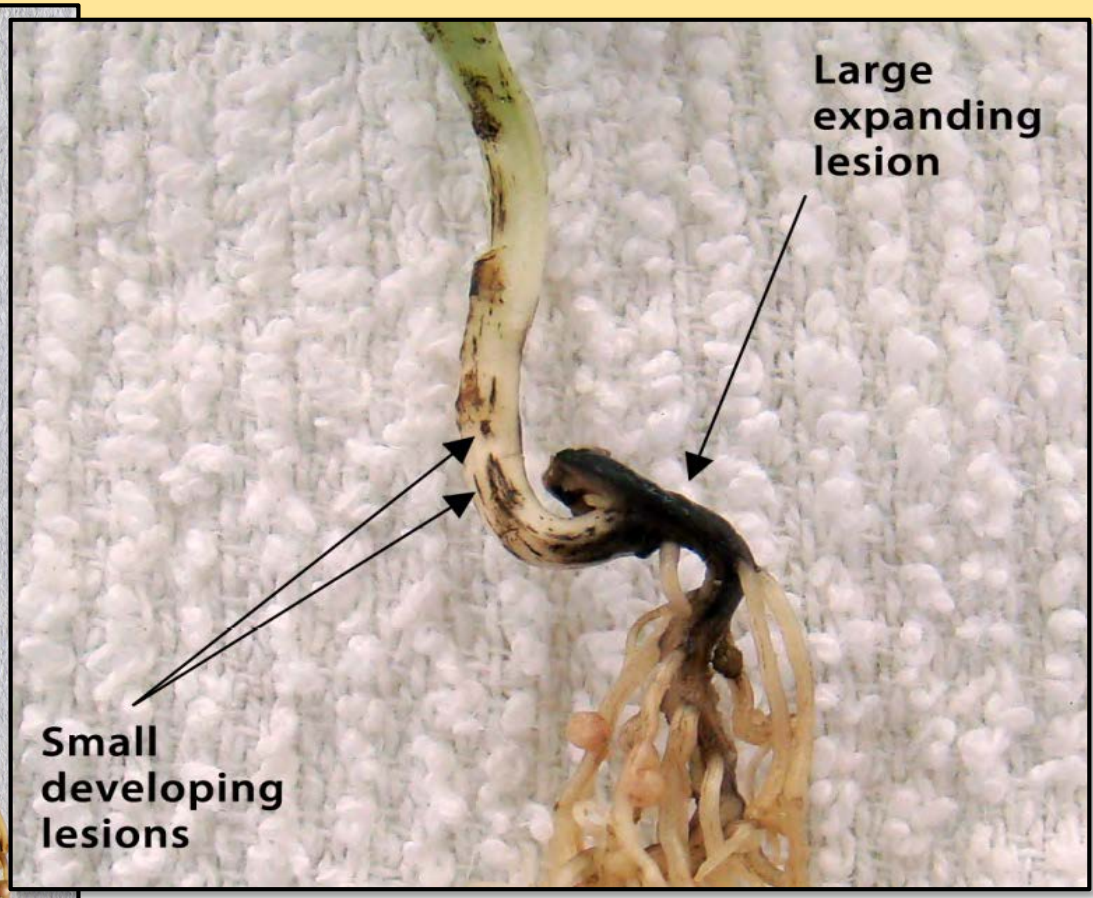
Diseases of seeds, seedlings and roots:

Fusarium root rot



Photos:
Julie Pasche, NDSU (above)
Michael Wunsch, NDSU (left)

Fusarium

Symptoms:

- *When soil temperatures are high prior to emergence:* Poor stand establishment due to seed decay and damping-off
- Root rot: lesions that are initially brick-red to brown and later necrotic
- Wilt: plants yellowing from the bottom up

Fusarium

Causal pathogens:

- *Fusarium* spp. (fungal pathogens)

Conditions that favor infection:

- Soil moisture: low to high
- Soil temperatures: high

Fusarium

Susceptibility:

- Field peas, lentils >> chickpeas
  - Chickpeas are not considered susceptible.
  - Lentils and field peas are highly susceptible.

Crop rotation:

- Effectiveness of crop rotation is limited by the pathogen’s persistence in the soil and host range

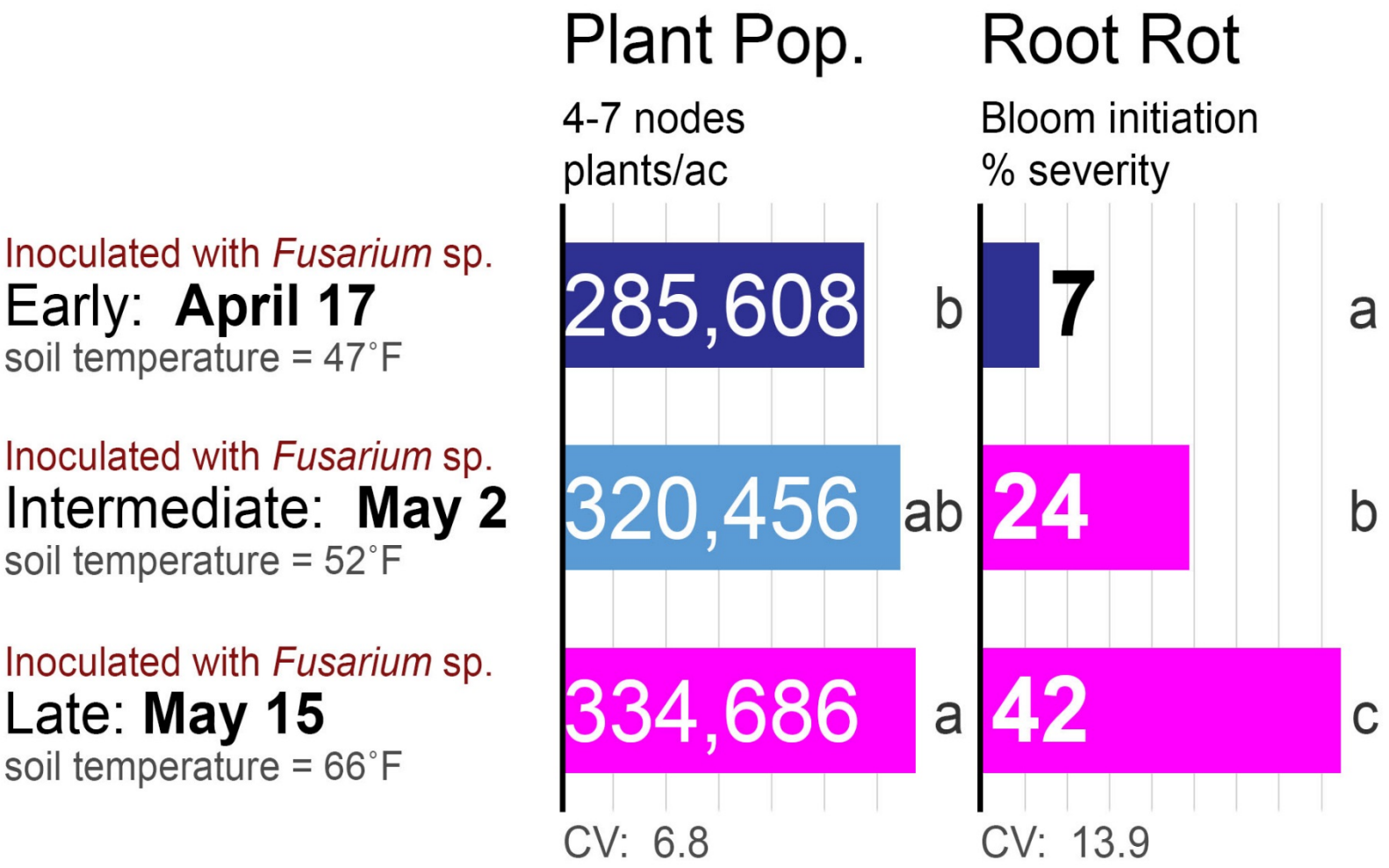
Fusarium

Seed treatments:

- Most seed treatments are effective against seed decay and damping off, not root rot.

  Root rot develops during vegetative growth and bloom, when the concentration of fungicide active ingredients in the target tissues (tap root, epicotyl) is low.

Fusarium - Response to planting date

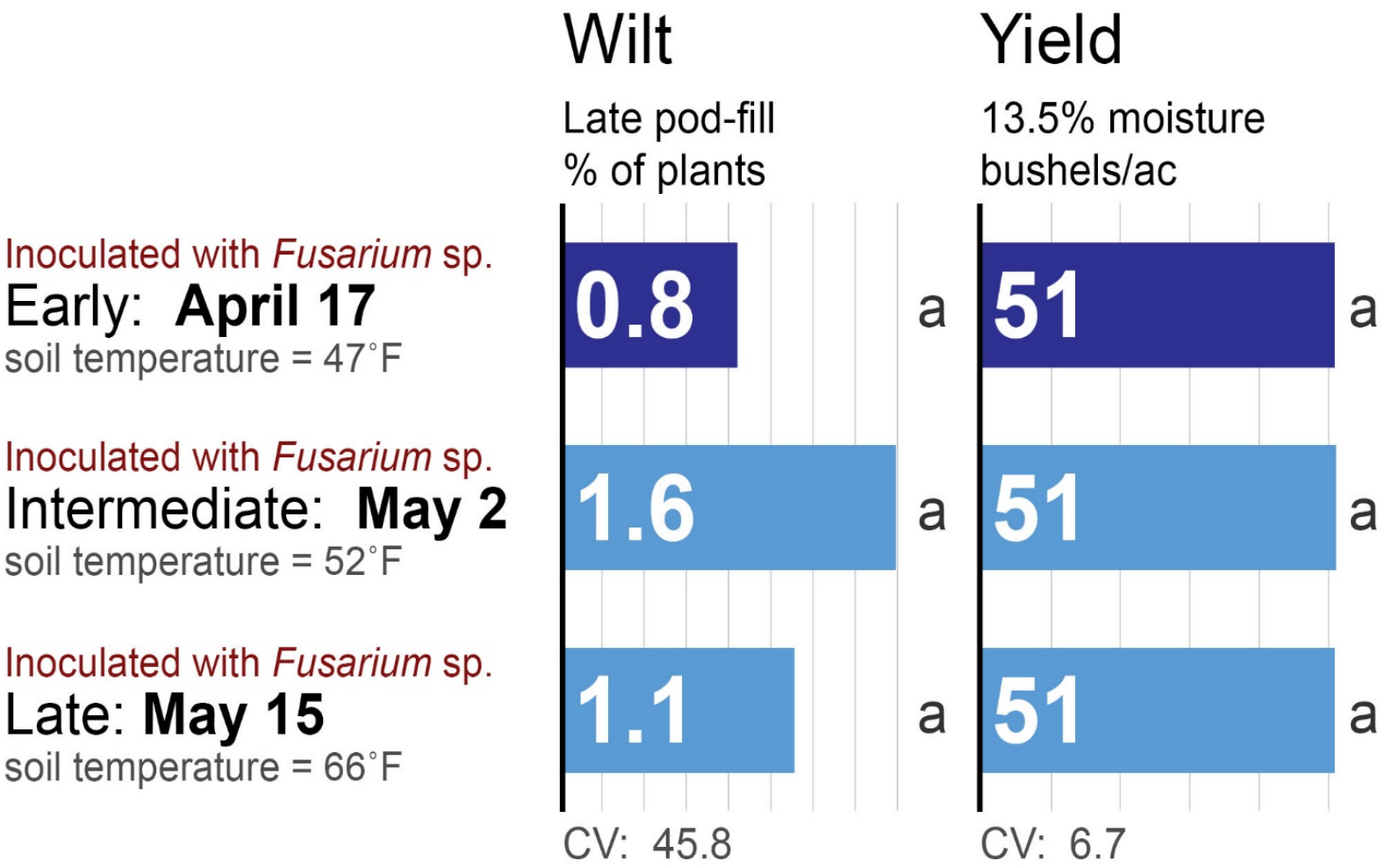


Variety: 'Abarth' (yellow-cotyledon type)
Seeding rate: 330,000 pure live seeds/ac **Direct-seeded** into wheat stubble

Seed treatment: Gaucho 1.6 fl oz/cwt + Evergol Energy 1.0 fl oz/ac +/- (with or without) fluopyram 0.05 mg ai/seed

Pathogen isolation: *Fusarium* sp. from **31%** of roots (early planting date), **26%** (intermediate), **26%** (late)
Aphanomyces sp. from **0%** of roots (early planting date), **0%** (intermediate), **0%** (late)

Fusarium - Response to planting date



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Pathogen isolation: *Fusarium* sp. from **35%** of roots (early planting date), **29%** (intermediate), **28%** (late)
Aphanomyces sp. from **0%** of roots (early planting date), **0%** (intermediate), **0%** (late)

Fusarium: efficacy of seed treatments

1. **Fludioxonil:** Maxim 4ST, Spirato 480ST, etc.
2. **Evergol Energy** (penflufen + prothioconazole)
3. **Vibrance Maxx** (fludioxonil + sedaxane)
4. **Obvius** (pyraclostrobin + fluxapyroxad)

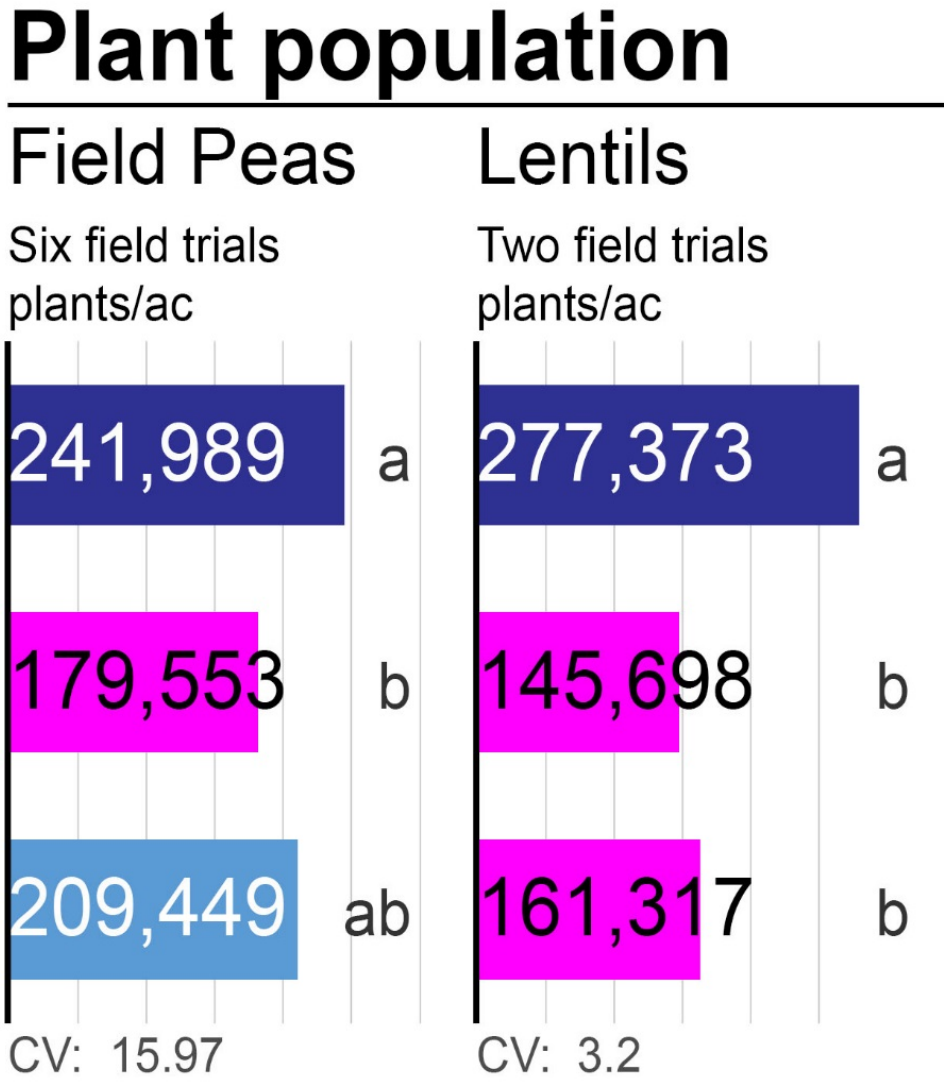
Fusarium – Efficacy of seed treatments

Fludioxonil:
Maxim 4ST,
Spirato 480ST, etc.

NO PATHOGEN INOCULUM
Seed treatment: **metalaxyl or mefenoxam**

Inoculated with *Fusarium* sp.
Seed treatment: **metalaxyl or mefenoxam**

Inoculated with *Fusarium* sp.
Seed treatment: **metalaxyl or mefenoxam + fludioxonil,** 1.14 g ai/cwt



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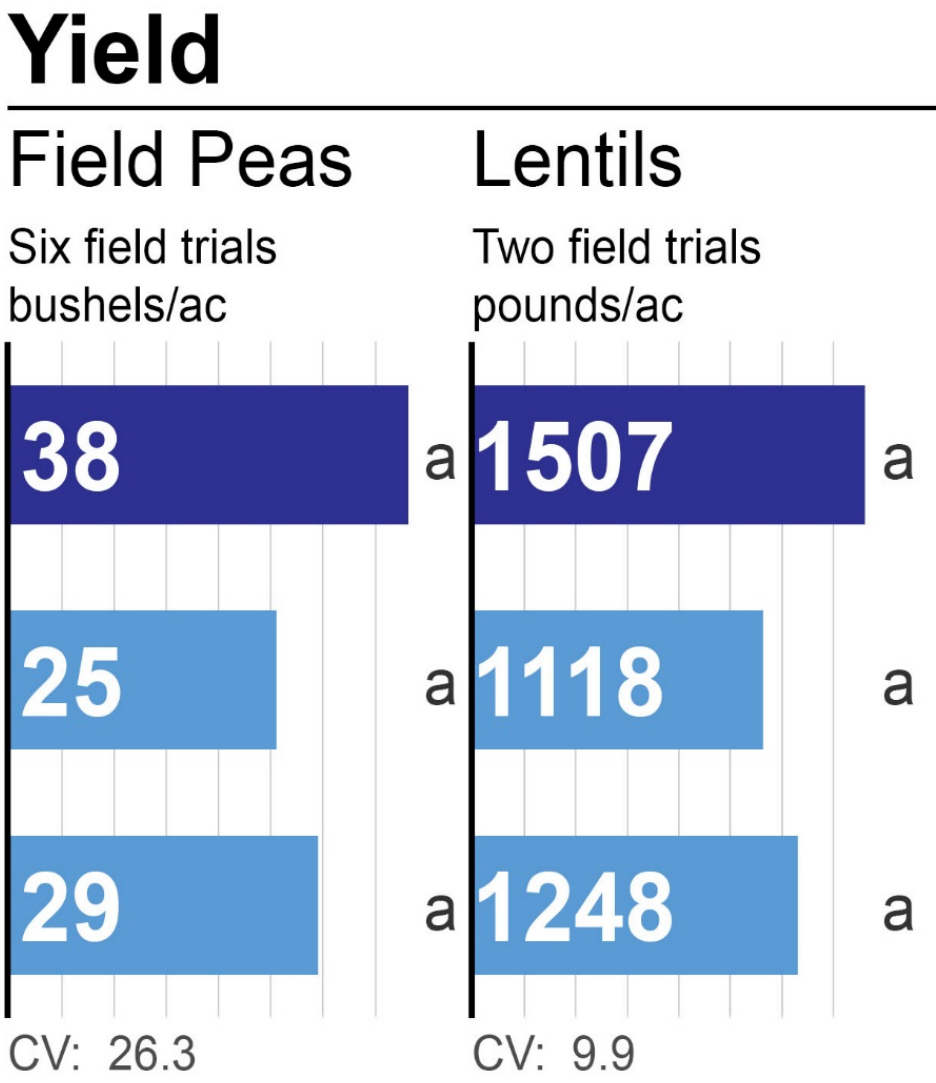

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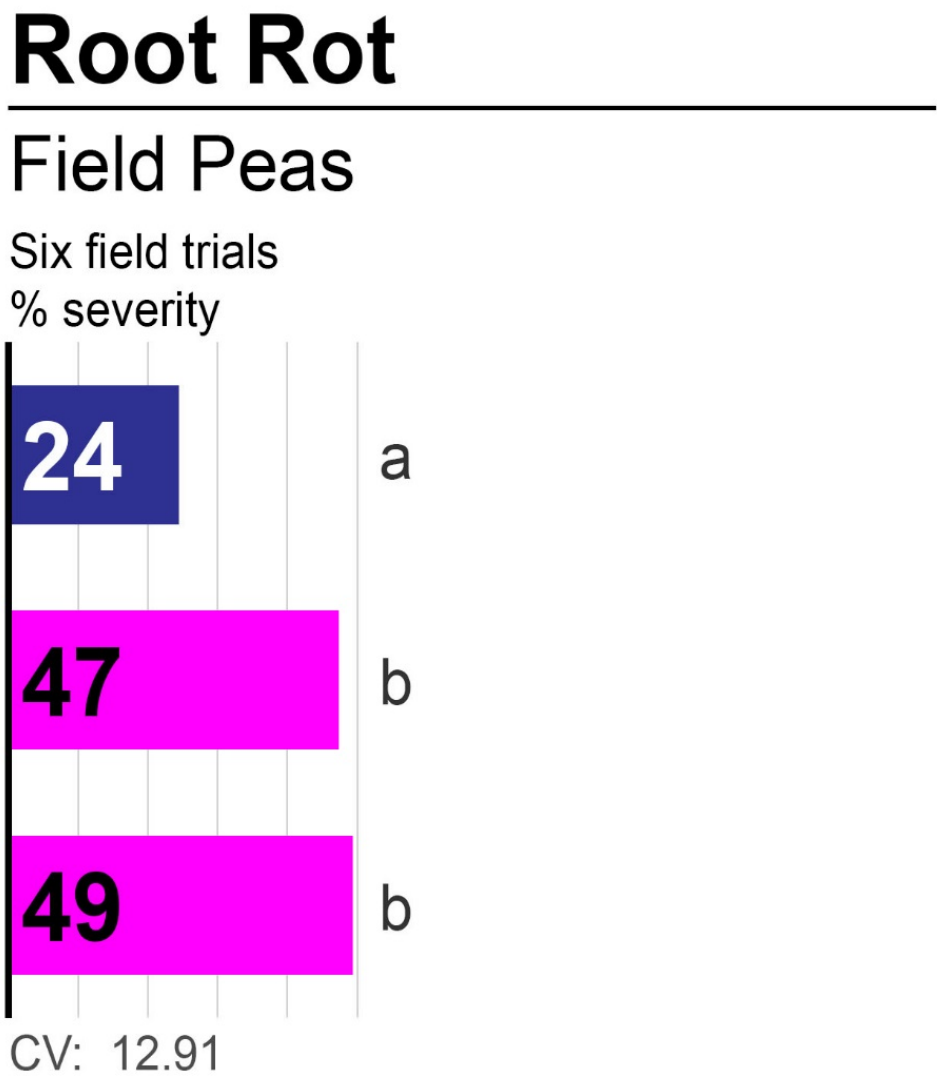
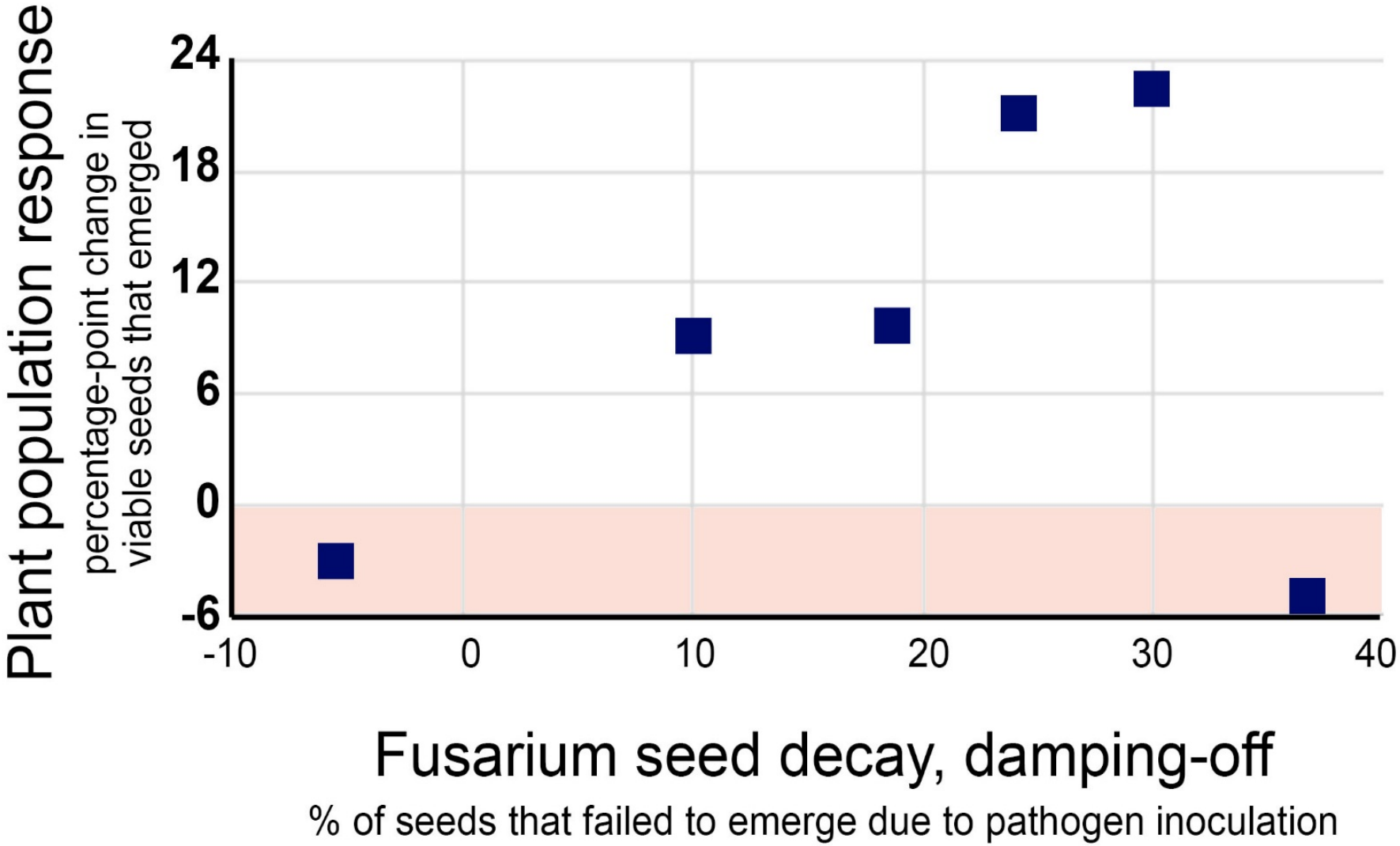


Response to seed treatment (field peas):

Fludioxonil, 1.14 g ai/cwt **(**Maxim 4ST, Spirato 480ST, etc.)



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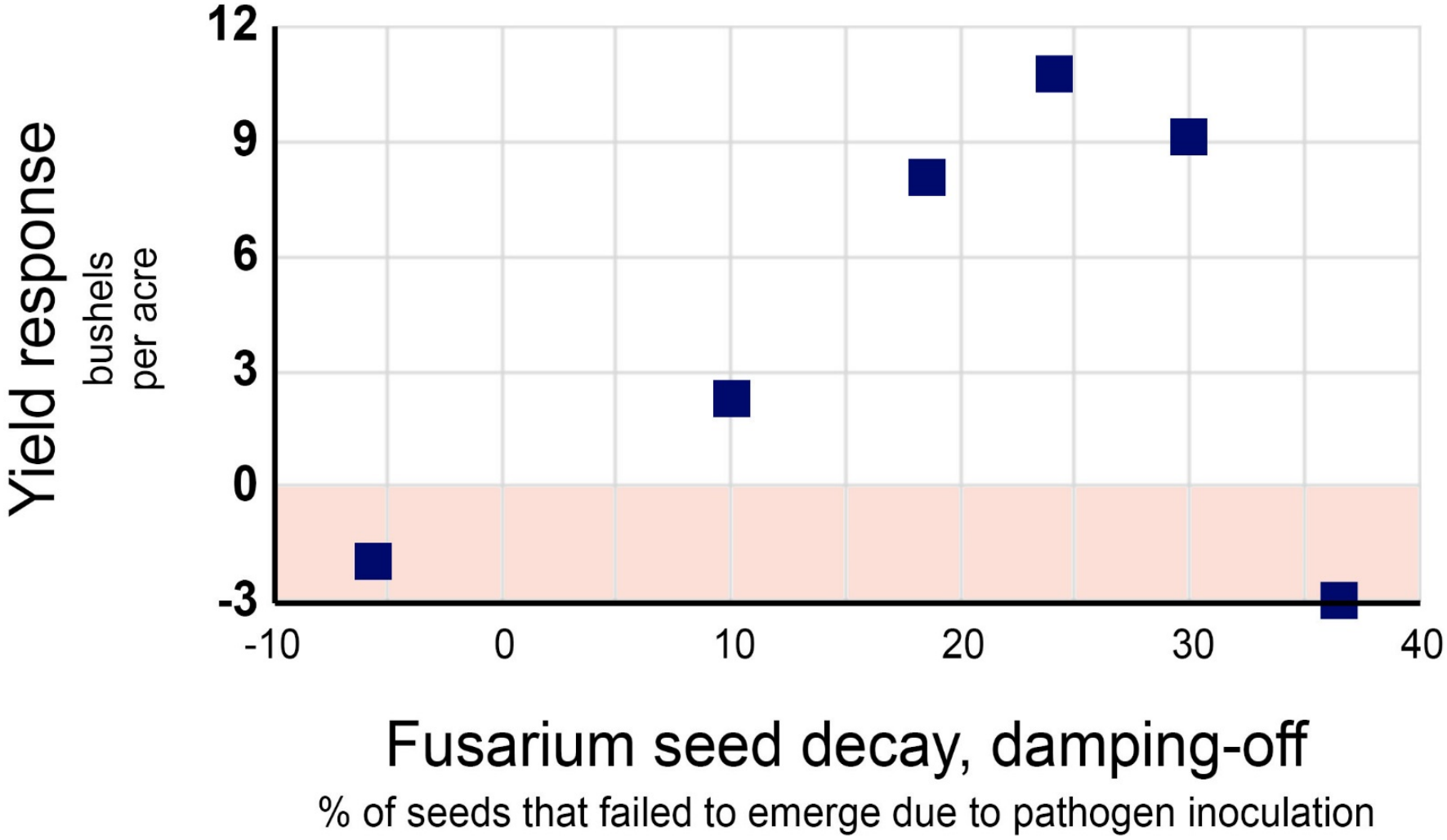

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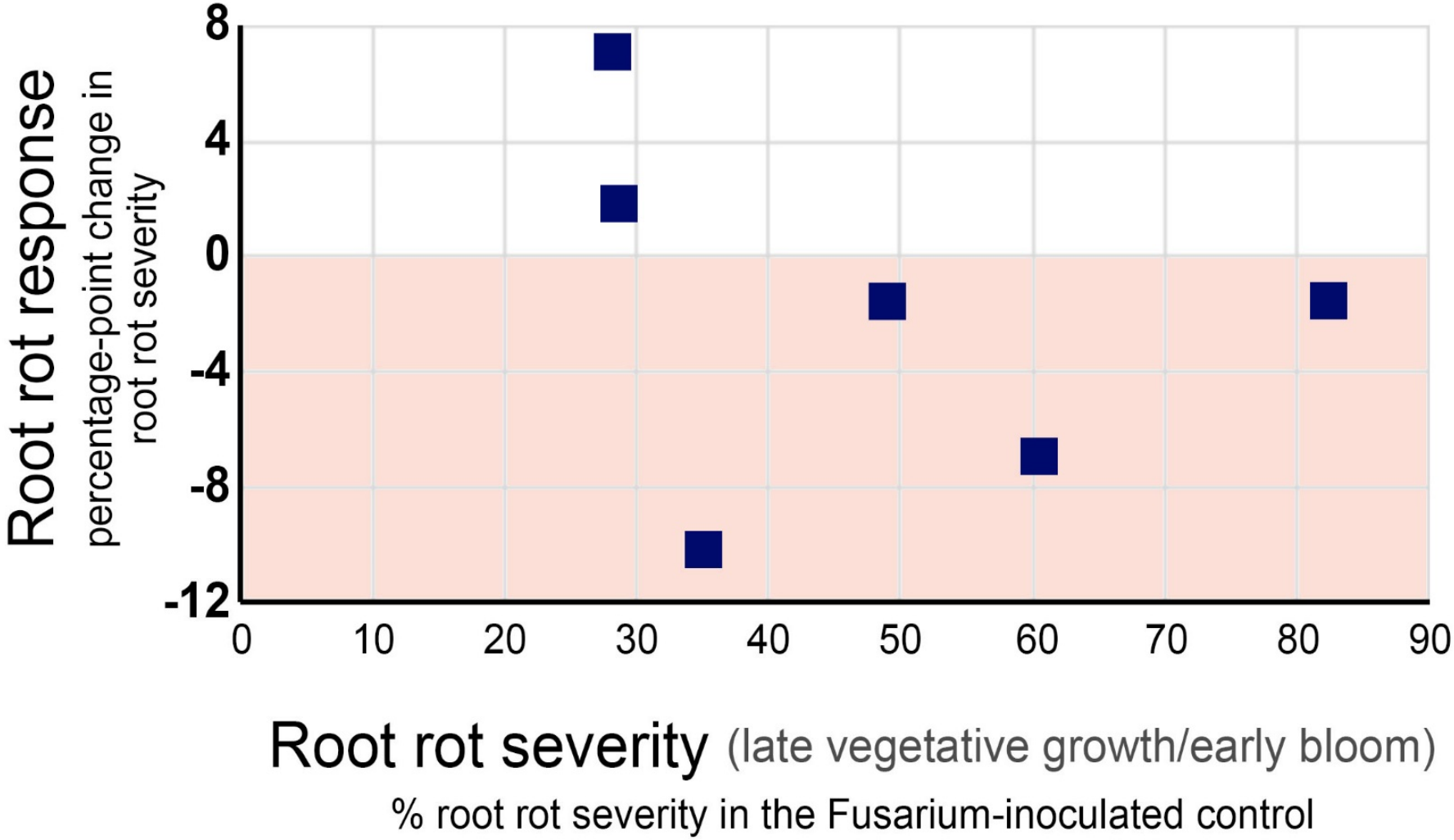
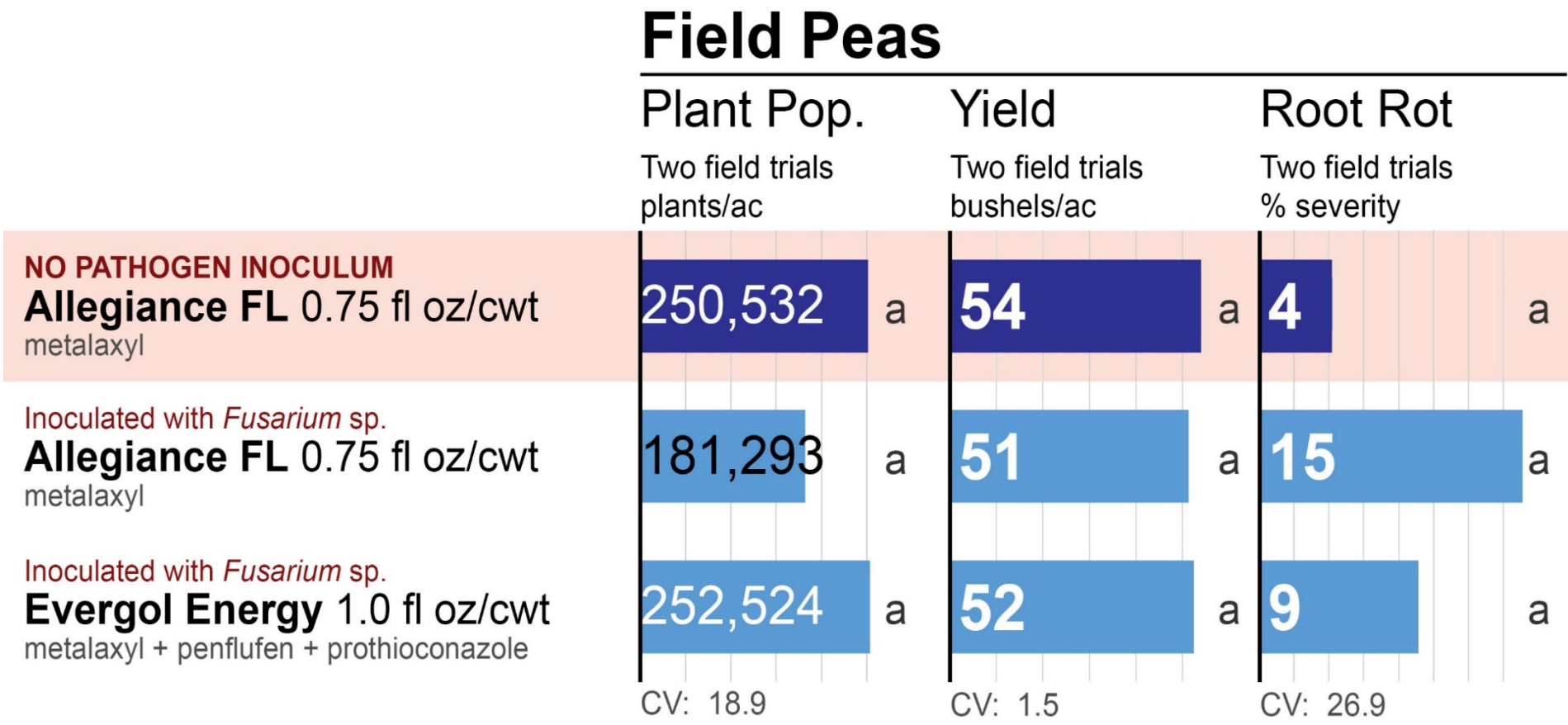


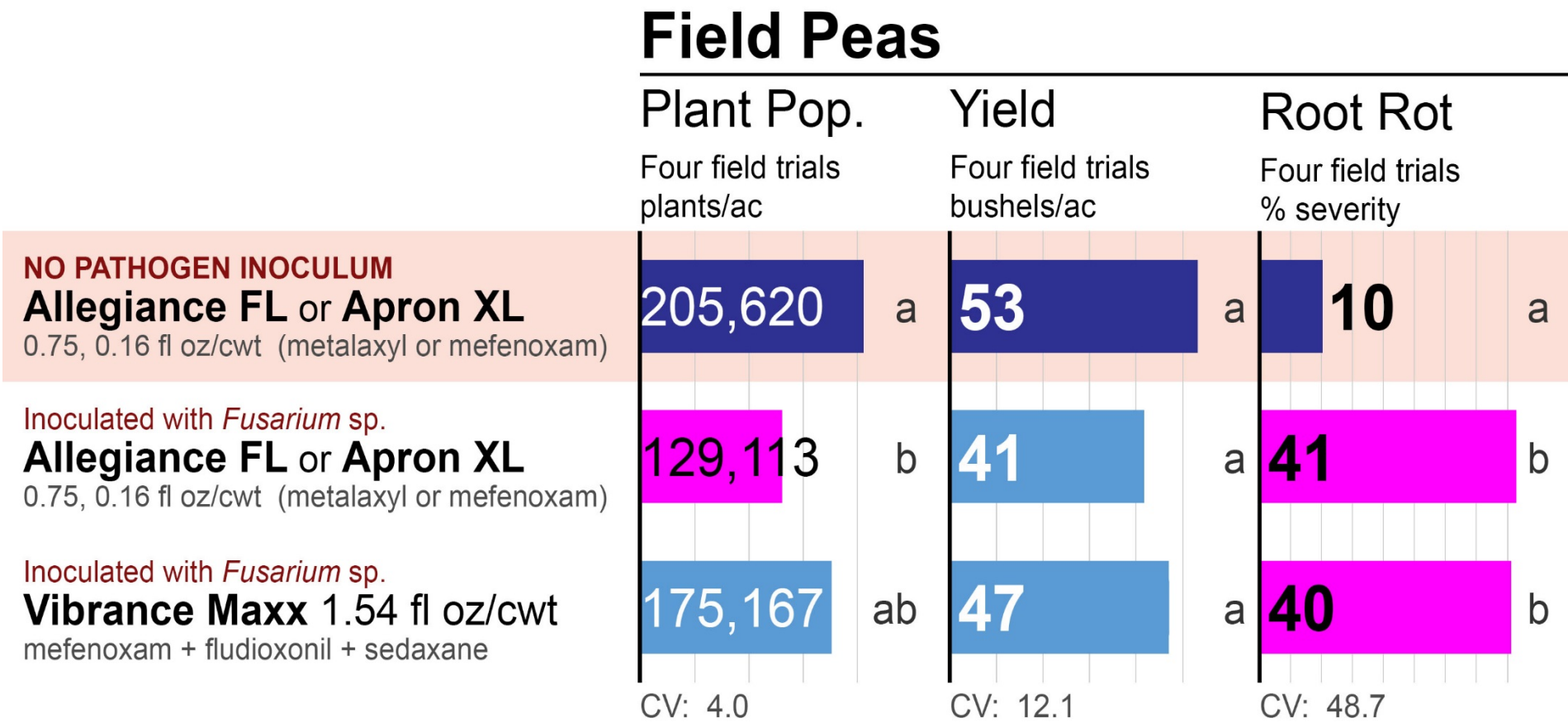
Fusarium: efficacy of seed treatments

Evergol Energy, 1.0 fl oz/cwt
Metalaxyl, 1.80 g ai/cwt + Penflufen, 1.14 g ai/cwt + Prothioconazole, 2.26 g ai/cwt



Fusarium: efficacy of seed treatments

Vibrance Maxx, 1.54 fl oz/cwt
Mefenoxam, 1.69 g ai/cwt + Fludioxonil, 1.14 g ai/cwt + Sedaxane, 2.29 g ai/cwt



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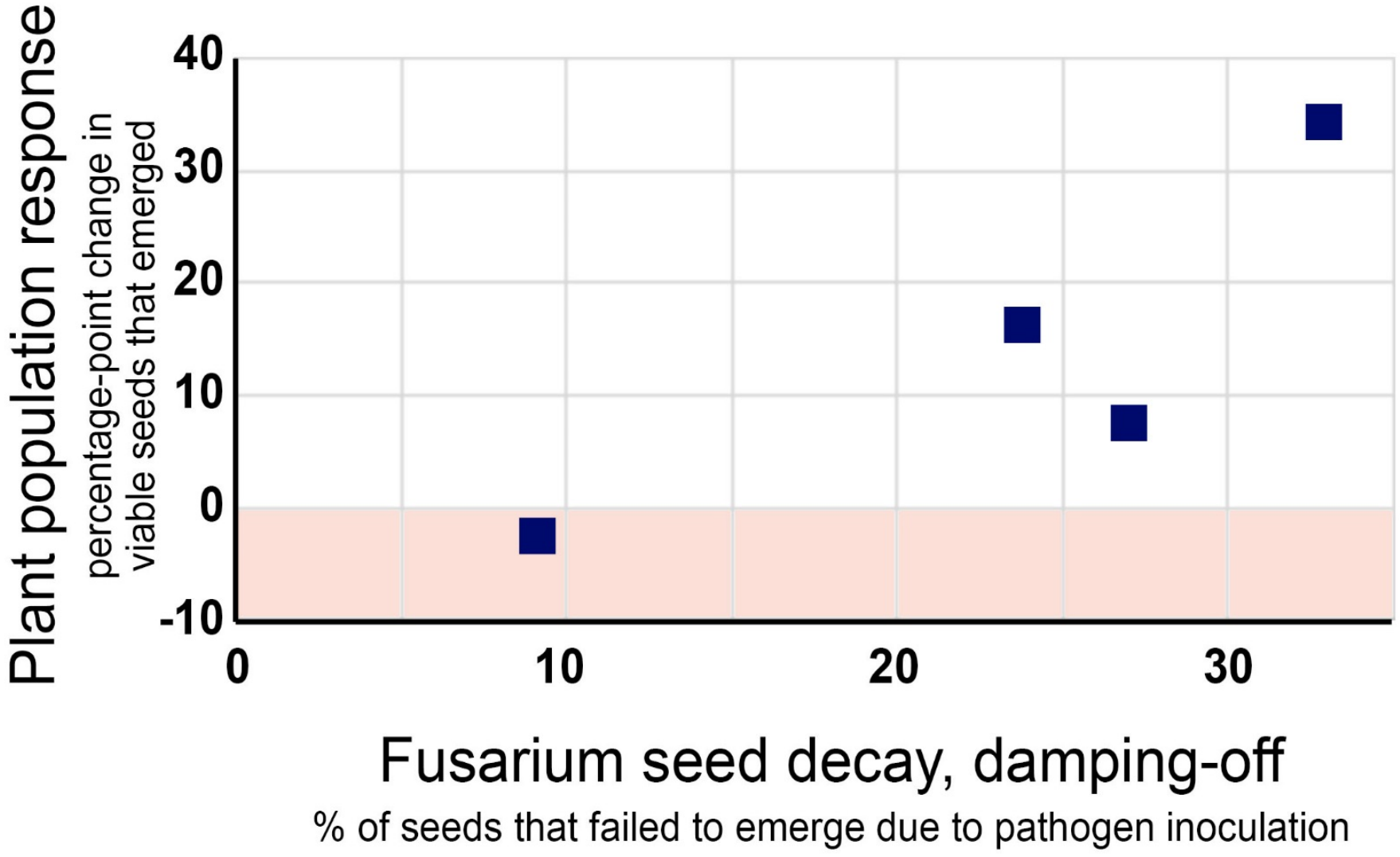

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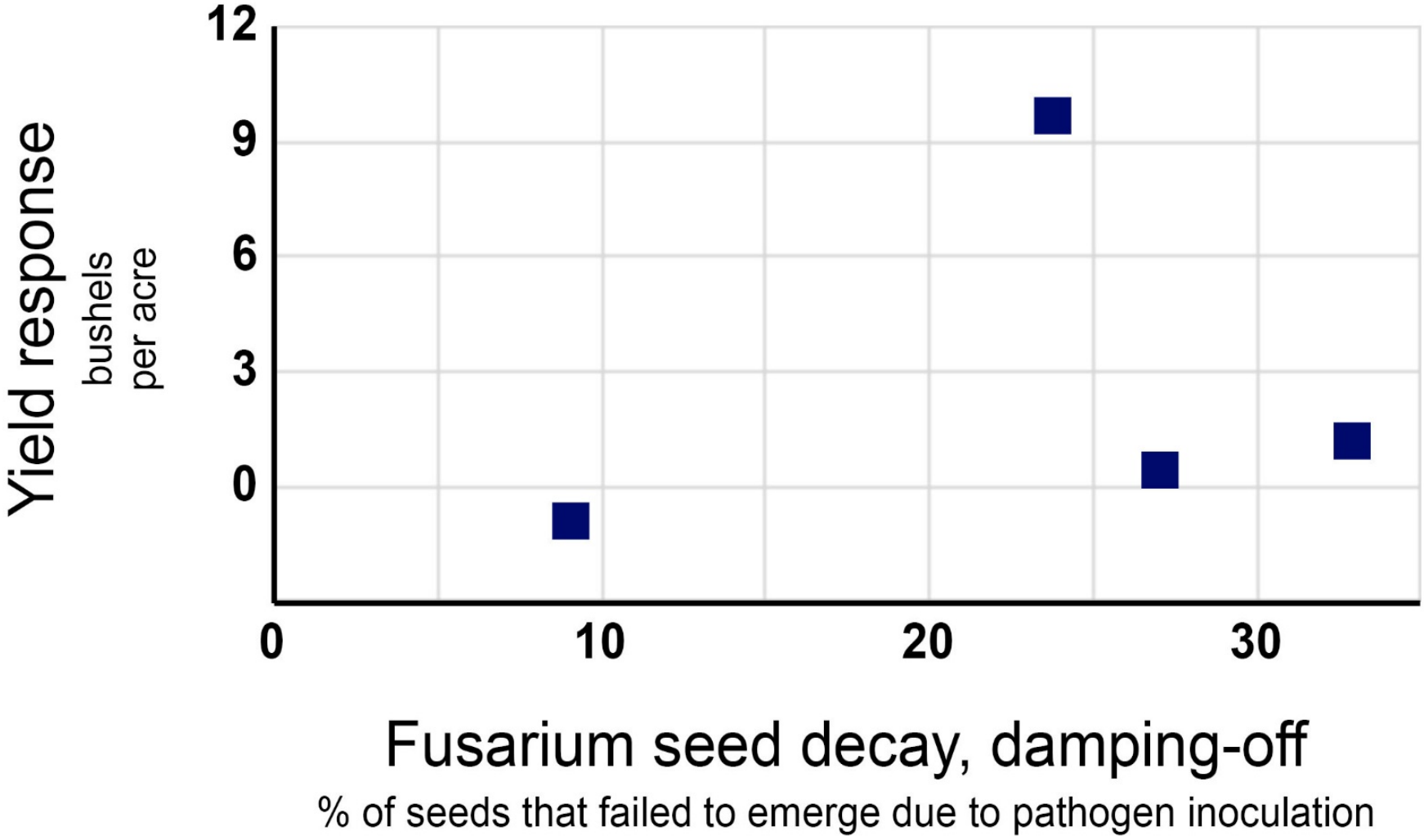

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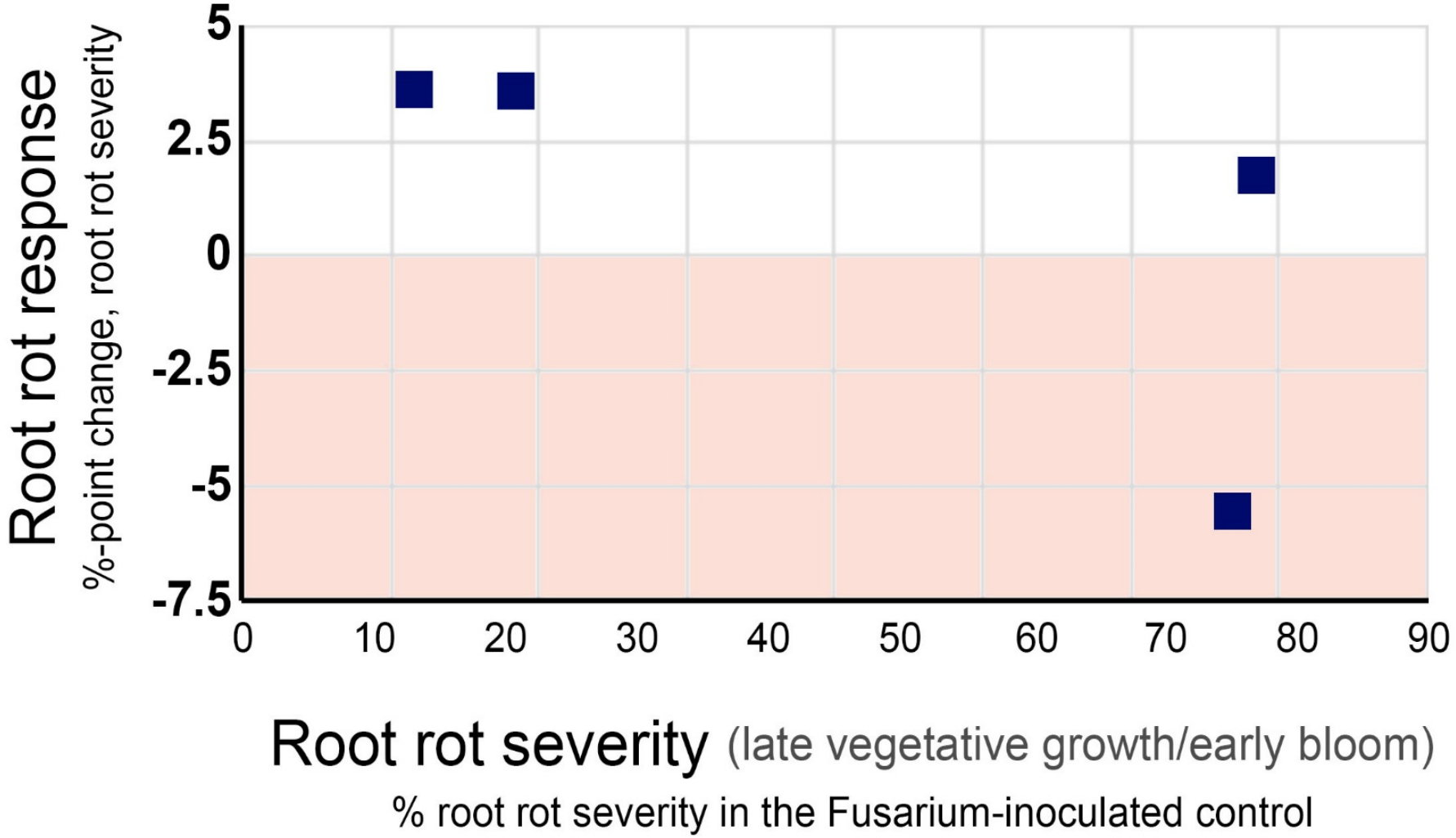
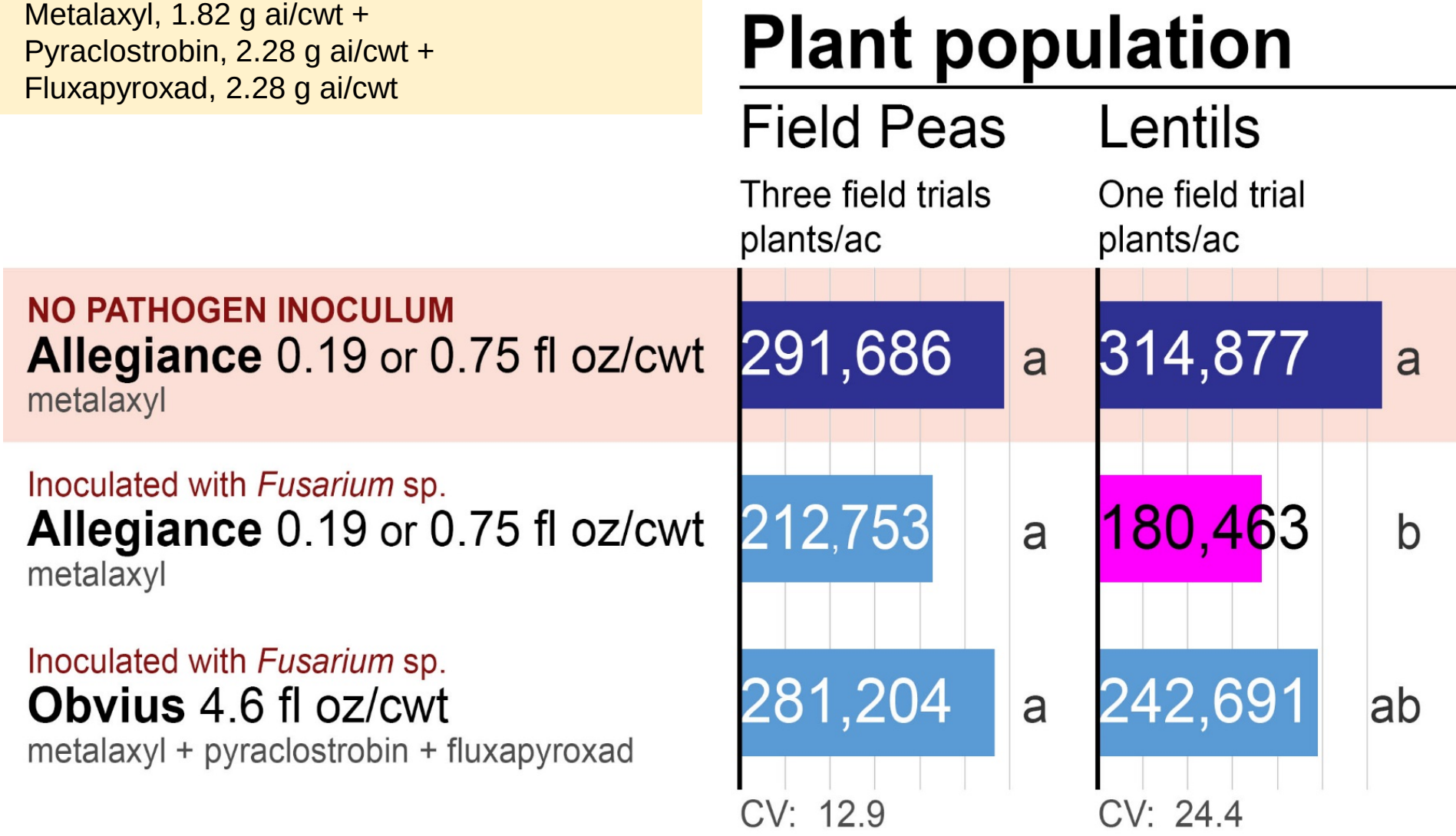


Fusarium – Efficacy of seed treatments

Obvius, 4.6 fl oz/cwt
Metalaxyl, 1.82 g ai/cwt +
Pyraclostrobin, 2.28 g ai/cwt +
Fluxapyroxad, 2.28 g ai/cwt



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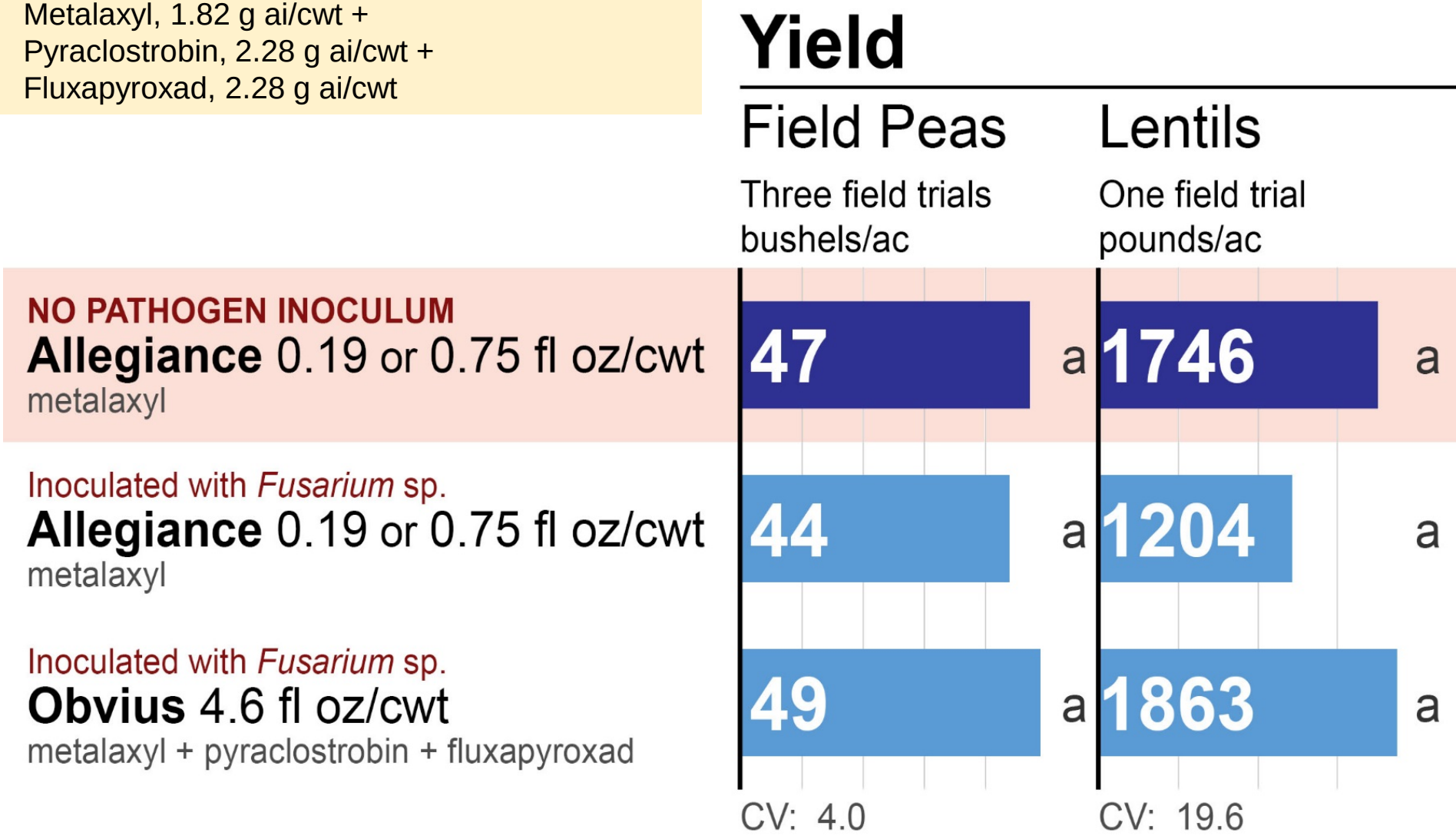

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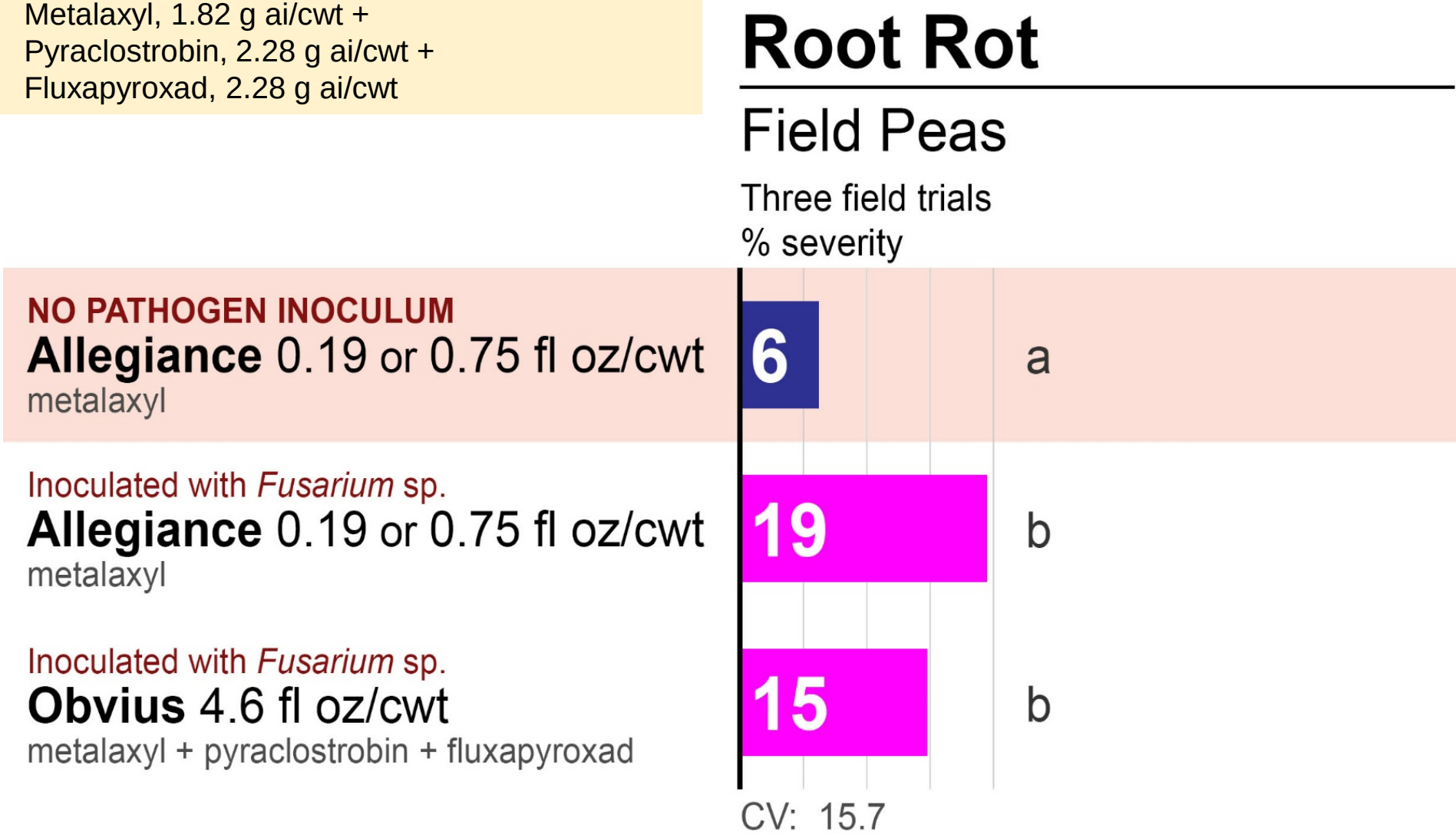

Response to seed treatment (field peas):

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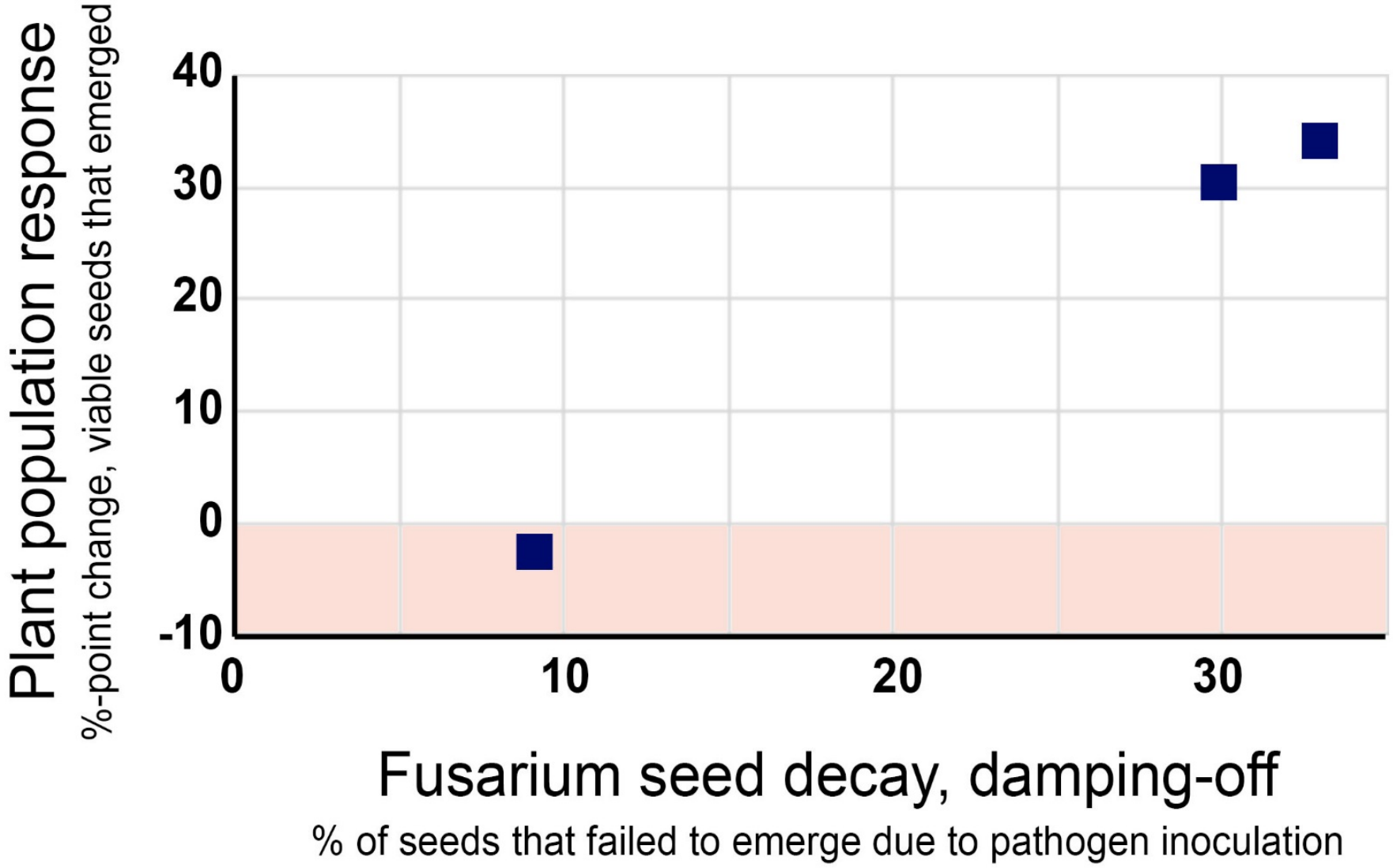

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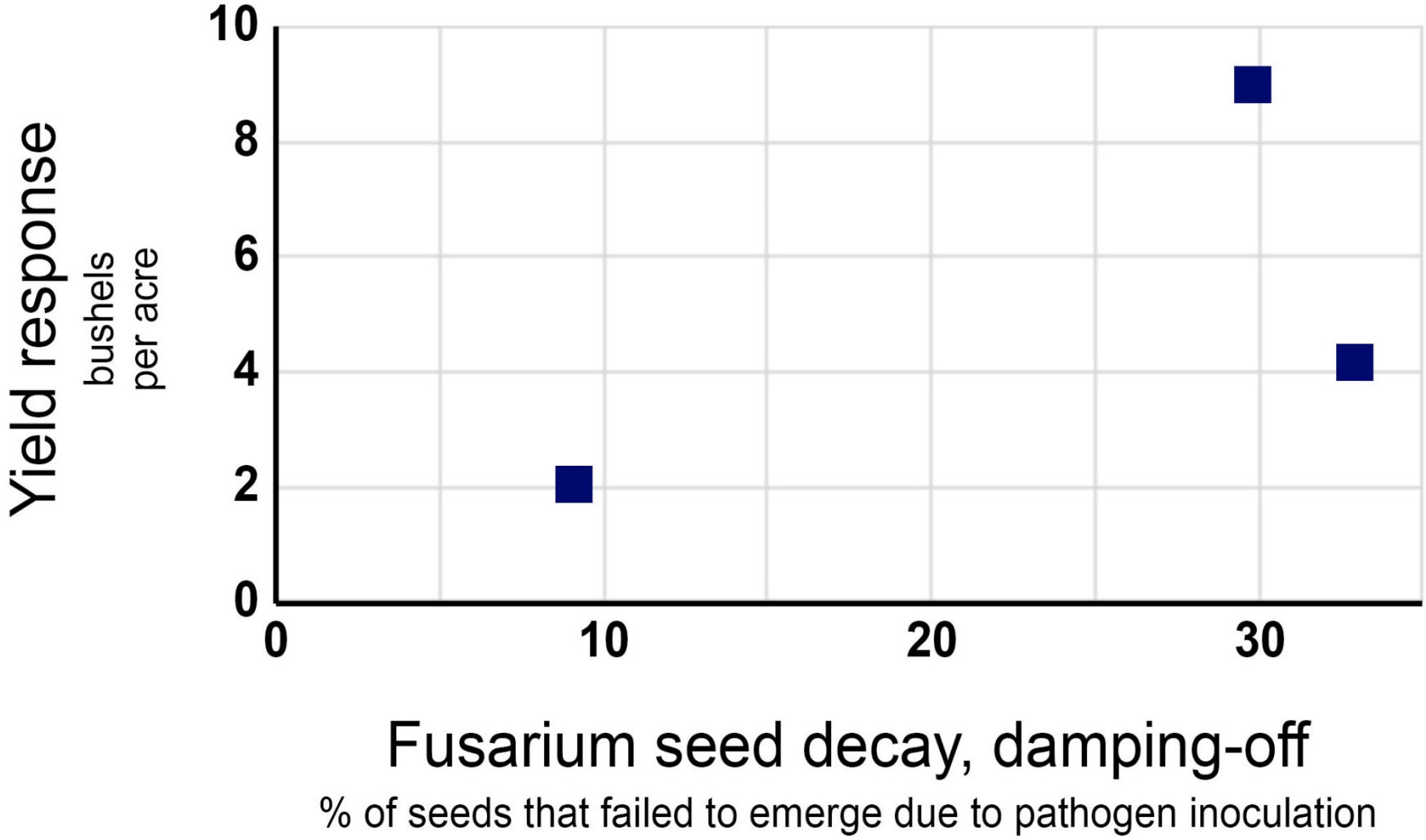

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