



Biological control of *Sclerotinia*  
head rot in confection sunflowers  
with honeybee-vectored  
*Clonostachys rosea*

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# Preliminary testing – Oilseed sunflowers, bumble-vectored *Clonostachys rosea*

Non-replicated studies. Sunflowers exposed to bees were spatially separated from identically managed sunflowers not exposed to bees.

**Langdon, ND (2016, 2017)**



Langdon  
2016  
NuSun '306'

Langdon  
2017  
NuSun '306'

## Sclerotinia head rot incidence (% of plants)

no bees	39	35
exposed to bees	26	16

Sunflowers were inoculated twice:

- Once at approx. R5.4-R5.6
- Once at approx. R5.5-R5.9

To each head, 15,000 ascospores were applied per head per inoculation (delivered with a hand-held spray bottle calibrated to deliver 5,000 spores per spray).

## Sunflower yield (pounds/acre)

bagged heads	1880	1981
unbagged heads	2053	1761

# Preliminary testing – Non-oil sunflowers, honeybee-vectored *Clonostachys rosea*

Replicated studies (4-5 reps). Bees were excluded from sunflower heads in the non-treated control by placing perforated pollination bags over heads. Heads were bagged from bloom initiation to R7.  
**Carrington, ND (2017, 2019)**



Carrington  
2018  
NuSeed 'Jaguar'

Carrington  
2019  
NuSeed 'Jaguar'

## Sclerotinia head rot incidence (% of plants)



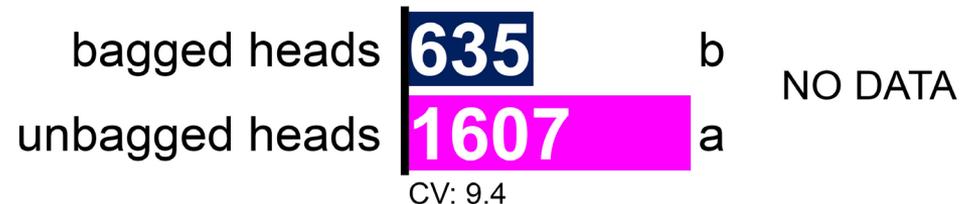
### INOCULATIONS:

- Sunflowers were inoculated twice in 2018 (at R5.5 and R5.8-R5.9) and once in 2019 (at R5.7-R5.9).
- To each head, 15,000 ascospores were applied per head per inoculation (delivered with hand-held spray bottle calibrated to deliver 5,000 spores / spray).

### POLLINATION BAGS:

18 x 16 inch (length x width) pollination bags made of fine mesh fabric with 1 mm x 1 mm holes (Lawson Bags; Northfield, IL)

## Sunflower yield (pounds/acre)



# Efficacy of honeybee-vectored *Clonostachys rosea* relative to distance from the bee hive

Replicated studies (3 reps). Sunflowers were established in a strip 60 to 110 feet wide by half-mile long. Bee hives were placed at one end and two-thirds the distance along the strip.

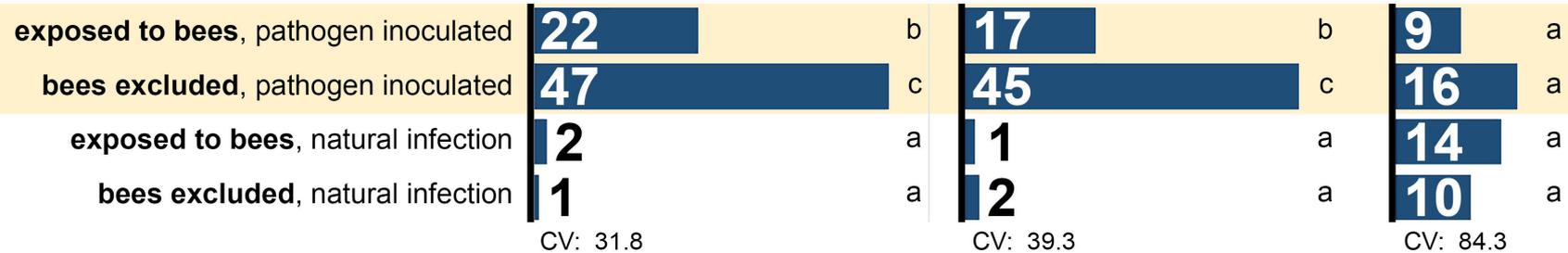
**Year #1: Foster and Cavalier Counties, ND (2020)**

**Foster County**  
2020 | on-farm study  
NuSeed 'Panther'

**Foster County**  
2020 | research center  
NuSeed 'Panther'

**Cavalier County**  
2020  
NuSeed 'Jaguar'

## SCLEROTINIA HEAD ROT (% incidence)



PLOT SIZE: Approx. 100 plants/plot across 3 or 4 rows. HIVES: 4 hives at each location, 100% of hives equipped with dispensers of the biological control agent at studies conducted in Foster County; 25% of hives equipped with dispensers at the study conducted in Cavalier County.

INOCULATIONS: Sunflowers were inoculated once at approx. R5.4-R5.8. To each head, 15,000 ascospores were applied per head.

POLLINATION BAGS: 16x18" (40.64 x 45.72 cm) HDPE plastic with 336-micron pore diameter; 24% of the surface open; Midco Global; Kirkwood, MO.

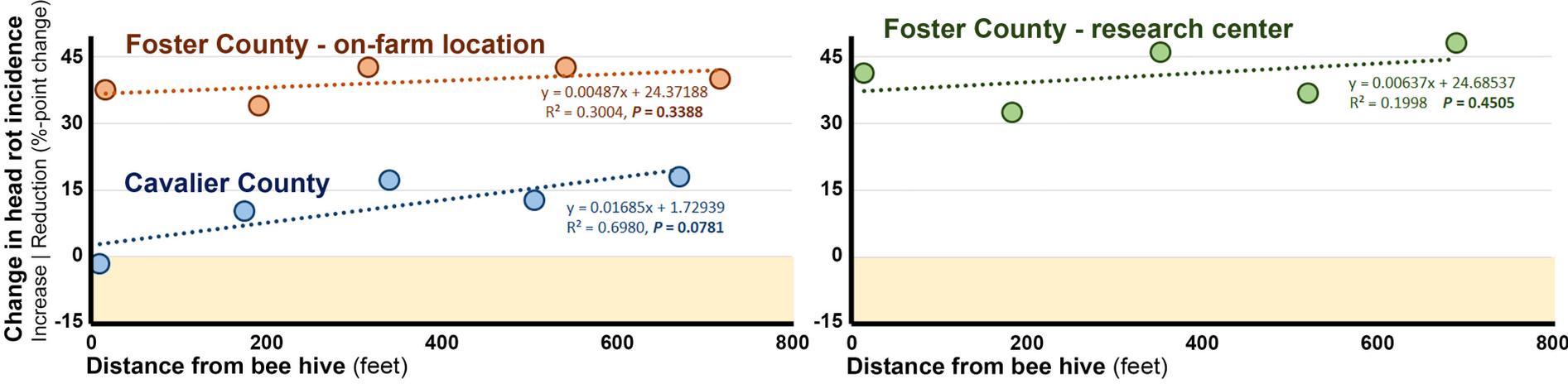
# Efficacy of honeybee-vectored *Clonostachys rosea* relative to distance from the bee hive

Replicated studies (3 reps). Sunflowers were established in a strip 60 to 110 feet wide by half-mile long. Bee hives were placed at one end and two-thirds the distance along the strip.

## Year #1: Foster and Cavalier Counties, ND (2020)

### Impact of bee-vectored *C. rosea* relative to distance from bee hive: reduction in *Sclerotinia* head rot incidence

Sunflowers inoculated with laboratory-grown ascospores of *S. sclerotiorum*. Honeybees excluded from sunflowers in the control treatment with perforated pollination bags



**PLOT SIZE:** ~100 plants/plot across 3 or 4 rows.

**HIVES:** 4 hives at each location, 100% of hives equipped with dispensers of the biological control agent at studies conducted in Foster County; 25% of hives equipped with dispensers at the study conducted in Cavalier County.

**INOCULATIONS:** Sunflowers were inoculated once at approx. R5.4-R5.8. To each head, 15,000 ascospores were applied per head.

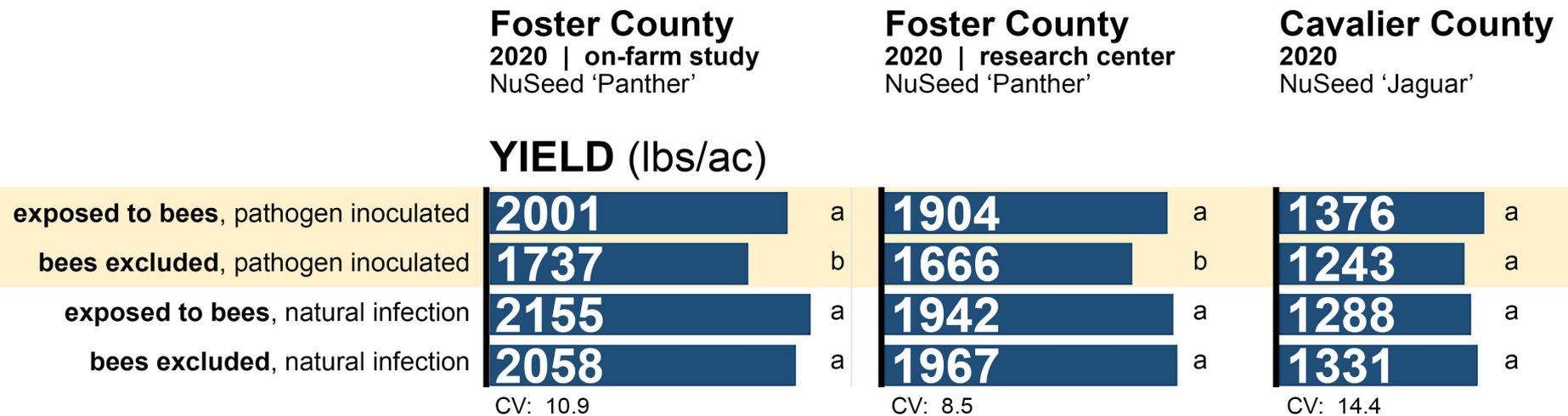
**POLLINATION BAGS:** 16x18" (40.64 x 45.72 cm) HDPE plastic with 336-micron pore diameter; 24% of the surface open; Midco Global; Kirkwood, MO.

	Foster County 2020   on-farm study NuSeed 'Panther'		Foster County 2020   research center NuSeed 'Panther'		Cavalier County 2020 NuSeed 'Jaguar'	
<b>SCLEROTINIA HEAD ROT (% incidence)</b>						
exposed to bees, pathogen inoculated	22	b	17	b	9	a
bees excluded, pathogen inoculated	47	c	45	c	16	a
exposed to bees, natural infection	2	a	1	a	14	a
bees excluded, natural infection	1	a	2	a	10	a
	CV: 31.8		CV: 39.3		CV: 84.3	

# Efficacy of honeybee-vectored *Clonostachys rosea* relative to distance from the bee hive

Replicated studies (3 reps). Sunflowers were established in a strip 60 to 110 feet wide by half-mile long. Bee hives were placed at one end and two-thirds the distance along the strip.

## Year #1: Foster and Cavalier Counties, ND (2020)



PLOT SIZE: Approx. 100 plants/plot across 3 or 4 rows. HIVES: 4 hives at each location, 100% of hives equipped with dispensers of the biological control agent at studies conducted in Foster County; 25% of hives equipped with dispensers at the study conducted in Cavalier County.

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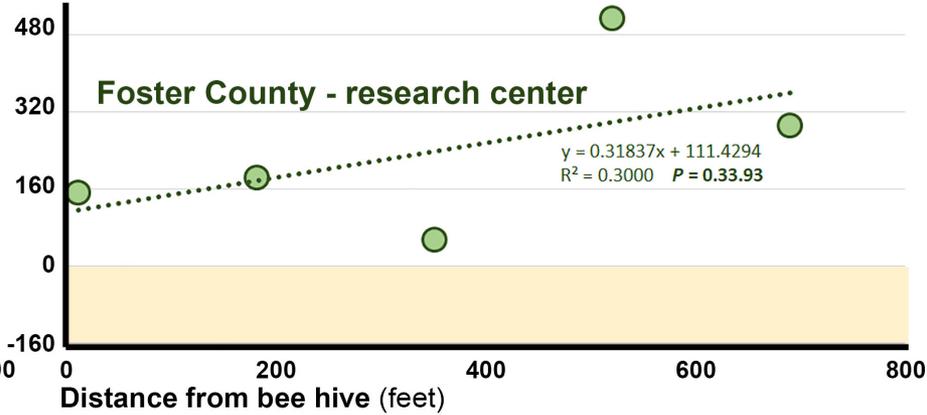
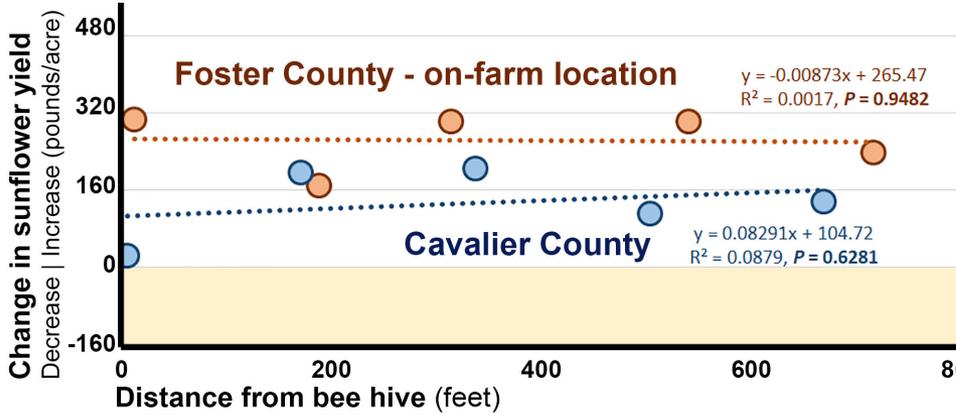
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Replicated studies (3 reps). Sunflowers were established in a strip 60 to 110 feet wide by half-mile long. Bee hives were placed at one end and two-thirds the distance along the strip.

## Year #1: Foster and Cavalier Counties, ND (2020)

### Impact of bee-vectored *C. rosea* relative to distance from bee hive: increase in sunflower yield (lbs/ac)

Sunflowers inoculated with laboratory-grown ascospores of *S. sclerotiorum*.  
Honeybees excluded from sunflowers in the control treatment with perforated pollination bags



PLOT SIZE: ~100 plants/plot across 3 or 4 rows.

HIVES: 4 hives at each location, 100% of hives equipped with dispensers of the biological control agent at studies conducted in Foster County; 25% of hives equipped with dispensers at the study conducted in Cavalier County.

INOCULATIONS: Sunflowers were inoculated once at approx. R5.4-R5.8. To each head, 15,000 ascospores were applied per head.

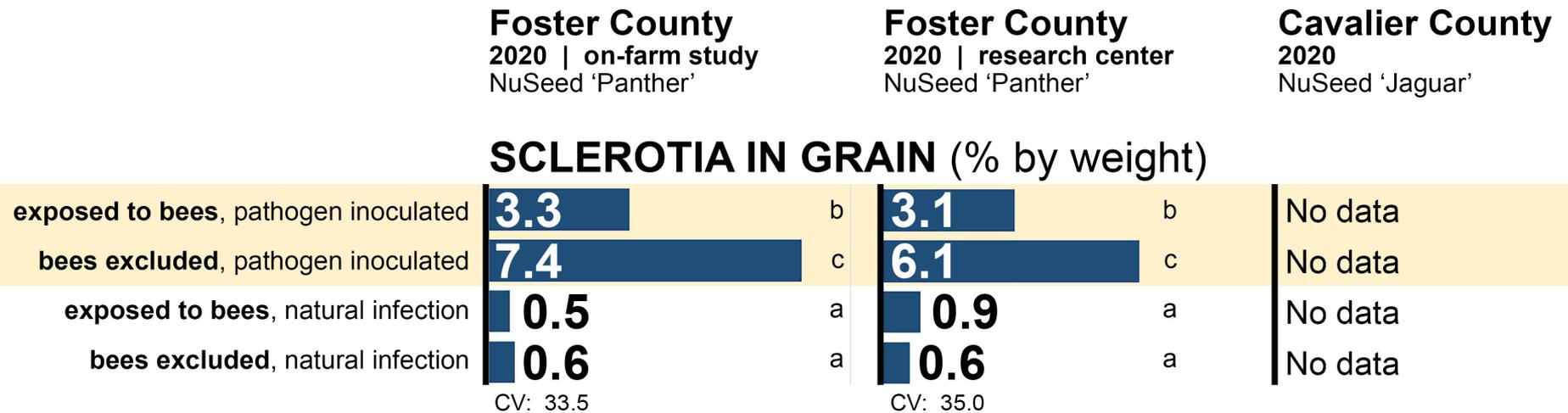
POLLINATION BAGS: 16x18" (40.64 x 45.72 cm) HDPE plastic with 336-micron pore diameter; 24% of the surface open; Midco Global; Kirkwood, MO.

	Foster County 2020   on-farm study NuSeed 'Panther'	Foster County 2020   research center NuSeed 'Panther'	Cavalier County 2020 NuSeed 'Jaguar'
<b>YIELD (lbs/ac)</b>			
exposed to bees, pathogen inoculated	2001 a	1904 a	1376 a
bees excluded, pathogen inoculated	1737 b	1666 b	1243 a
exposed to bees, natural infection	2155 a	1942 a	1288 a
bees excluded, natural infection	2058 a	1967 a	1331 a
	CV: 10.9	CV: 8.5	CV: 14.4

# Efficacy of honeybee-vectored *Clonostachys rosea* relative to distance from the bee hive

Replicated studies (3 reps). Sunflowers were established in a strip 60 to 110 feet wide by half-mile long. Bee hives were placed at one end and two-thirds the distance along the strip.

**Year #1: Foster and Cavalier Counties, ND (2020)**



**PLOT SIZE:** Approx. 100 plants/plot across 3 or 4 rows. **HIVES:** 4 hives at each location, 100% of hives equipped with dispensers of the biological control agent at studies conducted in Foster County; 25% of hives equipped with dispensers at the study conducted in Cavalier County.

**INOCULATIONS:** Sunflowers were inoculated once at approx. R5.4-R5.8. To each head, 15,000 ascospores were applied per head.

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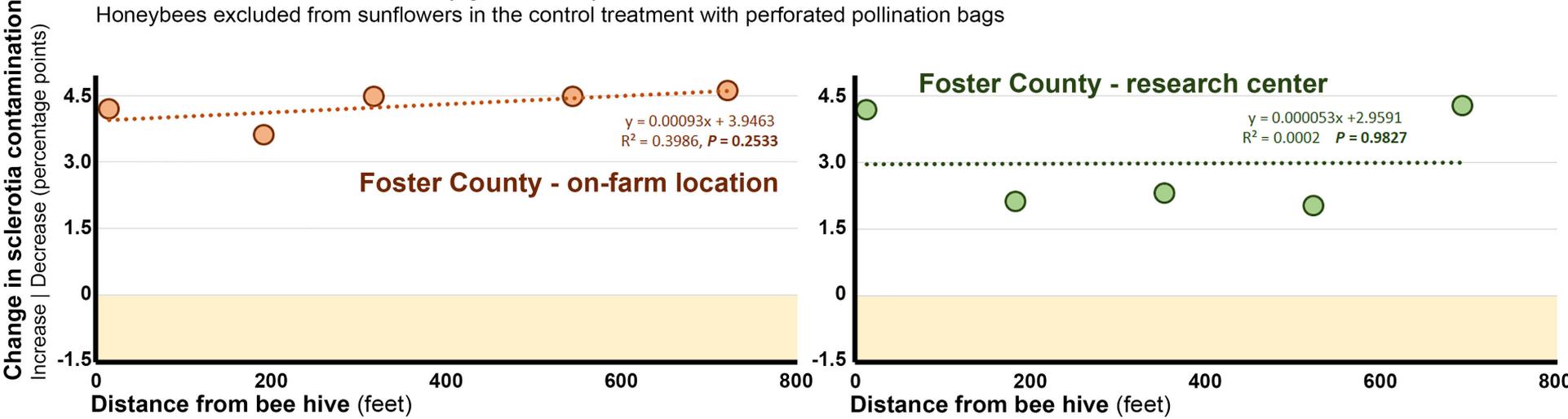
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Replicated studies (3 reps). Sunflowers were established in a strip 60 to 110 feet wide by half-mile long. Bee hives were placed at one end and two-thirds the distance along the strip.

**Year #1: Foster and Cavalier Counties, ND (2020)**

## Impact of bee-vectored *C. rosea* relative to distance from bee hive: reduction in sclerotia contamination of the grain (percent by weight)

Sunflowers inoculated with laboratory-grown ascospores of *S. sclerotiorum*.  
Honeybees excluded from sunflowers in the control treatment with perforated pollination bags



PLOT SIZE: ~100 plants/plot across 3 or 4 rows.

HIVES: 4 hives at each location, 100% of hives equipped with dispensers of the biological control agent at studies conducted in Foster County; 25% of hives equipped with dispensers at the study conducted in Cavalier County.

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	Foster County 2020   on-farm study NuSeed 'Panther'	Foster County 2020   research center NuSeed 'Panther'	Cavalier County 2020 NuSeed 'Jaguar'
<b>SCLEROTIA IN GRAIN (% by weight)</b>			
exposed to bees, pathogen inoculated	3.3	3.1	No data
bees excluded, pathogen inoculated	7.4	6.1	No data
exposed to bees, natural infection	0.5	0.9	No data
bees excluded, natural infection	0.6	0.6	No data
	CV: 33.5	CV: 35.0	

# Efficacy of honeybee-vectored *Clonostachys rosea* relative to distance from the bee hive

Replicated studies (3 reps). Sunflowers were established in a strip 60 to 110 feet wide by half-mile long. Bee hives were placed at one end and two-thirds the distance along the strip. **Year #2: Foster, Wells and Cavalier Counties, ND (2021)**

## Facilitating *Sclerotinia* head rot pressure under severe drought:

- Water was hauled to site in 1200-gal tank and pumped through mist system.
- Sunflowers inoculated in morning.
- Irrigation delivered continuously until dark.



# Efficacy of honeybee-vectored *Clonostachys rosea* relative to distance from the bee hive

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**Wells County**  
2021  
NuSeed 'Panther'

**Foster County**  
2021  
NuSeed 'Panther'

**Cavalier County**  
2021  
NuSeed 'LD5009'

## SCLEROTINIA HEAD ROT (% incidence)

	Wells County	Foster County	Cavalier County
exposed to bees, pathogen inoculated	23 <sup>b</sup>	4 <sup>b</sup>	27 <sup>b</sup>
bees excluded, pathogen inoculated	70 <sup>c</sup>	8 <sup>b</sup>	41 <sup>b</sup>
exposed to bees, natural infection	0 <sup>a</sup>	0 <sup>a</sup>	4 <sup>a</sup>
bees excluded, natural infection	0 <sup>a</sup>	0 <sup>a</sup>	0 <sup>a</sup>
	CV: 12.9	CV: 64.0	CV: 32.7



PLOT SIZE: Approx. 100 plants/plot across 3 or 4 rows.

HIVES: 4 or 6 hives at each location, 50 to 100% of hives equipped with dispensers of the biological control.

INOCULATIONS: Sunflowers were inoculated once at approx. R5.4-R5.9. To each head, 15,000 ascospores were applied per head.

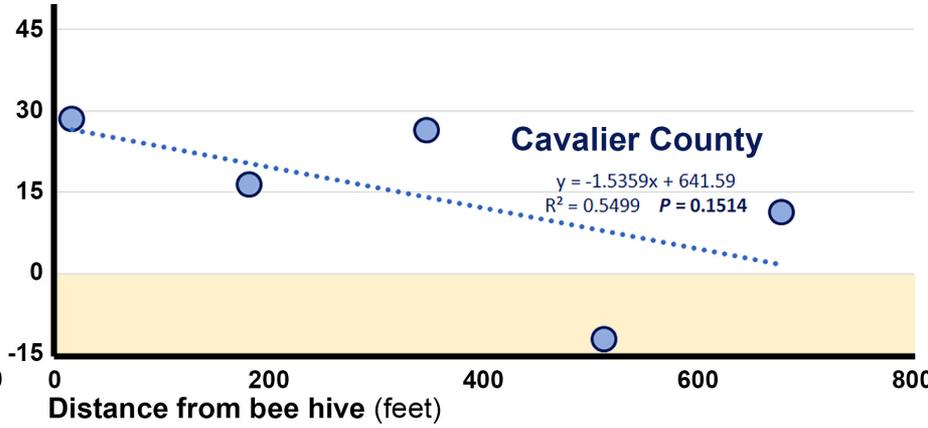
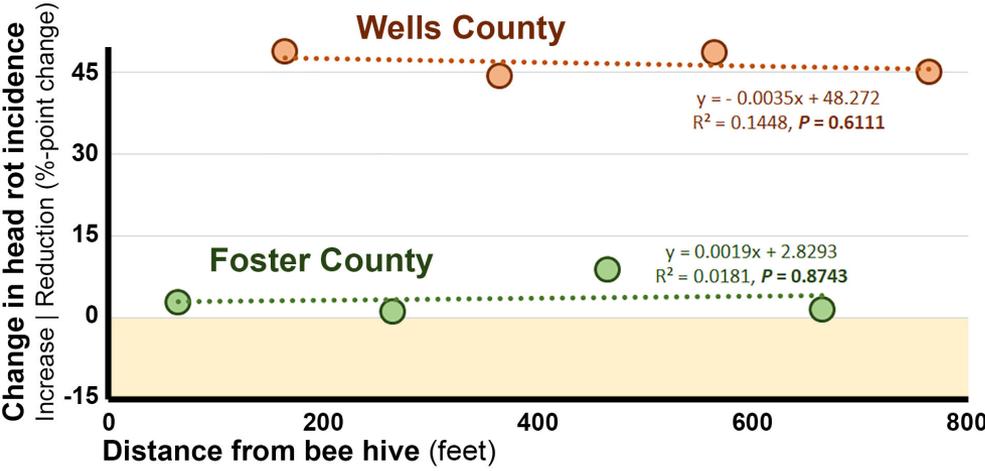
POLLINATION BAGS: *Rep 3 of Wells County study:* 18 x 16 inch (length x width), fine mesh fabric with 1 mm x 1 mm holes (Lawson Bags; Northfield, IL)  
*Remainder of studies:* 16x18" (40.64 x 45.72 cm) HDPE plastic with 336-micron pore diameter; 24% of surface open (Midco Global; Kirkwood, MO)

# Efficacy of honeybee-vectored *Clonostachys rosea* relative to distance from the bee hive

Replicated studies (3 reps). Sunflowers were established in a strip 60 to 110 feet wide by half-mile long. Bee hives were placed at one end and two-thirds the distance along the strip. **Year #2: Foster, Wells and Cavalier Counties, ND (2021)**

## Impact of bee-vectored *C. rosea* relative to distance from bee hive: reduction in *Sclerotinia* head rot incidence

Sunflowers inoculated with laboratory-grown ascospores of *S. sclerotiorum*. Honeybees excluded from sunflowers in the control treatment with perforated pollination bags.



PLOT SIZE: ~100 plants/plot across 3 or 4 rows.  
 HIVES: 4 or 6 hives at each location, 50 to 100% of hives equipped with dispensers of the biological control.  
 INOCULATIONS: Sunflowers were inoculated once at approx. R5.4-R5.8. To each head, 15,000 ascospores were applied per head.  
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 Remainder of studies: 16x18" (40.64 x 45.72 cm) HDPE plastic with 336-micron pore diameter; 24% of the surface open (Midco Global; Kirkwood, MO)

	Wells County 2021 NuSeed 'Panther'	Foster County 2021 NuSeed 'Panther'	Cavalier County 2021 NuSeed 'LD5009'
<b>SCLEROTINIA HEAD ROT (% incidence)</b>			
exposed to bees, pathogen inoculated	23 b	4 b	27 b
bees excluded, pathogen inoculated	70 c	8 b	41 b
exposed to bees, natural infection	0 a	0 a	4 a
bees excluded, natural infection	0 a	0 a	0 a
	CV: 12.9	CV: 64.0	CV: 32.7

# Efficacy of honeybee-vectored *Clonostachys rosea* relative to distance from the bee hive

Replicated studies (3 reps). Sunflowers were established in a strip 60 to 110 feet wide by half-mile long. Bee hives were placed at one end and two-thirds the distance along the strip. **Year #2: Foster, Wells and Cavalier Counties, ND (2021)**

**Wells County**  
2021  
NuSeed 'Panther'

**Foster County**  
2021  
NuSeed 'Panther'

**Cavalier County**  
2021  
NuSeed 'LD5009'

## YIELD (lbs/ac)

	Wells County	Foster County	Cavalier County
<b>exposed to bees, pathogen inoculated</b>	2872 a	1313 a	1892 b
<b>bees excluded, pathogen inoculated</b>	2295 b	1267 a	1637 b
<b>exposed to bees, natural infection</b>	2967 a	1426 a	2793 a
<b>bees excluded, natural infection</b>	2869 a	1320 a	2458 a
	CV: 10.6	CV: 10.2	CV: 23.0



PLOT SIZE: Approx. 100 plants/plot across 3 or 4 rows.

HIVES: 4 or 6 hives at each location, 50 to 100% of hives equipped with dispensers of the biological control.

INOCULATIONS: Sunflowers were inoculated once at approx. R5.4-R5.9. To each head, 15,000 ascospores were applied per head.

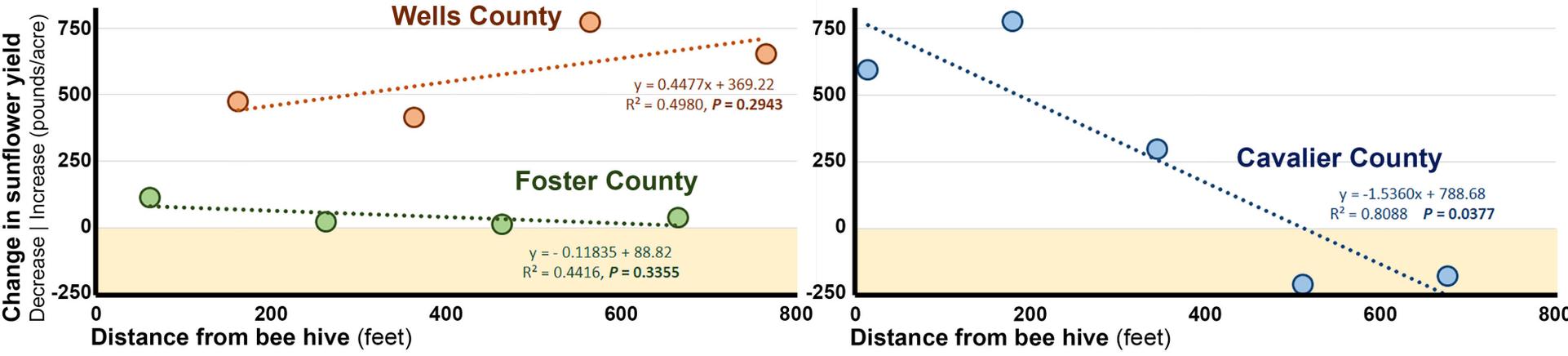
POLLINATION BAGS: *Rep 3 of Wells County study:* 18 x 16 inch (length x width), fine mesh fabric with 1 mm x 1 mm holes (Lawson Bags; Northfield, IL)  
*Remainder of studies:* 16x18" (40.64 x 45.72 cm) HDPE plastic with 336-micron pore diameter; 24% of surface open (Midco Global; Kirkwood, MO)

# Efficacy of honeybee-vectored *Clonostachys rosea* relative to distance from the bee hive

Replicated studies (3 reps). Sunflowers were established in a strip 60 to 110 feet wide by half-mile long. Bee hives were placed at one end and two-thirds the distance along the strip. **Year #2: Foster, Wells and Cavalier Counties, ND (2021)**

## Impact of bee-vectored *C. rosea* relative to distance from bee hive: change in sunflower yield (lbs/ac)

Sunflowers inoculated with laboratory-grown ascospores of *S. sclerotiorum*.  
Honeybees excluded from sunflowers in the control treatment with perforated pollination bags



PLOT SIZE: ~100 plants/plot across 3 or 4 rows.  
 HIVES: 4 or 6 hives at each location, 50 to 100% of hives equipped with dispensers of the biological control.  
 INOCULATIONS: Sunflowers were inoculated once at approx. R5.4-R5.8. To each head, 15,000 ascospores were applied per head.  
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	Wells County 2021 NuSeed 'Panther'	Foster County 2021 NuSeed 'Panther'	Cavalier County 2021 NuSeed 'LD5009'
<b>YIELD (lbs/ac)</b>			
exposed to bees, pathogen inoculated	2872 a	1313 a	1892 b
bees excluded, pathogen inoculated	2295 b	1267 a	1637 b
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bees excluded, natural infection	2869 a	1320 a	2458 a
	CV: 10.6	CV: 10.2	CV: 23.0

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Replicated studies (3 reps). Sunflowers were established in a strip 60 to 110 feet wide by half-mile long. Bee hives were placed at one end and two-thirds the distance along the strip. **Year #2: Foster, Wells and Cavalier Counties, ND (2021)**

**Wells County**  
2021  
NuSeed 'Panther'

**Foster County**  
2021  
NuSeed 'Panther'

**Cavalier County**  
2021  
NuSeed 'LD5009'

## SCLEROTIA IN GRAIN (% by weight)

	Wells County	Foster County	Cavalier County
exposed to bees, pathogen inoculated	2.3 <sup>b</sup>	0.6 <sup>b</sup>	0.8 <sup>a</sup>
bees excluded, pathogen inoculated	9.3 <sup>c</sup>	0.6 <sup>b</sup>	7.9 <sup>b</sup>
exposed to bees, natural infection	0.3 <sup>a</sup>	0.2 <sup>ab</sup>	0.7 <sup>a</sup>
bees excluded, natural infection	0.4 <sup>a</sup>	0.1 <sup>a</sup>	0.4 <sup>a</sup>
	CV: 34.3	CV: 107.3	CV: 86.7



PLOT SIZE: Approx. 100 plants/plot across 3 or 4 rows.

HIVES: 4 or 6 hives at each location, 50 to 100% of hives equipped with dispensers of the biological control.

INOCULATIONS: Sunflowers were inoculated once at approx. R5.4-R5.9. To each head, 15,000 ascospores were applied per head.

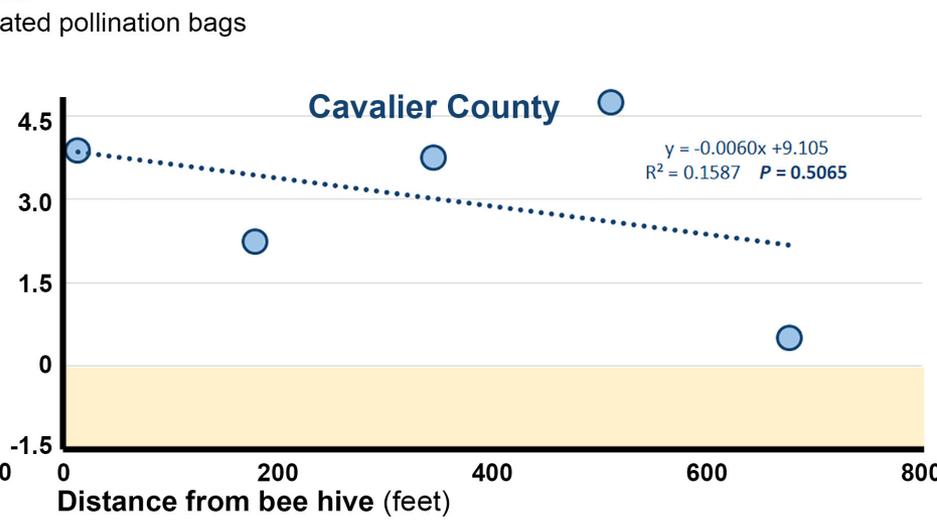
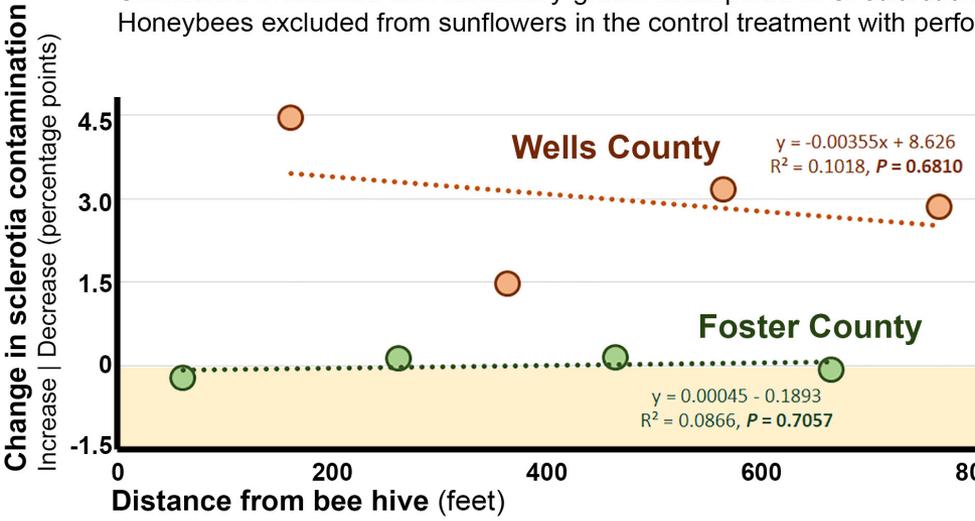
POLLINATION BAGS: *Rep 3 of Wells County study:* 18 x 16 inch (length x width), fine mesh fabric with 1 mm x 1 mm holes (Lawson Bags; Northfield, IL)  
*Remainder of studies:* 16x18" (40.64 x 45.72 cm) HDPE plastic with 336-micron pore diameter; 24% of surface open (Midco Global; Kirkwood, MO)

# Efficacy of honeybee-vectored *Clonostachys rosea* relative to distance from the bee hive

Replicated studies (3 reps). Sunflowers were established in a strip 60 to 110 feet wide by half-mile long. Bee hives were placed at one end and two-thirds the distance along the strip. **Year #2: Foster, Wells and Cavalier Counties, ND (2021)**

## Impact of bee-vectored *C. rosea* relative to distance from bee hive: reduction in sclerotia contamination of the grain (percent by weight)

Sunflowers inoculated with laboratory-grown ascospores of *S. sclerotiorum*.  
Honeybees excluded from sunflowers in the control treatment with perforated pollination bags



PLOT SIZE: ~100 plants/plot across 3 or 4 rows.  
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**Wells County 2021**  
NuSeed 'Panther'

**Foster County 2021**  
NuSeed 'Panther'

**Cavalier County 2021**  
NuSeed 'LD5009'

### SCLEROTIA IN GRAIN (% by weight)

Treatment	Wells County 2021	Foster County 2021	Cavalier County 2021
exposed to bees, pathogen inoculated	2.3	0.6	0.8
bees excluded, pathogen inoculated	9.3	0.6	7.9
exposed to bees, natural infection	0.3	0.2	0.7
bees excluded, natural infection	0.4	0.1	0.4
	CV: 34.3	CV: 107.3	CV: 86.7

# Efficacy of honeybee-vectored *Clonostachys rosea* relative to sunflower hybrid

Replicated studies (3 reps).

Sunflowers were established in plots 15 to 215 feet from each set of bee hives (Foster and Wells County study sites) and 615 to 815 from each set of bee hives (Foster County only).

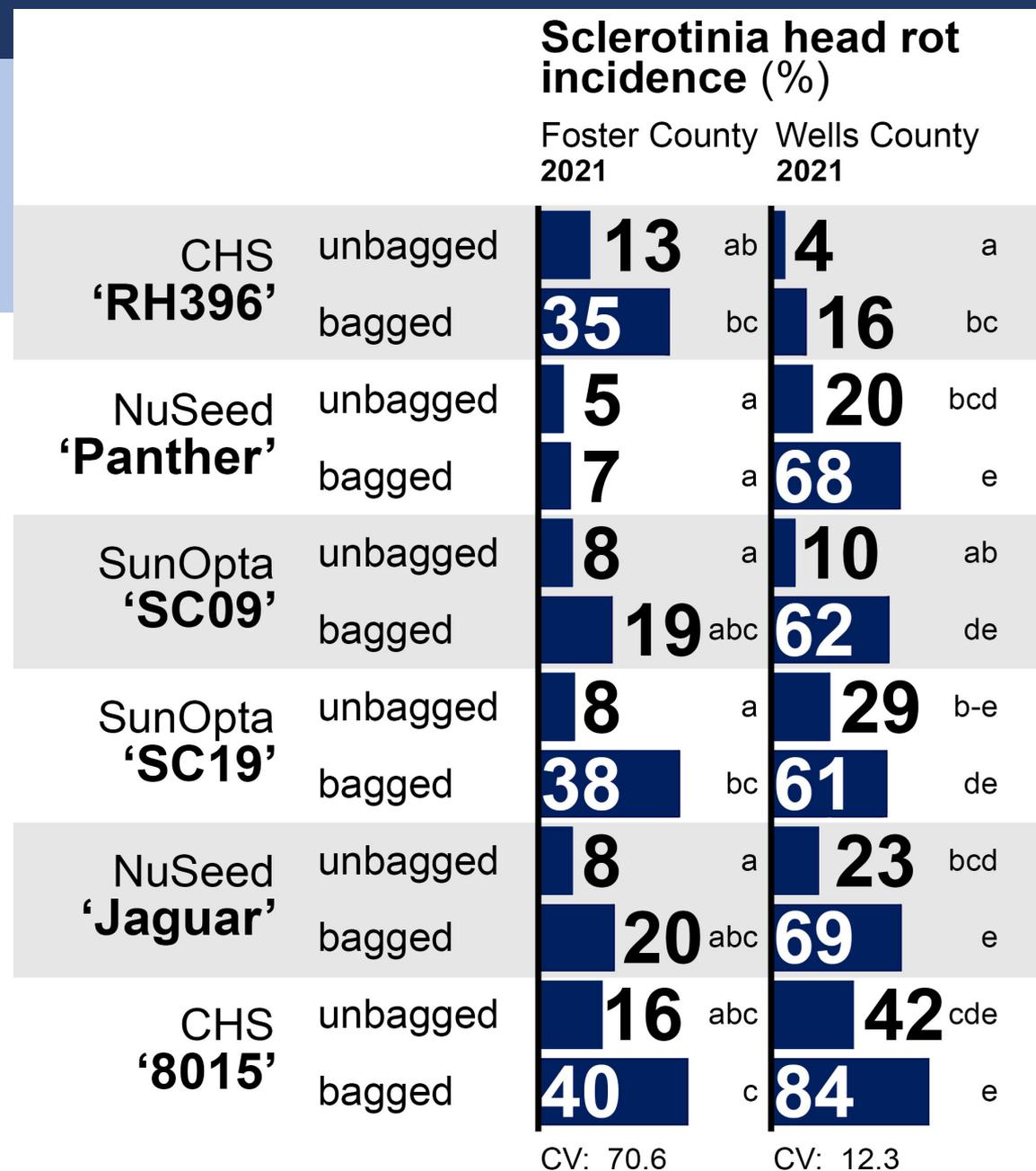
**Foster and Wells Counties, ND (2021)**

PLOT SIZE: ~100 plants/plot across 3 or 4 rows.

HIVES: 4 hives at each location, 50 to 100% of hives equipped with dispensers of the biological control.

INOCULATIONS: Sunflowers were inoculated once at approx. R5.4-R5.8. To each head, 15,000 ascospores were applied per head.

POLLINATION BAGS: 16x18" (40.64 x 45.72 cm) HDPE plastic with 336-micron pore diameter; 24% of the surface open (Midco Global; Kirkwood, MO)



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Sunflowers were established in plots 15 to 215 feet from each set of bee hives (Foster and Wells County study sites) and 615 to 815 from each set of bee hives (Foster County only).

**Foster and Wells Counties, ND (2021)**

PLOT SIZE: ~100 plants/plot across 3 or 4 rows.

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INOCULATIONS: Sunflowers were inoculated once at approx. R5.4-R5.8. To each head, 15,000 ascospores were applied per head.

POLLINATION BAGS: 16x18" (40.64 x 45.72 cm) HDPE plastic with 336-micron pore diameter; 24% of the surface open (Midco Global; Kirkwood, MO)

		Sunflower yield (pounds/acre)			
		Foster County 2021		Wells County 2021	
<b>CHS 'RH396'</b>	unbagged	<b>975</b>	a	<b>3358</b>	a
	bagged	<b>1423</b>	bc	<b>2790</b>	bc
<b>NuSeed 'Panther'</b>	unbagged	<b>1450</b>	bcd	<b>2715</b>	bcd
	bagged	<b>1375</b>	e	<b>2243</b>	e
<b>SunOpta 'SC09'</b>	unbagged	<b>1306</b>	ab	<b>2518</b>	ab
	bagged	<b>948</b>	de	<b>1394</b>	de
<b>SunOpta 'SC19'</b>	unbagged	<b>1371</b>	b-e	<b>2436</b>	b-e
	bagged	<b>1052</b>	de	<b>1379</b>	de
<b>NuSeed 'Jaguar'</b>	unbagged	<b>1532</b>	bcd	<b>2808</b>	bcd
	bagged	<b>1285</b>	e	<b>1437</b>	e
<b>CHS '8015'</b>	unbagged	<b>1293</b>	cde	<b>2184</b>	cde
	bagged	<b>729</b>	e	<b>1049</b>	e
		CV: 24.3		CV: 20.0	

# Efficacy of honeybee-vectored *Clonostachys rosea* relative to sunflower hybrid

Replicated studies (3 reps).

Sunflowers were established in plots 15 to 215 feet from each set of bee hives (Foster and Wells County study sites) and 615 to 815 from each set of bee hives (Foster County only).

**Foster and Wells Counties, ND (2021)**

PLOT SIZE: ~100 plants/plot across 3 or 4 rows.

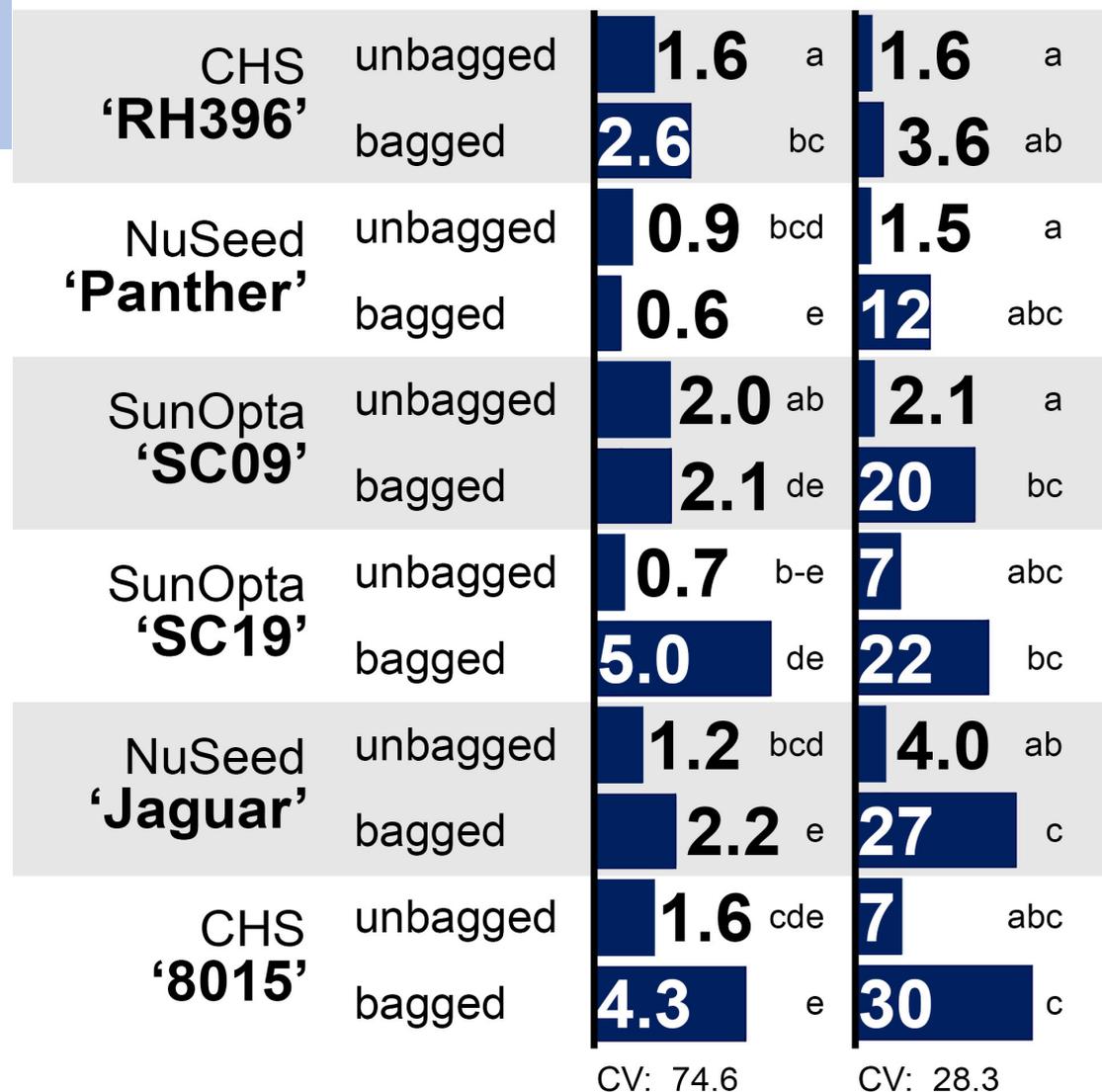
HIVES: 4 hives at each location, 50 to 100% of hives equipped with dispensers of the biological control.

INOCULATIONS: Sunflowers were inoculated once at approx. R5.4-R5.8. To each head, 15,000 ascospores were applied per head.

POLLINATION BAGS: 16x18" (40.64 x 45.72 cm) HDPE plastic with 336-micron pore diameter; 24% of the surface open (Midco Global; Kirkwood, MO)

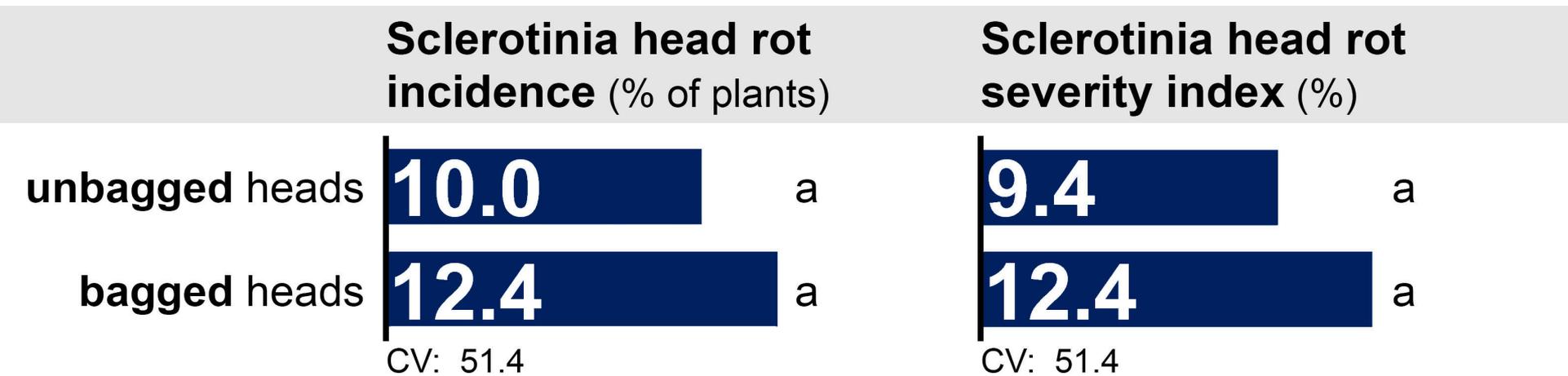
## Sclerotia in grain (% by weight)

Foster County 2021      Wells County 2021



# What impact do pollination bags have on Sclerotinia head rot disease pressure?

Replicated study (5 reps; average 34 plants/plot).  
Foster County, ND (2021)



- Pollination bags were associated with a modest, but not statistically significant, increase in head rot pressure
- Increase in head rot pressure was less than that observed in the bee-vectoring studies

PLOT SIZE: Average 34 plants/plot (max = 46 plants, min = 28 plants).

NO BEE HIVES. Study was conducted nearly 1 mile from the bee-vectoring study.

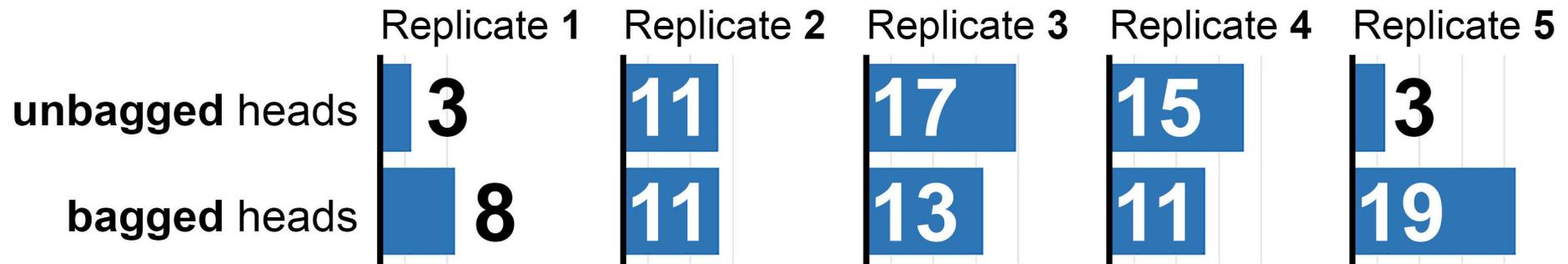
INOCULATIONS: Sunflowers were inoculated once at approx. R5.5-R5.8. To each head, 15,000 ascospores were applied per head.

POLLINATION BAGS: 18 x 16 inch (length x width), fine mesh fabric with 1 mm x 1 mm holes (Lawson Bags; Northfield, IL)

# What impact do pollination bags have on Sclerotinia head rot disease pressure?

Replicated study (5 reps; average 34 plants/plot).  
Foster County, ND (2021)

## Sclerotinia head rot incidence by experimental replicate



## Follow-up testing is needed.

- Very high variability in results was observed across replicates.
- Two brands of pollination bags were utilized, and the impact of the pollination bag on head rot may differ across brands.

PLOT SIZE: Average 34 plants/plot (max = 46 plants, min = 28 plants).

NO BEE HIVES. Study was conducted nearly 1 mile from the bee-vectoring study.

INOCULATIONS: Sunflowers were inoculated once at approx. R5.5-R5.8. To each head, 15,000 ascospores were applied per head.

POLLINATION BAGS: 18 x 16 inch (length x width), fine mesh fabric with 1 mm x 1 mm holes (Lawson Bags; Northfield, IL)



# Thank you!

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