

# Diseases of seeds, seedlings and roots: Rhizoctonia root rot



Photos: Weidong Chen, USDA-ARS

# Rhizoctonia

**Causal pathogen:** *Rhizoctonia solani*  
(fungal pathogen)

## **Conditions that favor infection:**

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

## **Symptoms:**

- Poor stand establishment due to seed decay and damping-off
- Root rot: sunken reddish to dark brown lesions

# Rhizoctonia

## **Susceptibility:**

- Chickpeas and lentils > field peas
  - Chickpeas and lentils: highly susceptible.
  - Field peas, while also susceptible, are less susceptible than chickpeas or lentils.

# Rhizoctonia

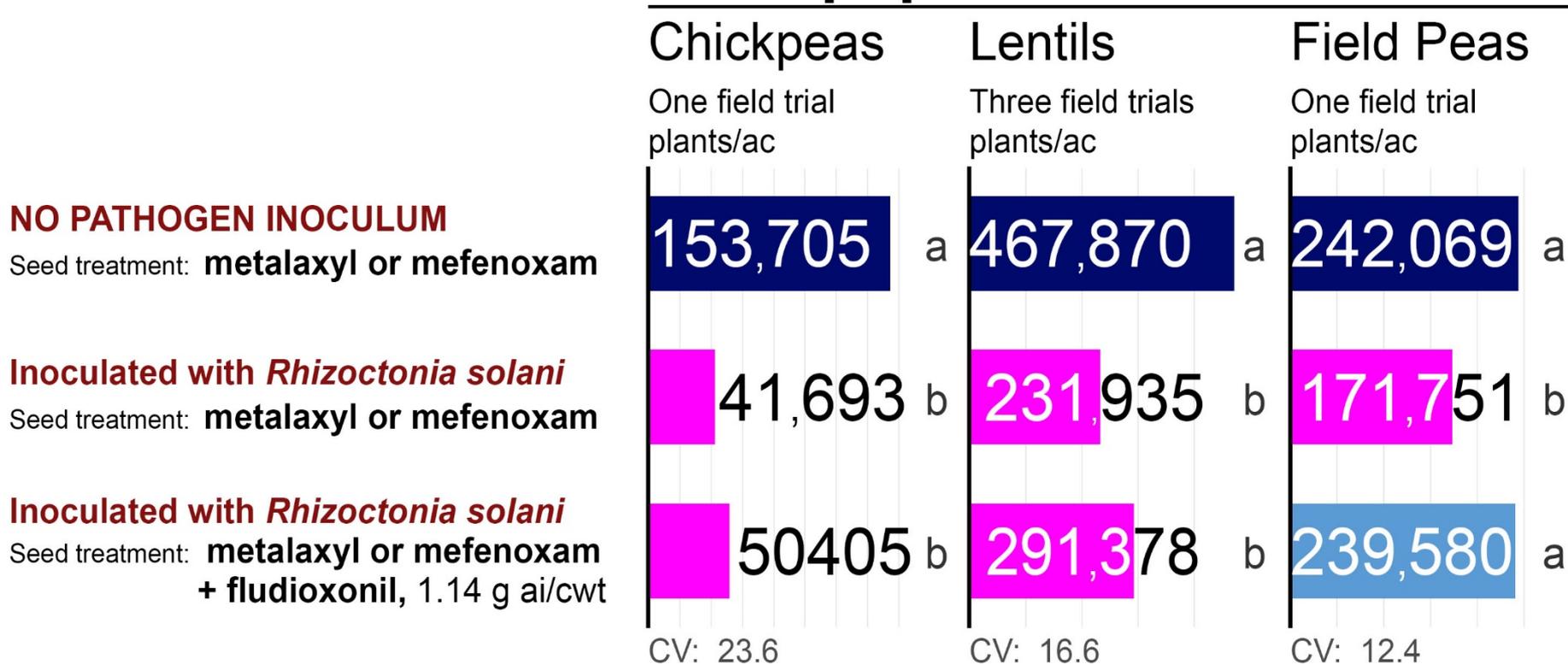
## **Seed treatments:**

- Very effective.
- Rhizoctonia primarily causes losses early in crop development when the concentration of active ingredient in affected tissues is high.

# Rhizoctonia: efficacy of seed treatments

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

## Plant population



# Rhizoctonia: efficacy of seed treatments

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

## Yield

### NO PATHOGEN INOCULUM

Seed treatment: **metalaxyl or mefenoxam**

### Inoculated with *Rhizoctonia solani*

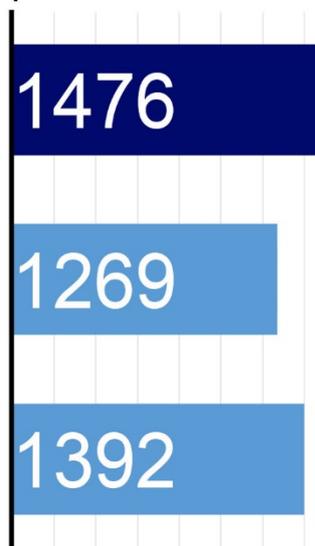
Seed treatment: **metalaxyl or mefenoxam**

### Inoculated with *Rhizoctonia solani*

Seed treatment: **metalaxyl or mefenoxam + fludioxonil, 1.14 g ai/cwt**

### Chickpeas

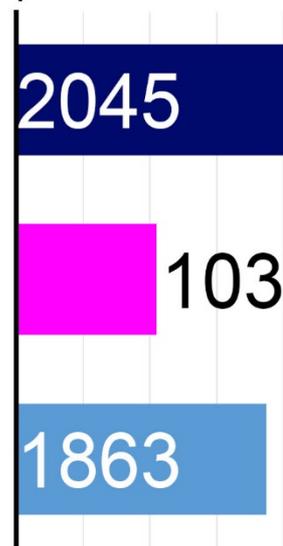
One field trial  
pounds/ac



CV: 18.2

### Lentils

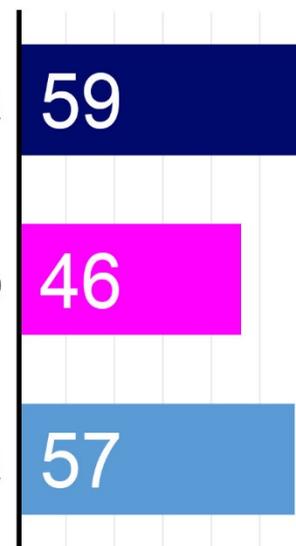
Two field trials  
pounds/ac



CV: 3.5

### Field Peas

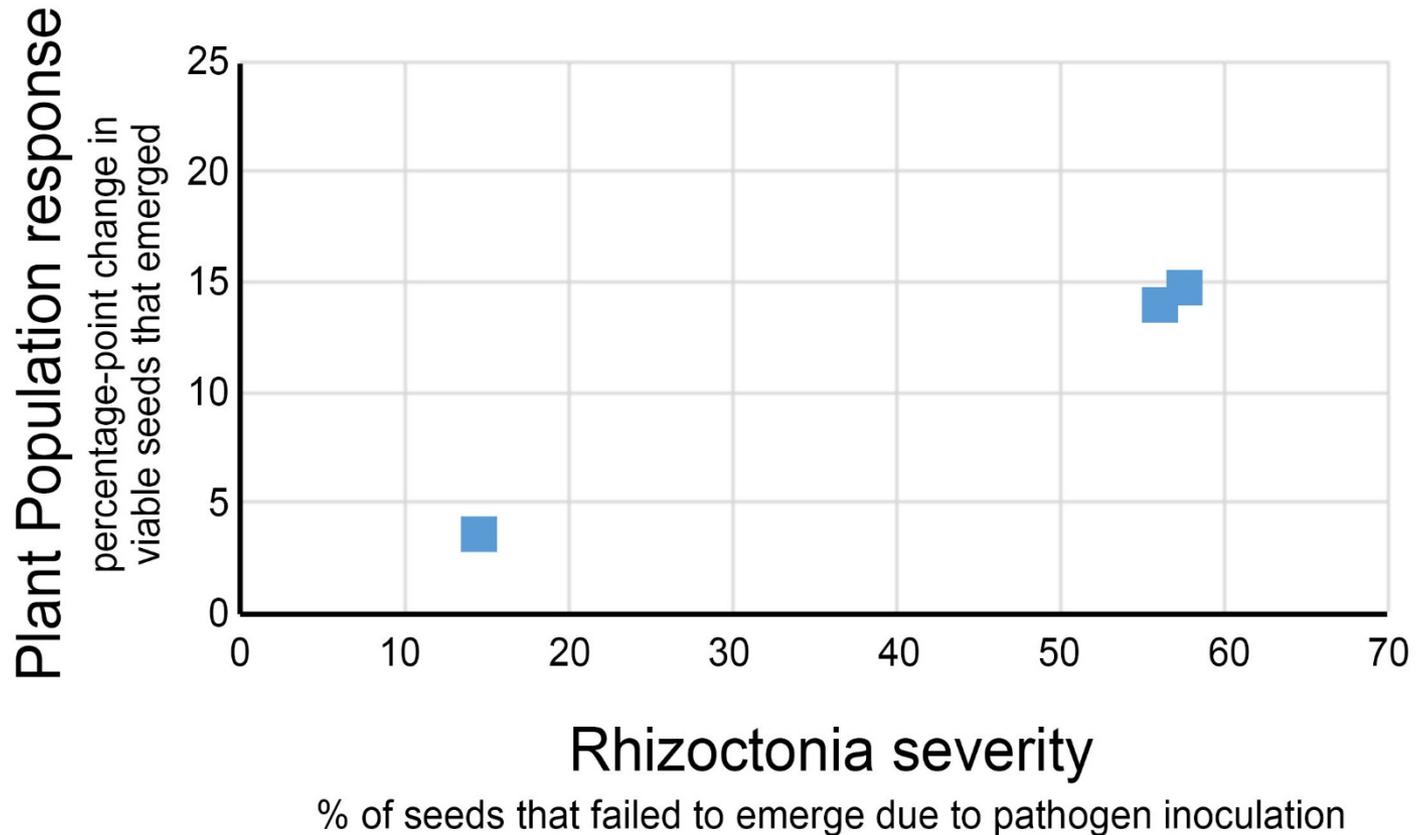
One field trial  
bushels/ac



CV: 7.9

# Rhizoctonia: response to seed treatments (lentils)

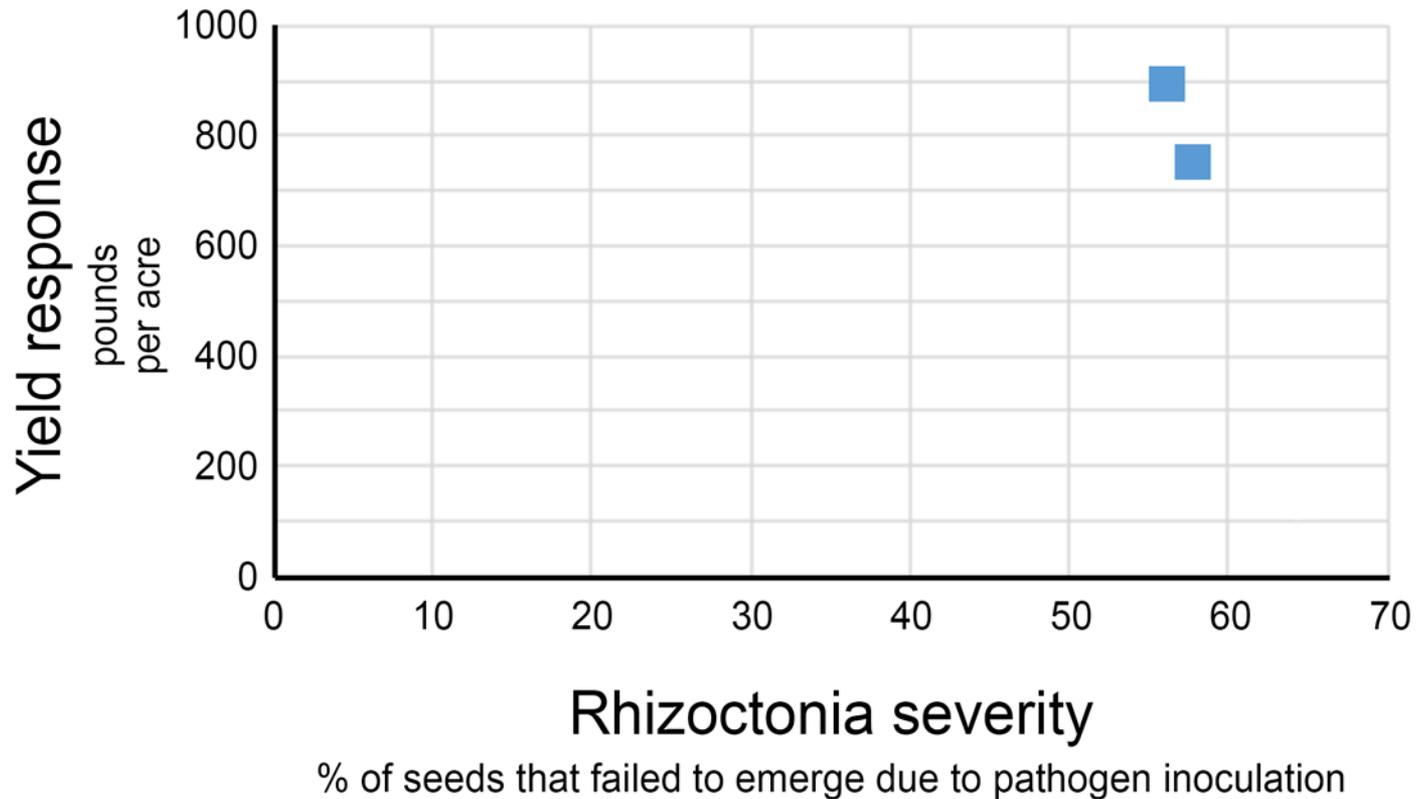
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■ INDIVIDUAL FIELD TRIAL (lentils); Carrington, ND

# Rhizoctonia: response to seed treatments (lentils)

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



■ INDIVIDUAL FIELD TRIAL (lentils); Carrington, ND

# Impact of seed treatment with Apron Maxx RTA (5 fl oz/cwt).

1.14 g fludioxonil + 1.69 g mefenoxam/cwt

Strips of plots planted to treated and non-  
treated seed, 'CDC Frontier' chickpeas.

Carrington, ND (2017).



# Rhizoctonia: efficacy of seed treatments

## Plant Population

	Chickpeas Carrington, ND (2016) plants/ac	Chickpeas Carrington, ND (2017) plants/ac	Lentils Carrington, ND (2017) plants/ac	Field Peas Carrington, ND (2017) plants/ac
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NO PATHOGEN INOCULATION

**ApronMaxx RTA 5.0 fl oz/cwt**  
mefenoxam + fludioxonil

No Data	160,550 <sup>a</sup>	388,306 <sup>a</sup>	278,962 <sup>a</sup>
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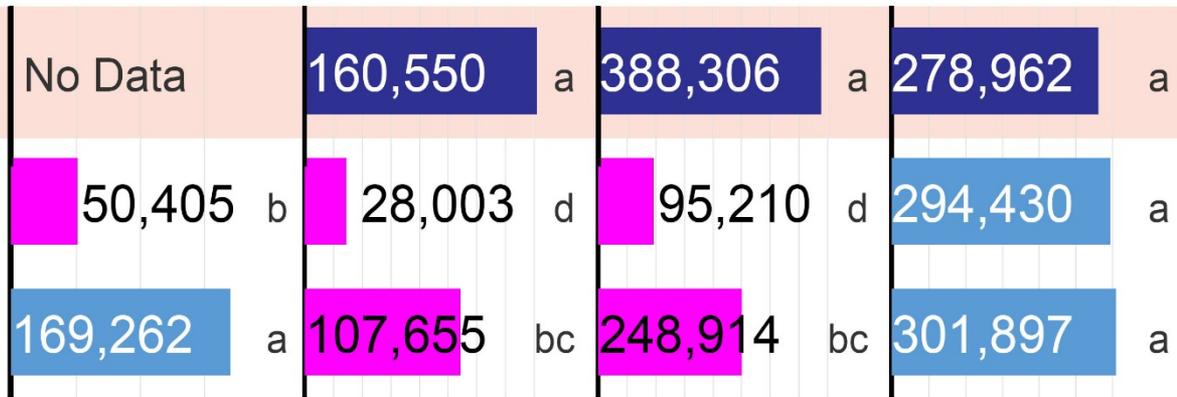
**ApronMaxx RTA 5.0 fl oz/cwt**  
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50,405 <sup>b</sup>	28,003 <sup>d</sup>	95,210 <sup>d</sup>	294,430 <sup>a</sup>
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**Vibrance Maxx 5.0 fl oz/cwt**  
mefenoxam + fludioxonil + sedaxane

169,262 <sup>a</sup>	107,655 <sup>bc</sup>	248,914 <sup>bc</sup>	301,897 <sup>a</sup>
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----- Inoculated with *Rhizoctonia solani*



# Rhizoctonia: efficacy of seed treatments

## Yield

	Chickpeas Carrington, ND (2016) pounds/ac	Chickpeas Carrington, ND (2017) pounds/ac	Lentils Carrington, ND (2017) pounds/ac	Field Peas Carrington, ND (2017) bushels/ac
<b>NO PATHOGEN INOCULATION</b>	No Data	3465 <sup>a</sup>	1826 <sup>a</sup>	45 <sup>ab</sup>
<b>ApronMaxx RTA 5.0 fl oz/cwt</b> mefenoxam + fludioxonil	1392 <sup>a</sup>	2484 <sup>b</sup>	1194 <sup>b</sup>	42 <sup>b</sup>
<b>Vibrance Maxx 5.0 fl oz/cwt</b> mefenoxam + fludioxonil + sedaxane	1761 <sup>a</sup>	3057 <sup>a</sup>	1940 <sup>a</sup>	46 <sup>ab</sup>

----- Inoculated with *Rhizoctonia solani* -----

# Rhizoctonia: efficacy of seed treatments

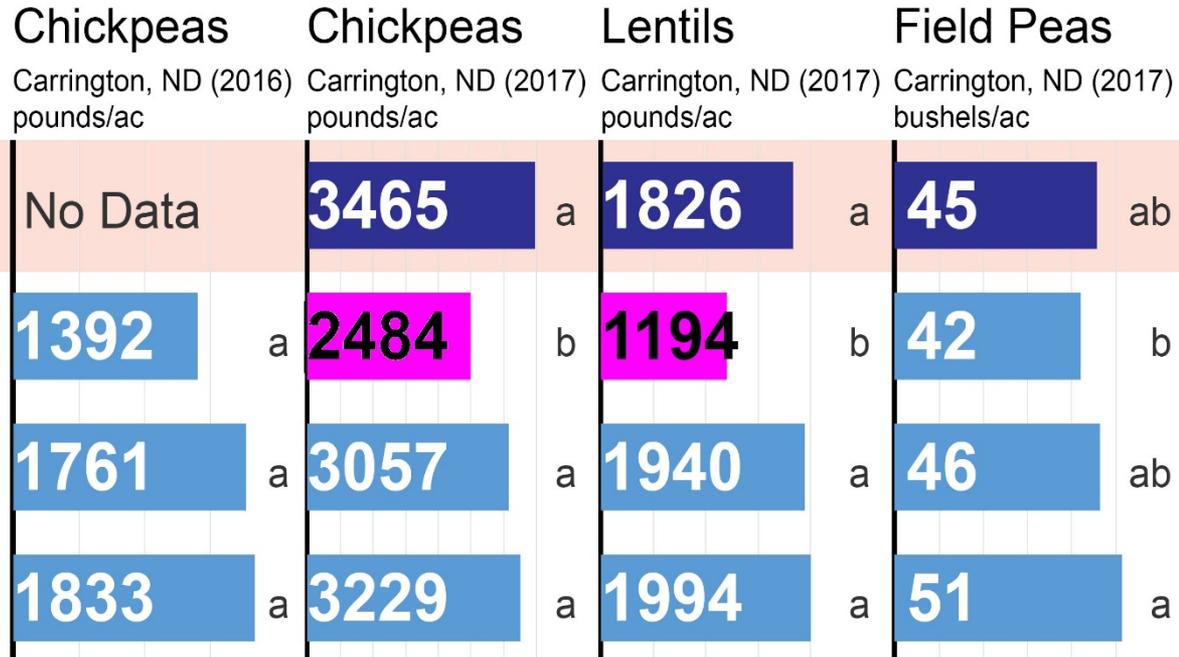
## Plant Population

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<b>Vibrance Maxx 5.0 fl oz + Mertect 0.47 fl oz/cwt</b> mefenoxam + fludioxonil + sedaxane + thiabendazole	158,683 <sup>a</sup>	136,903 <sup>a</sup>	294,963 <sup>bc</sup>	297,630 <sup>a</sup>

----- Inoculated with *Rhizoctonia solani*

# Rhizoctonia: efficacy of seed treatments

## Yield



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# Rhizoctonia: efficacy of seed treatments

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158,683 <sup>a</sup>	136,903 <sup>a</sup>	294,963 <sup>bc</sup>	297,630 <sup>a</sup>
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**Obvius 5.9 fl oz/cwt**  
metalaxyl + pyraclostrobin + fluxapyroxad

182,952 <sup>a</sup>	135,036 <sup>ab</sup>	309,898 <sup>ab</sup>	306,698 <sup>a</sup>
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----- Inoculated with *Rhizoctonia solani* -----

# Rhizoctonia: efficacy of seed treatments

## Yield

Chickpeas Carrington, ND (2016) pounds/ac	Chickpeas Carrington, ND (2017) pounds/ac	Lentils Carrington, ND (2017) pounds/ac	Field Peas Carrington, ND (2017) bushels/ac
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<b>1761</b> a	<b>3057</b> a	<b>1940</b> a	<b>46</b> ab
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**Vibrance Maxx 5.0 fl oz  
+ Mertect 0.47 fl oz/cwt**  
mefenoxam + fludioxonil + sedaxane + thiabendazole

<b>1833</b> a	<b>3229</b> a	<b>1994</b> a	<b>51</b> a
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**Obvius 5.9 fl oz/cwt**  
metalaxyl + pyraclostrobin + fluxapyroxad

<b>1630</b> a	<b>3280</b> a	<b>2068</b> a	<b>50</b> ab
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----- Inoculated with *Rhizoctonia solani* -----

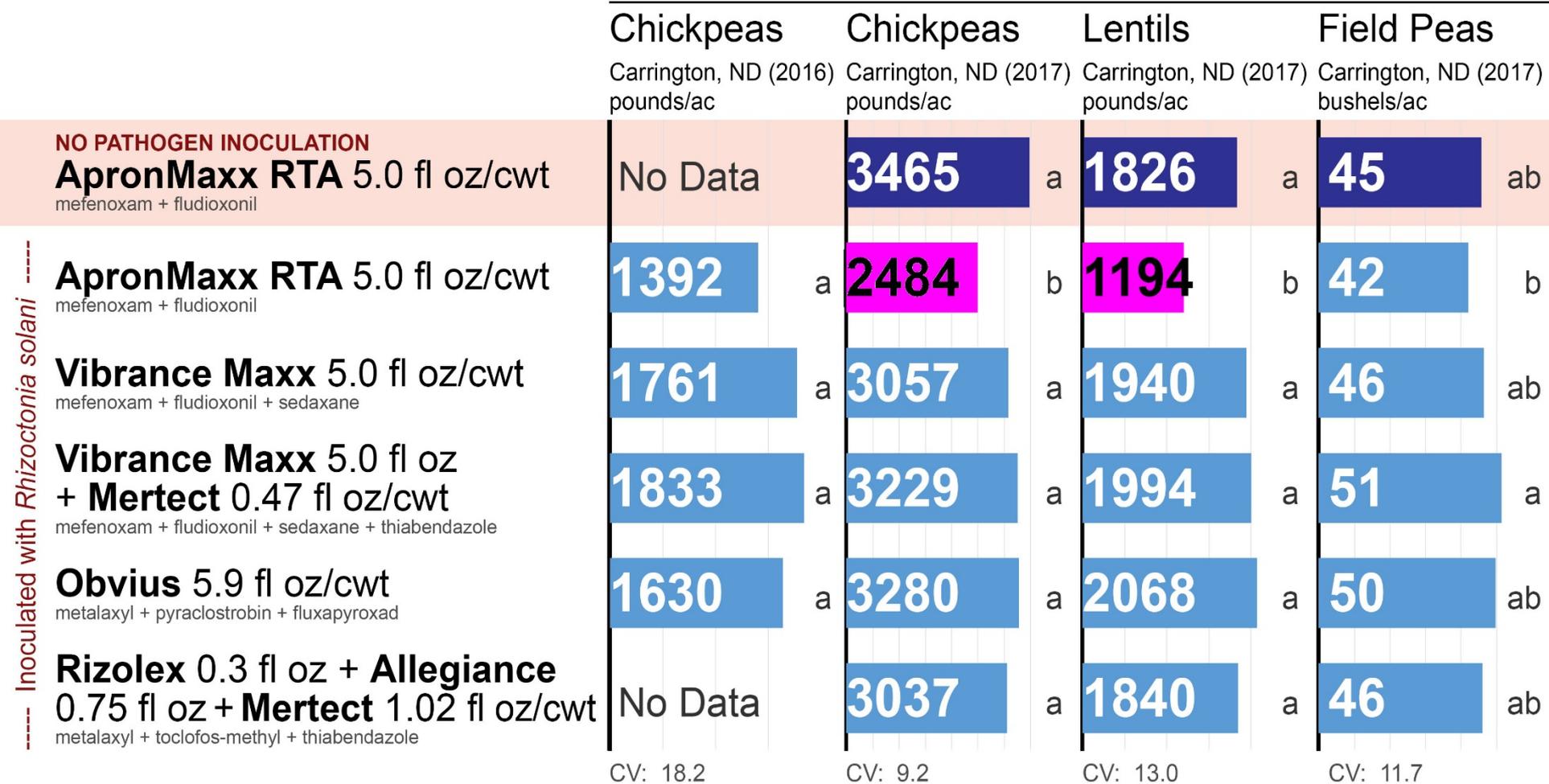
# Rhizoctonia: efficacy of seed treatments

## Plant Population



# Rhizoctonia: efficacy of seed treatments

## Yield



----- Inoculated with *Rhizoctonia solani* -----