Fresno County white rot management field trial results

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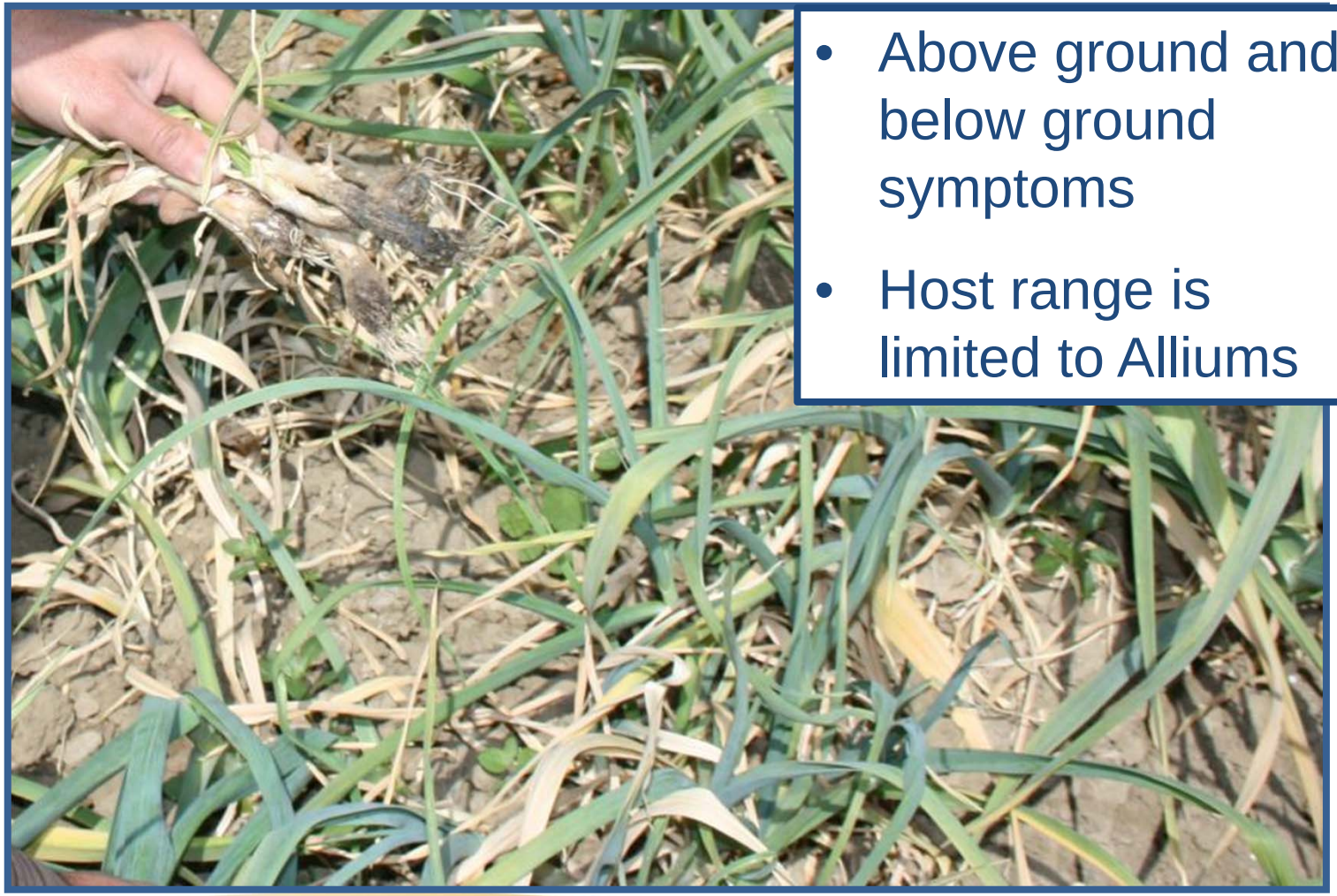
White rot of onions and garlic



- Above ground and below ground symptoms
- Host range is limited to Alliums

Central San Joaquin Valley Infested Fields

More than 21,000 acres are reported as infested with the white rot pathogen

Caused by *Sclerotium cepivorum*

Sclerotia survive for decades, cause disease at very low concentrations and are easily disseminated.

Germination Stimulants

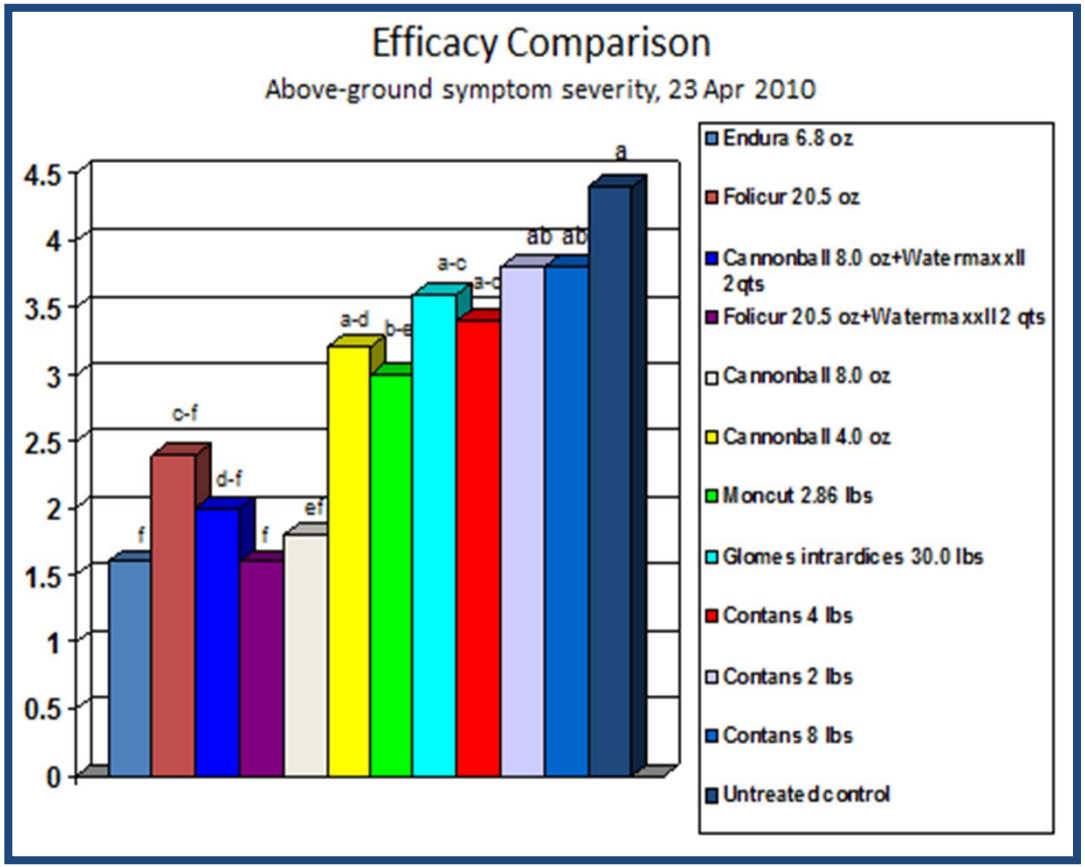
Materials containing volatile sulfur-containing compounds stimulate sclerotia to germinate in the absence of a host.

- diallyl-disulfide (DADS) reduced soil levels of the fungus by 90 to 98 % in field trials*
- DADS is currently unavailable.

* Davis, R. M., J. J. Hao, M. K. Romberg, J. J. Nunez, and R. F. Smith. (2007). Efficacy of Germination Stimulants of Sclerotia of *Sclerotium cepivorum* for Management of White Rot of Garlic. 91:2, 204-208.

Fungicides Applied at Planting

Fungicide application at planting results in reduction of disease severity and increase in yields.

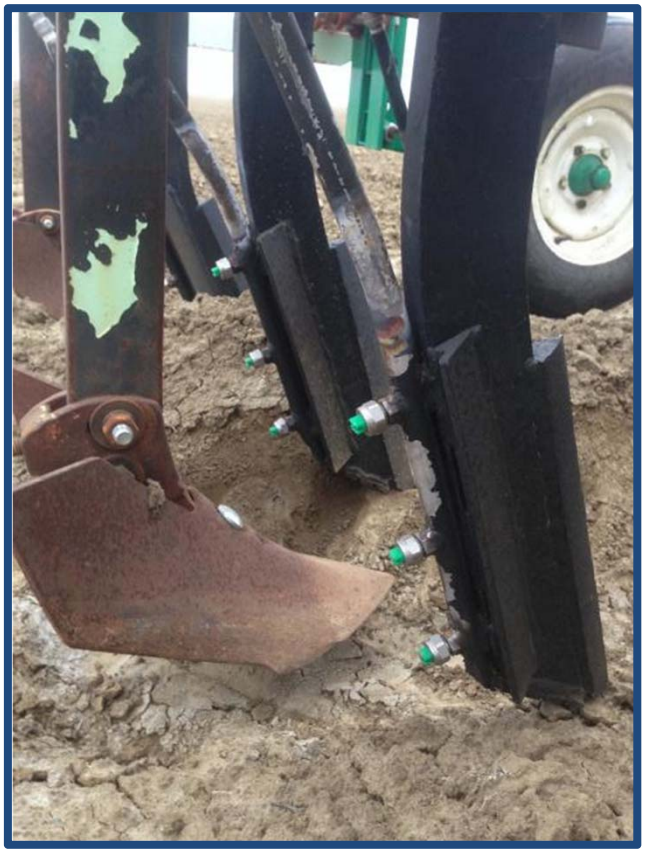


Objectives of 2015-16 Study

- Evaluate fallow application of garlic juice impact on soil levels of sclerotia.
- Assess influence of garlic juice on yield and quality of the garlic.
- Compare performance of garlic juice with and without fungicides applied at planting.

Garlic Juice Treatments

1. garlic juice at 2.0 gal/acre
2. garlic juice at 20.0 gal/a
3. Untreated control



Applied: January 23, 2015

Garlic Juice Injection

- 23 Jan 2015
- 30 gallons of tank mix per acre
- 4 beds per pass
- 40 inch beds

Fungicide Treatments

1. Tebuzol 3.6F 20.5 fl oz/a (tebuconazol) + Cannonball WP 7 oz/a (fludioxonil) + Fontelis 24 fl oz/a (penthiopyrad)
2. Tebuzol 3.6F 20.5 fl oz/a
3. Cannonball WP 7 oz/a
4. Fontelis 24 fl oz/a
5. untreated control

Application details

- Immediately before planting, on 19 Nov 2015,
- Applied in 5 inch band
- CO_2–pressurized sprayer
- 30 psi
- 15 gal/a

Field Conditions

- California Late garlic was planted on 19-20 Nov 2015. First irrigation sprinklers on 21 Nov. After emergence all irrigations were through surface drip.
- Fertilization as well as pest control was according to commercial practice.
- Irrigation was discontinued in late-Apr, which was earlier than ideal for garlic planted in mid- to late-Nov.

Experimental Design

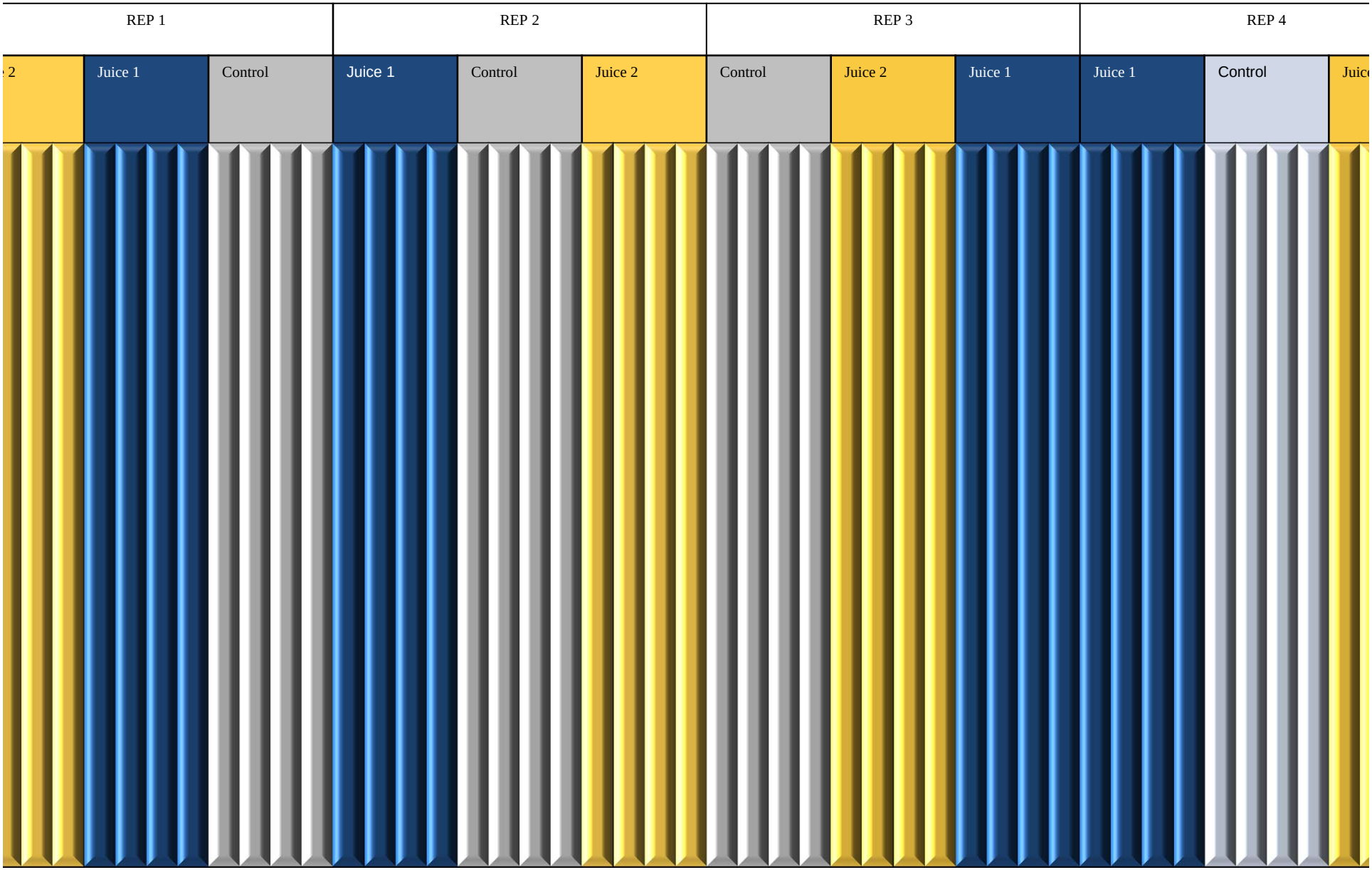
Split-block design

- 4 Replication
- Main plot –

  garlic juice (4 rows x 150 ft)
- Sub plot – fungicide treatments

All data was collected from the middle two rows

Garlic Juice Injection



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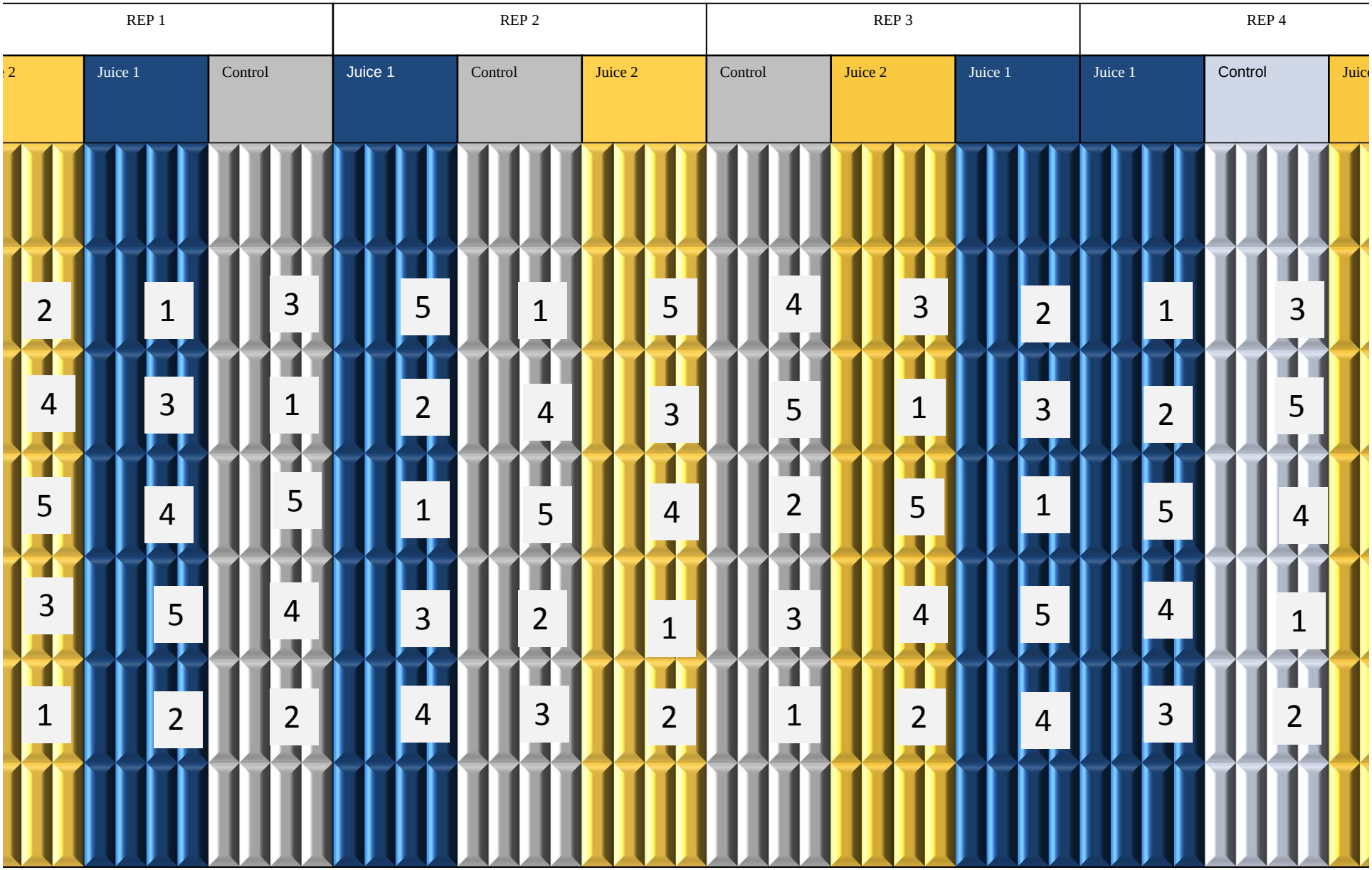
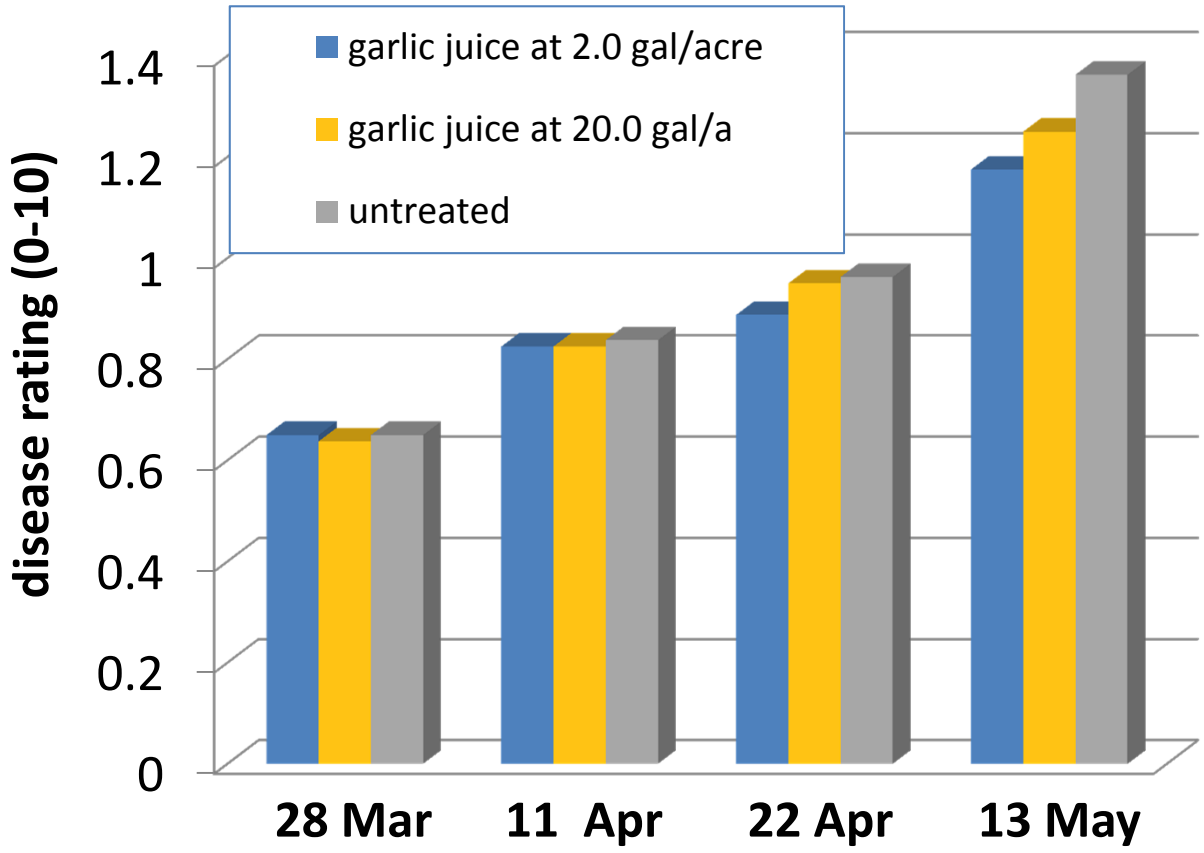


Evaluations

- Soil samples Jan 15 and Dec 15 sclerotia counts
- Above ground symptom rated (0-10) on 28 Mar, 11, 22 Apr and 13 May
- Yield was calculated from hand harvest of 20 row ft. on 26 May 2016

Influence of garlic juice on above ground symptom severity



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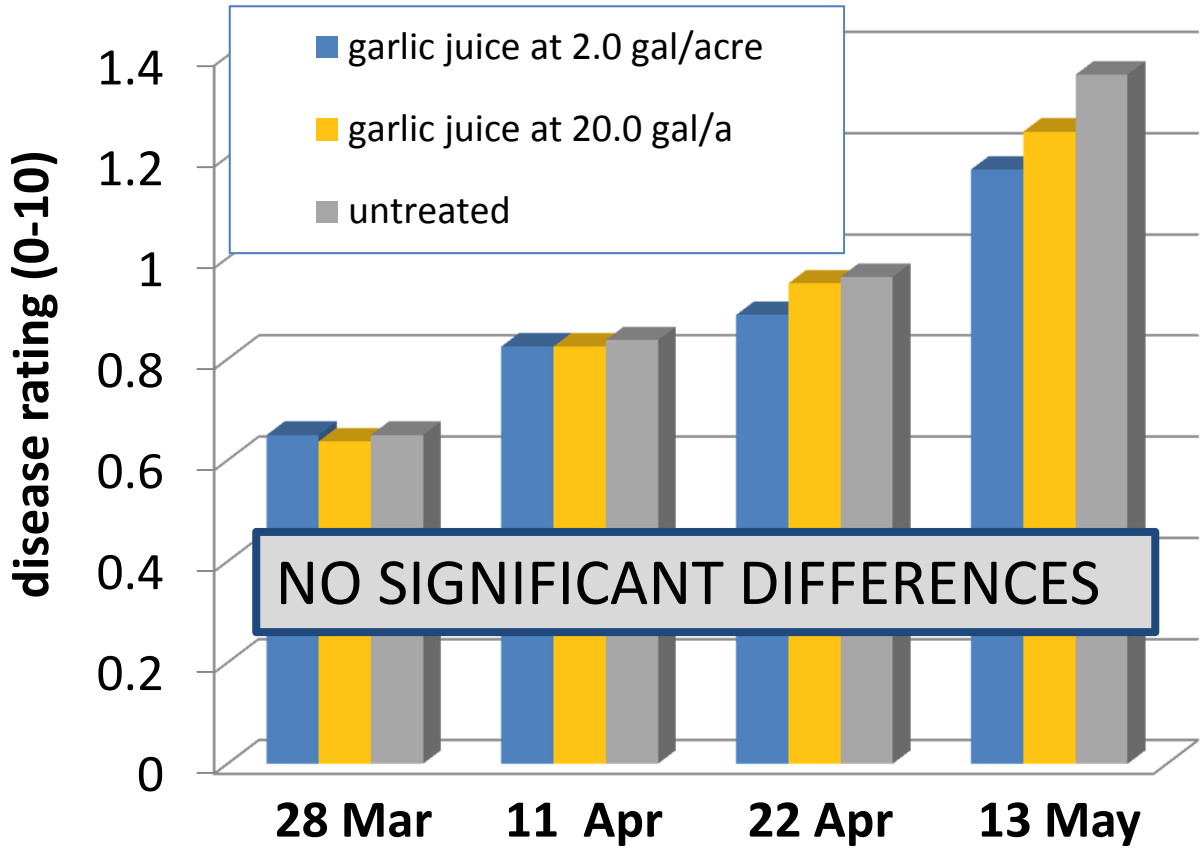
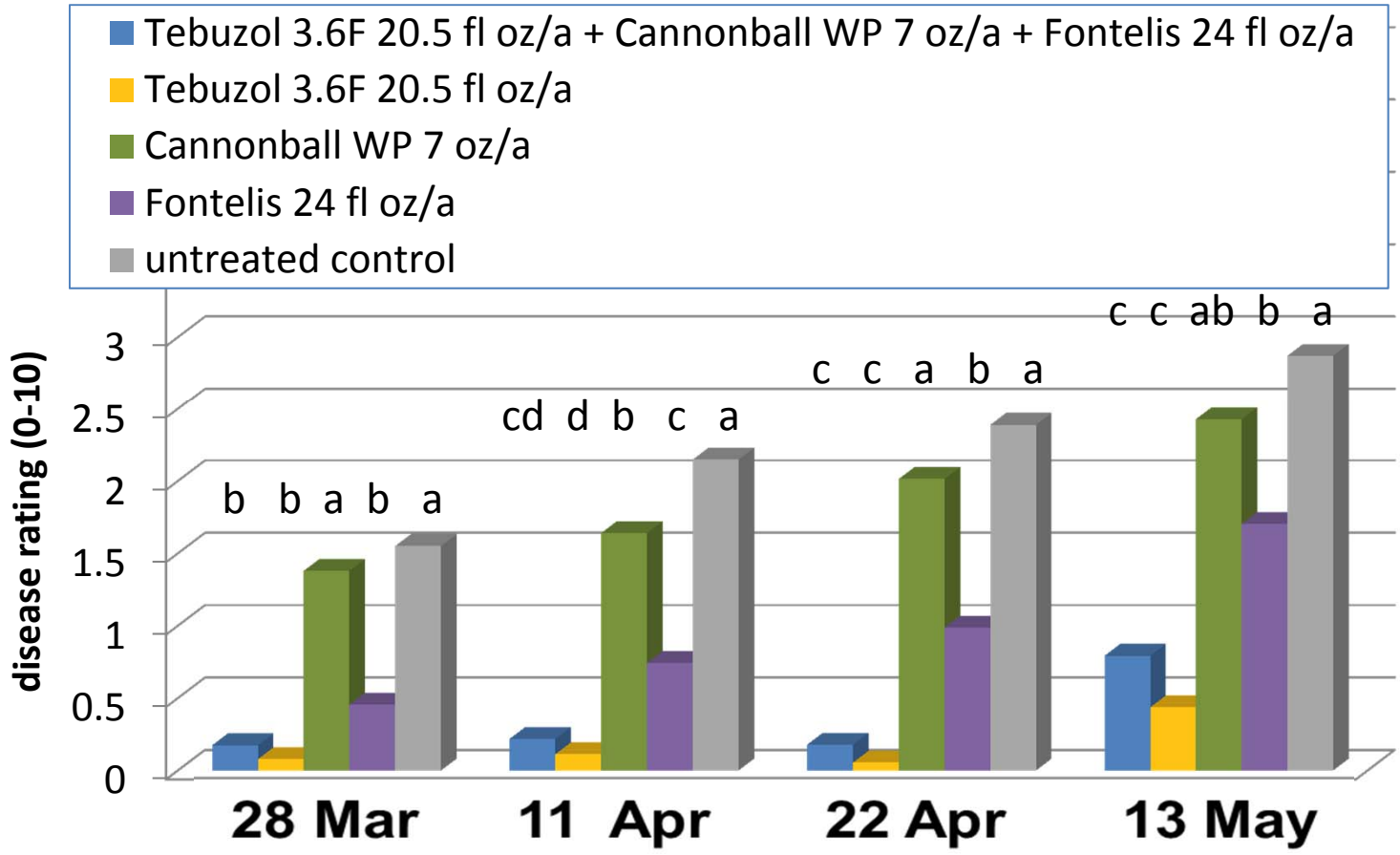
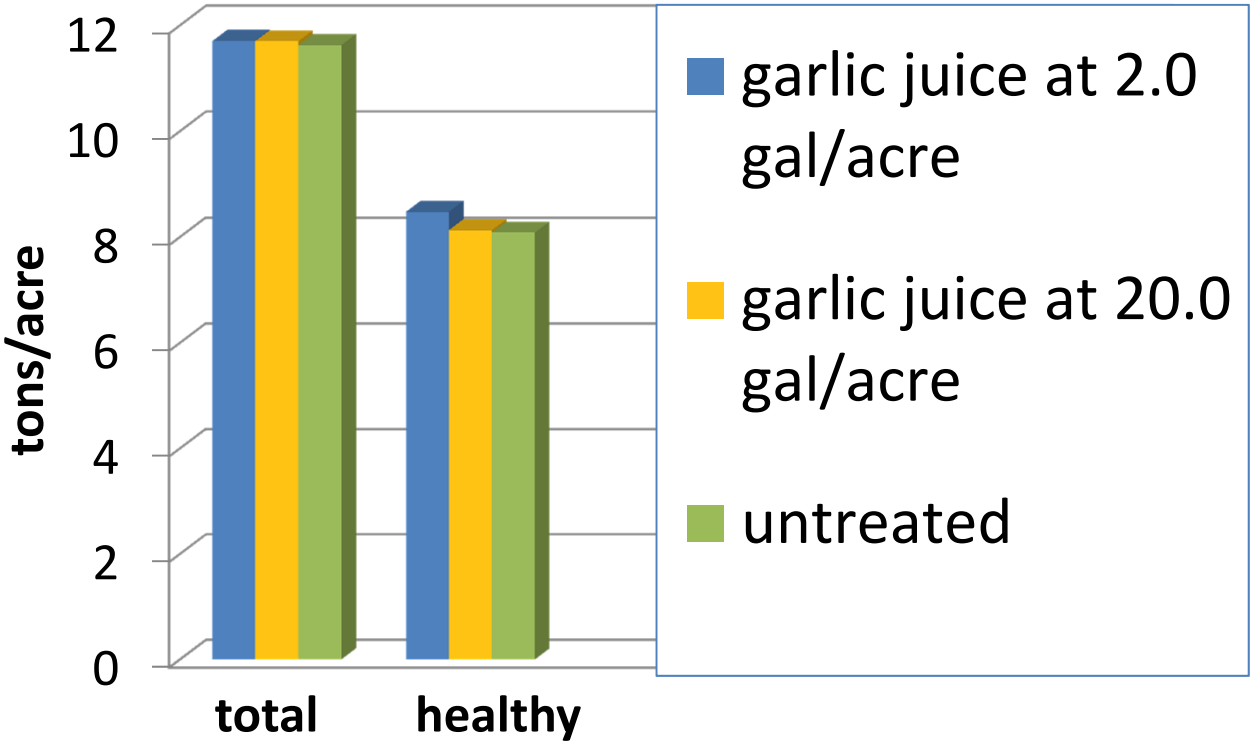


Influence of fungicides on above ground symptom severity



Influence of garlic juice on total yield and yield without signs of white rot



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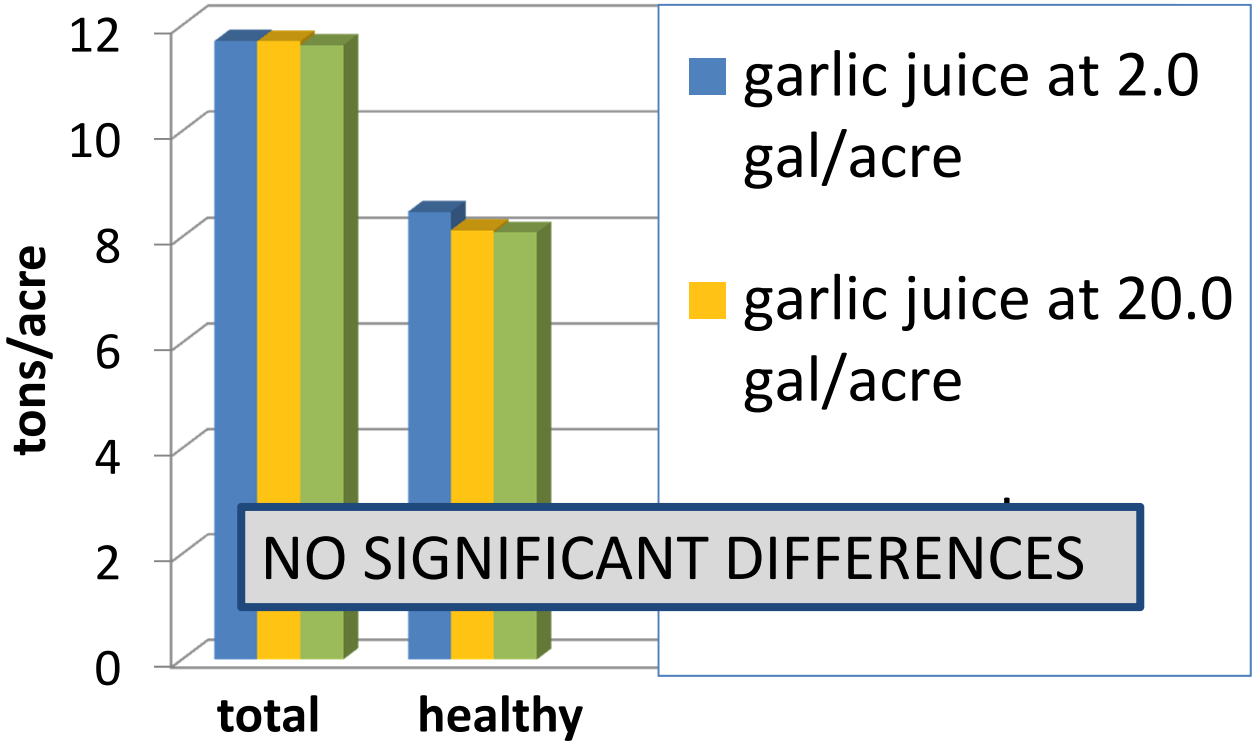

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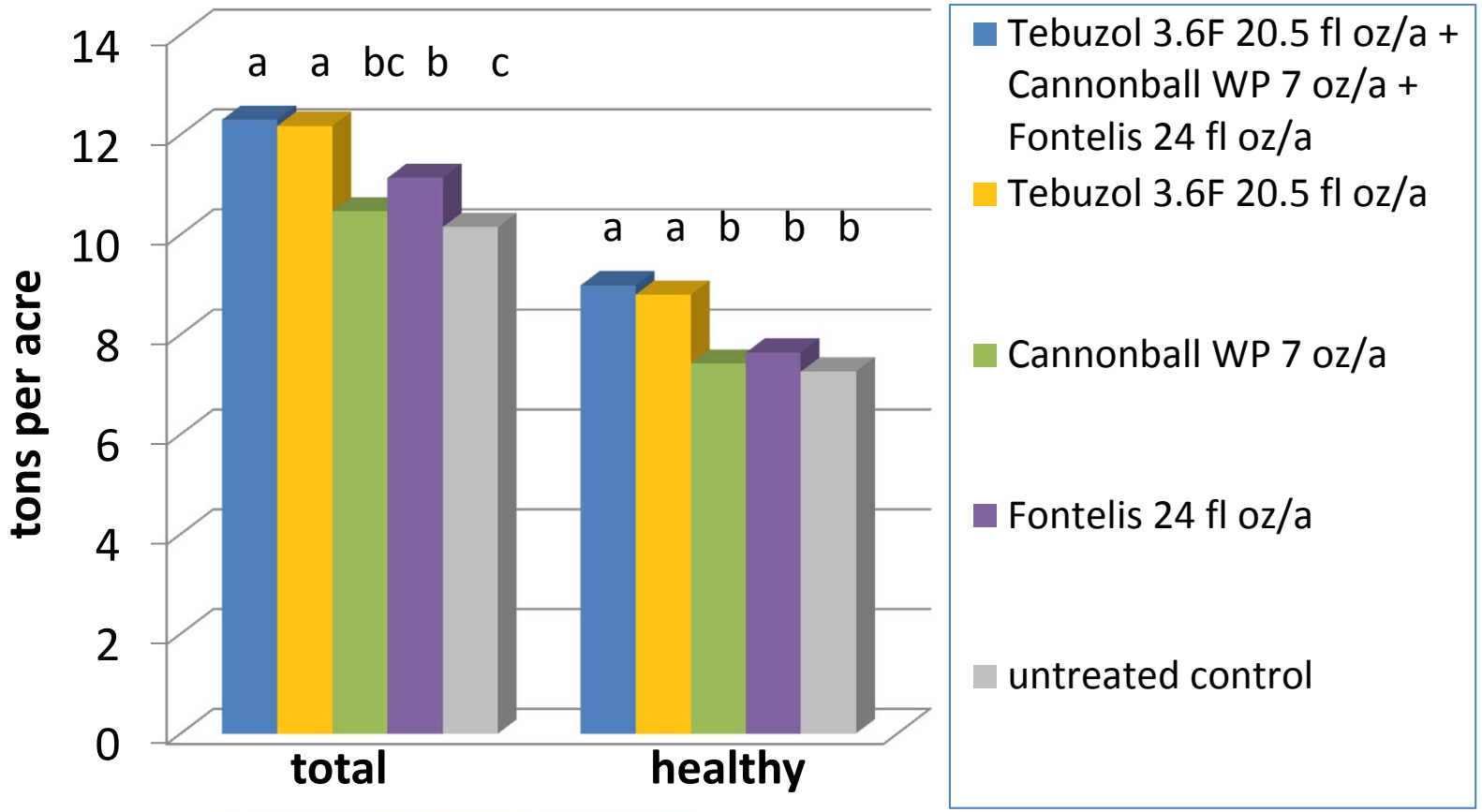
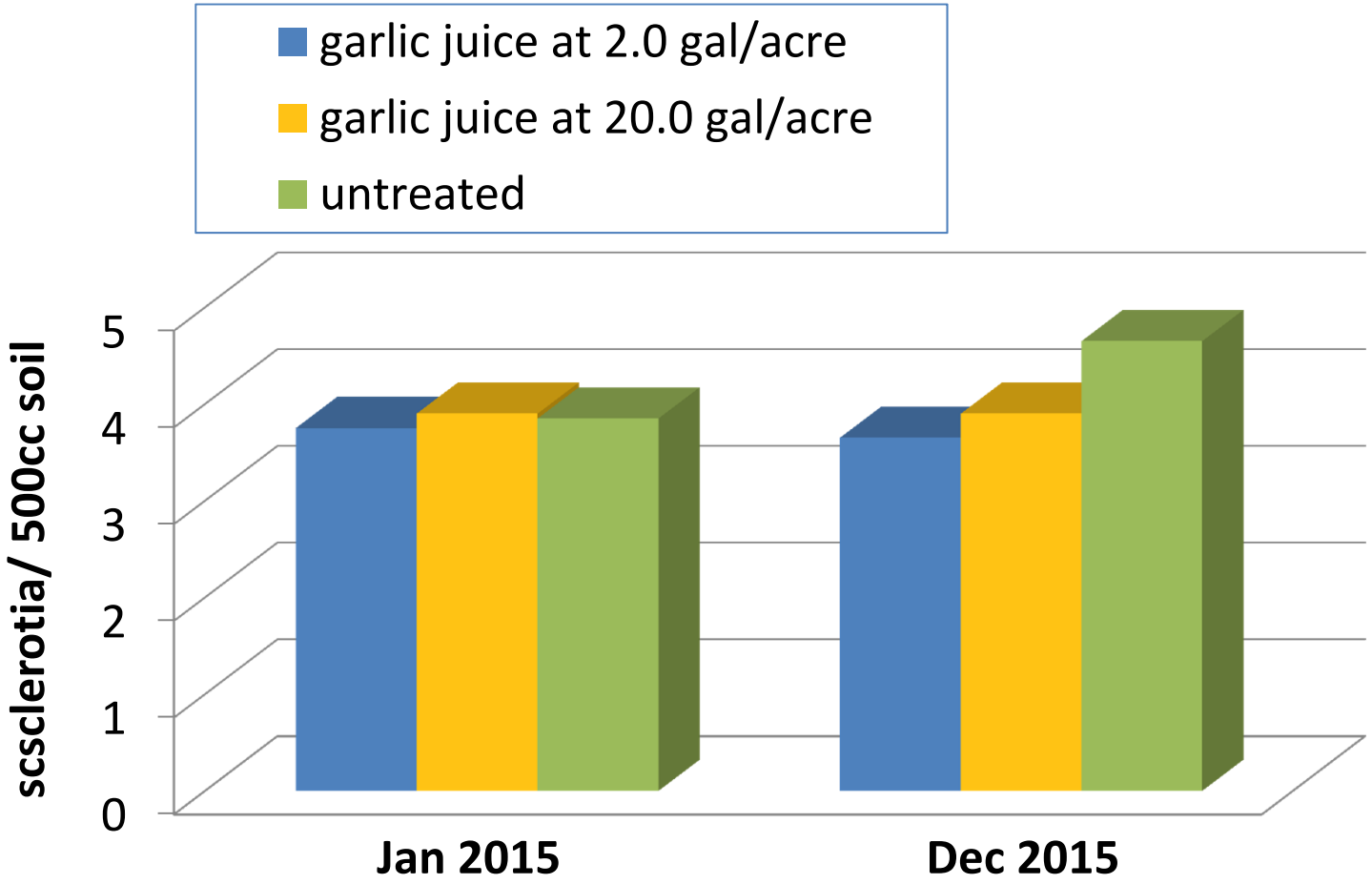


Sclerotia counts before and after treatment with garlic juice



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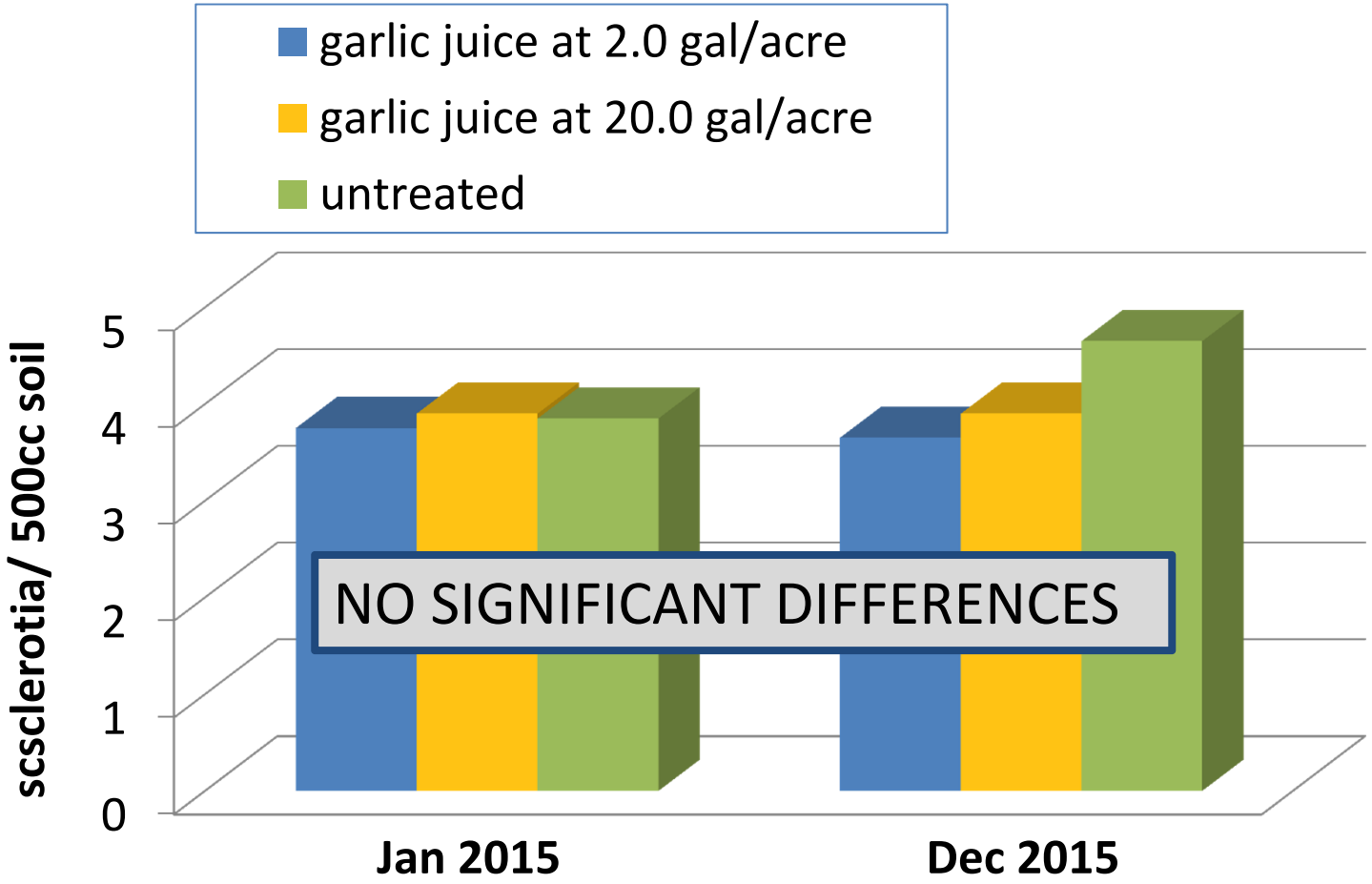

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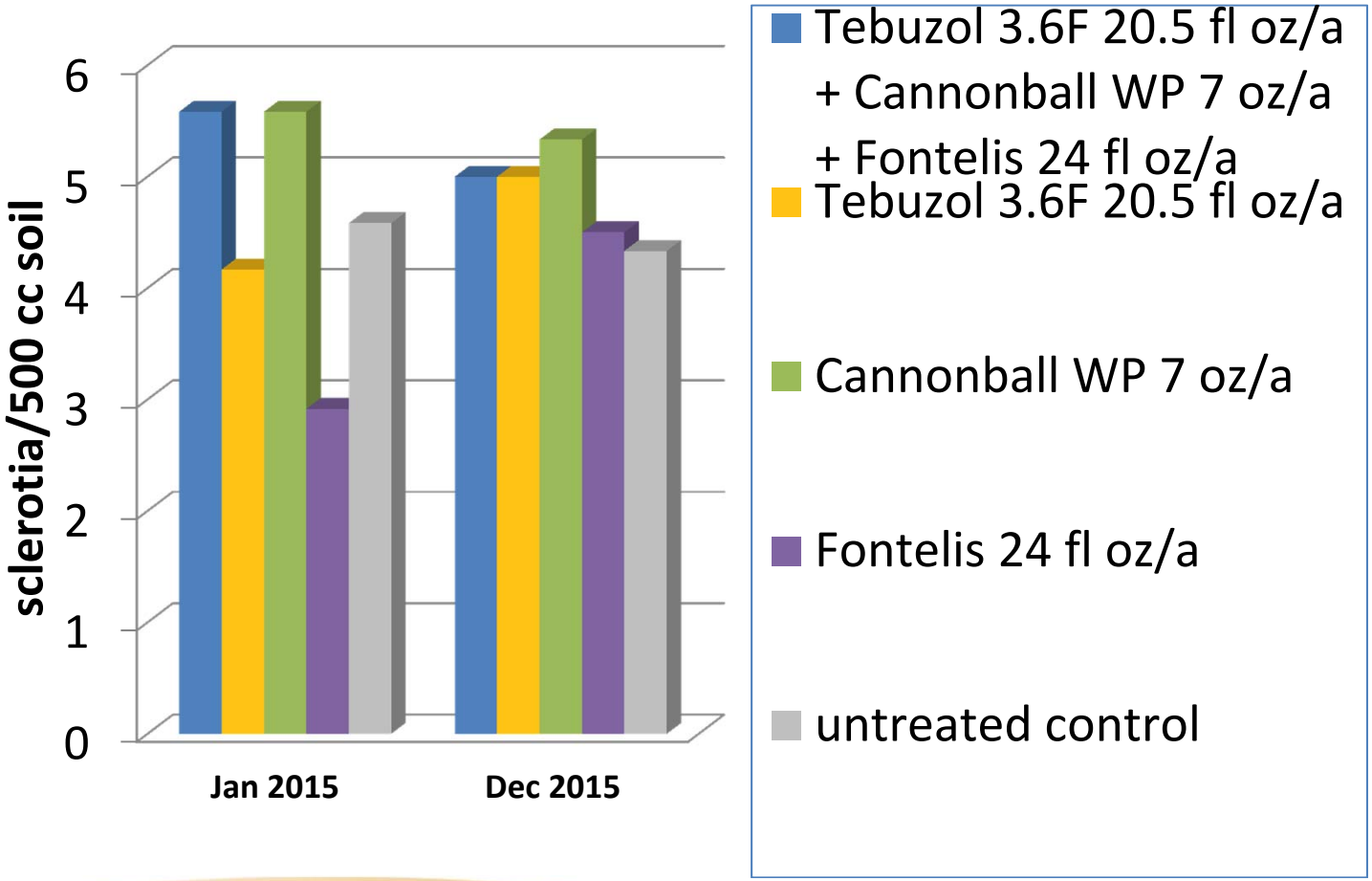

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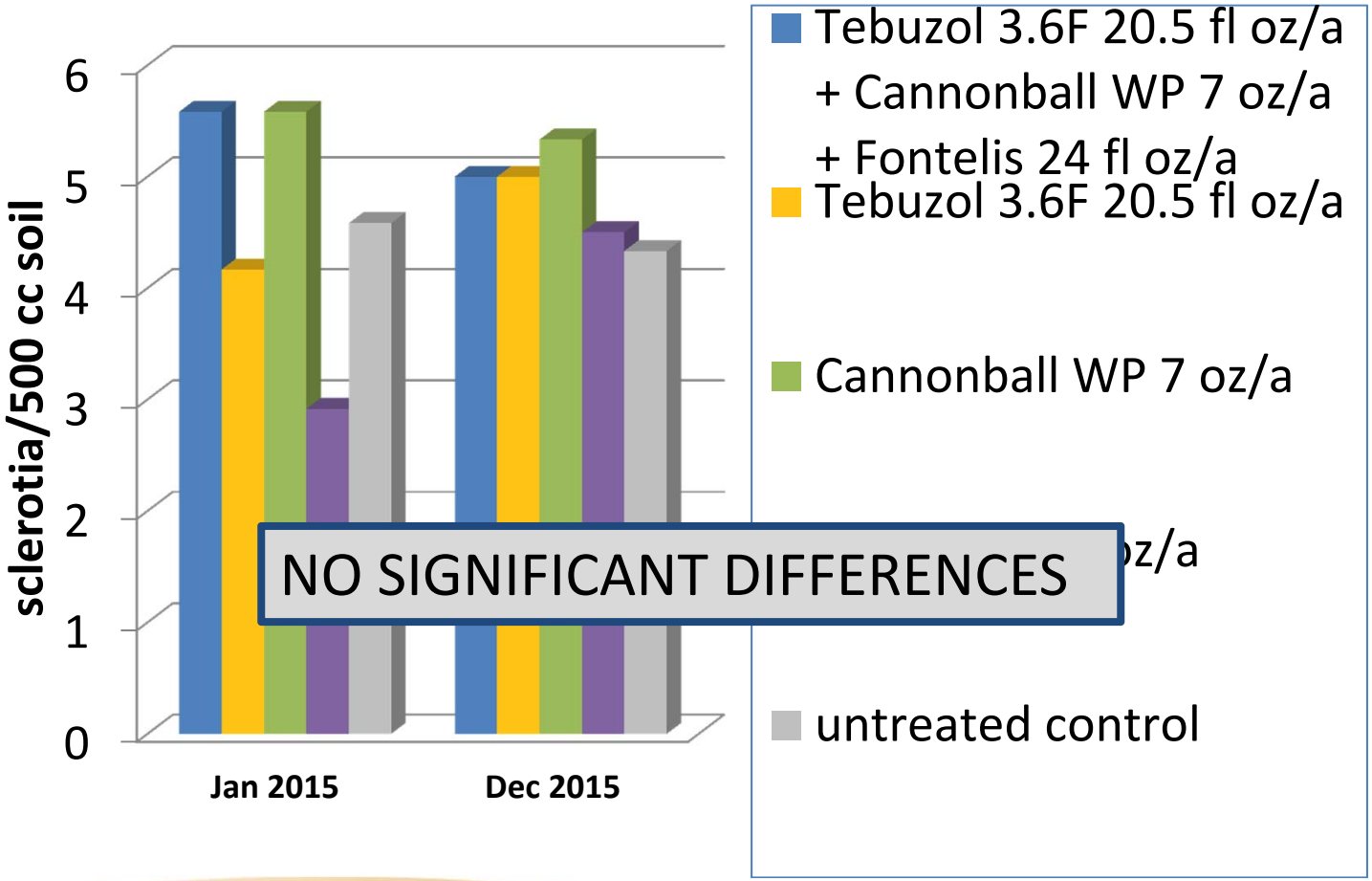

Overview

- There were no differences among garlic juice treatments in terms of above ground symptoms, yield, diseased bulbs nor sclerotia counts.
- Tebuzol, Fontelis and the combination fungicide treatment reduced symptom incidence.
- Tebuzol and the combination fungicide treatment had higher yield and healthy yield

Acknowledgments

- California Garlic and Onion Research Advisory Board
- UC West Side Research and Extension Center
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- Jeremiah Dung – OSU
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- Sensient Natural Ingredients
- Sequoia

Thank you

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Hard neck garlic lines evaluated for response to *Sclerotium cepivorum*

- Garlic lines were provided for screening in a white rot infested field.
- These entries were derived from true seed garlic.
- Tested at the same field as the garlic juice/fungicide evaluation 2015-2016

Rina Kamenetsky Goldstein - Institute of Plant Sciences-ARO, The Volcani Center, Israel

Itzhak Esquira - Classeed CEO

Hard neck garlic lines evaluated for response to *Sclerotium cepivorum*

- Twenty entries were tested, but three did not emerge due to low number of cloves per entry poor clove conditions.
- Four to 28 cloves per plot in each of 4 replications – if possible
- Planted on

Rina Kamenetsky Goldstein - Institute of Plant Sciences-ARO, The Volcani Center, Israel

Itzhak Esquira - Classeed CEO

Field Conditions

- California Late garlic was planted on 19-20 Nov 2015. First irrigation sprinklers on 21 Nov. After emergence all irrigations were through surface drip.
- Fertilization as well as pest control was according to commercial practice.
- Irrigation was discontinued in late-Apr, which was earlier than ideal for garlic planted in mid- to late-Nov.

Experimental Design

Randomized complete block design

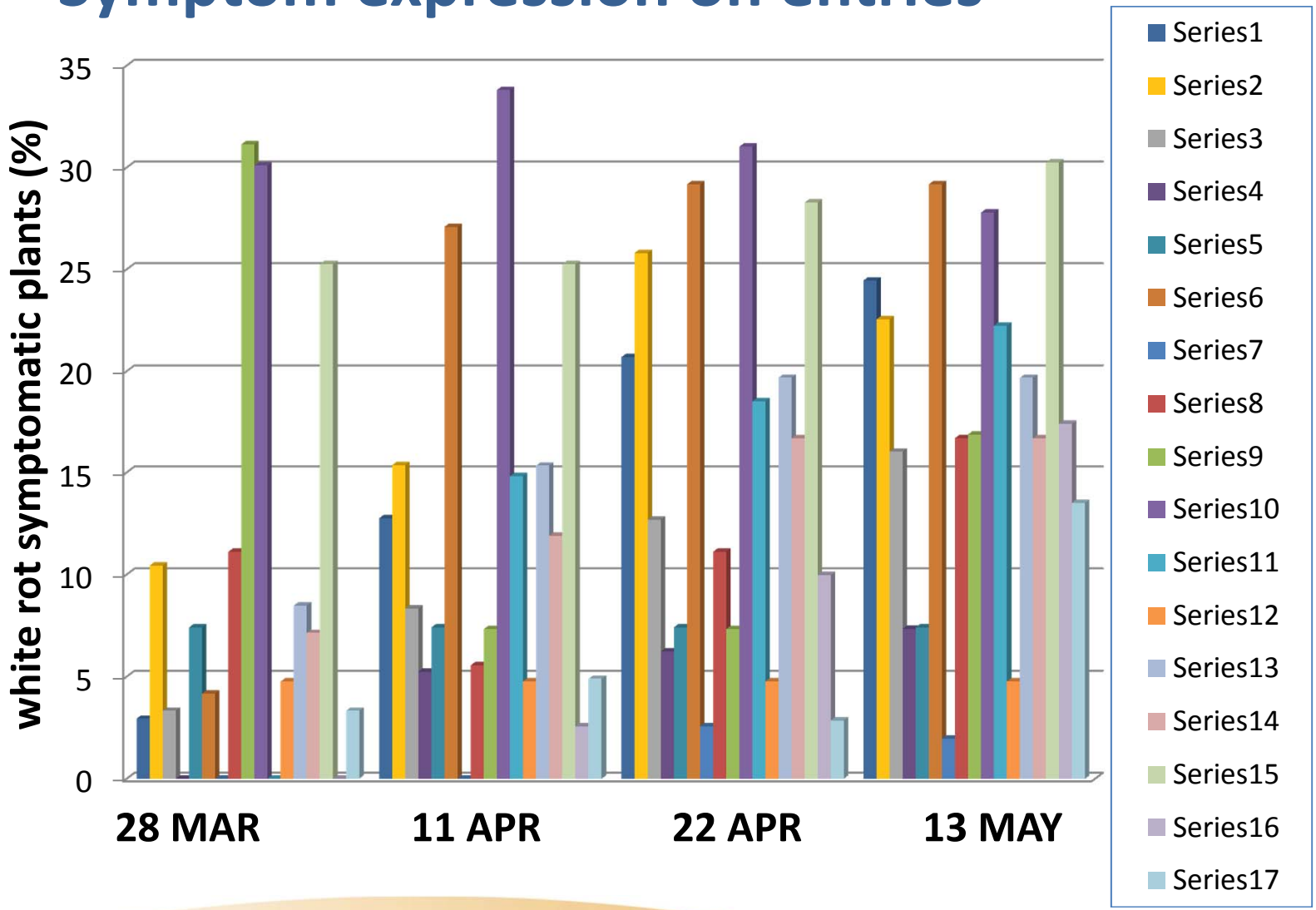
- Four replication
- Plot size: single bed x 5 ft – 2 lines per bed

Evaluations

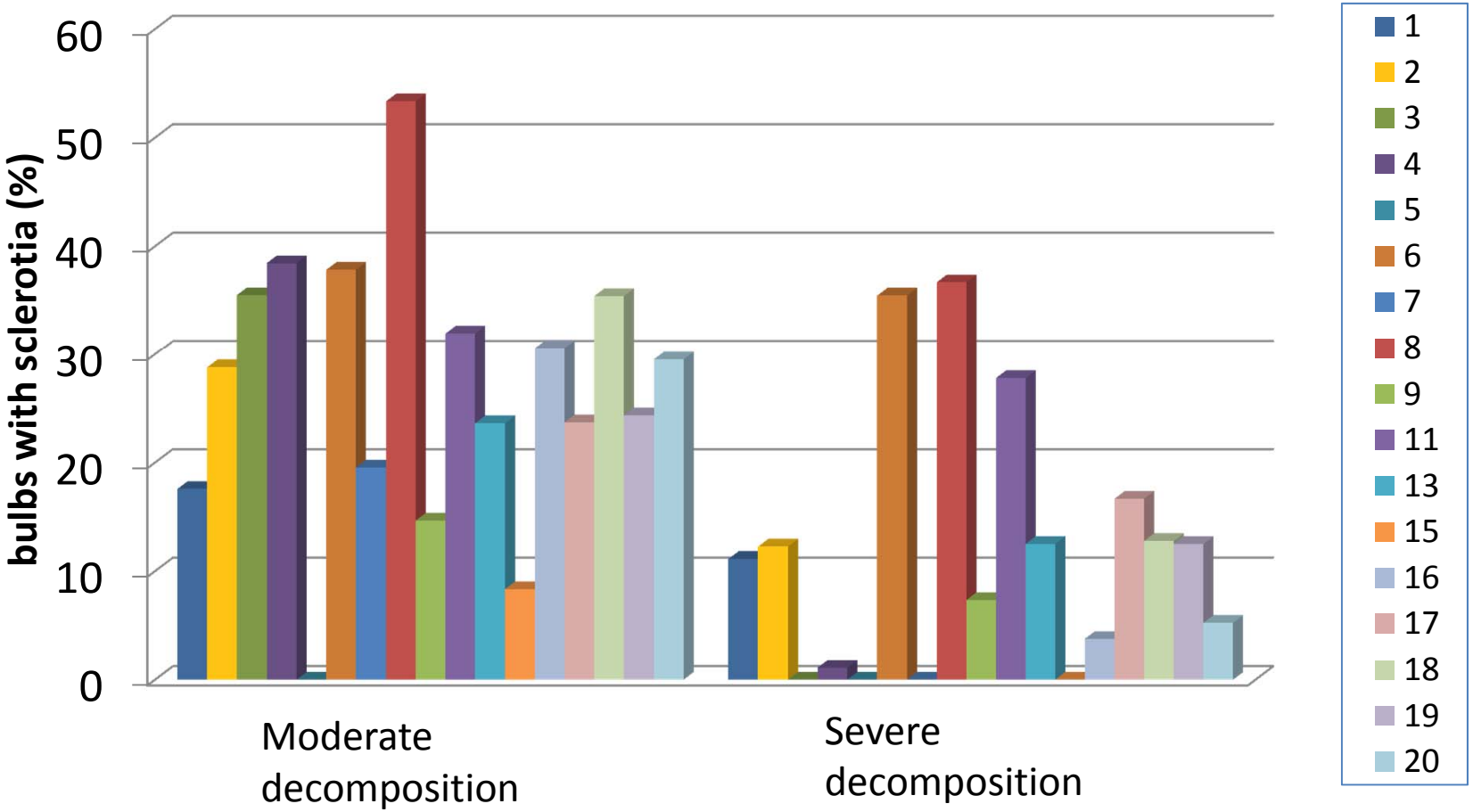
- Above grounds smptom rated (0-10) on 28 Mar, 11, 22 Apr and 13 May.

- Harvest was earlier than ideal on 27 May 2016: Heads were counted weighed and inspected with 15x magnification for sclerotia.

Symptom expression on entries



Influence of garlic juice on above ground symptom severity



Summary

- Additional research is needed to further evaluate the performance of these lines under heavy disease pressure.
- No sclerotia were deteced on any of the cloves of two entries.