Cover crops and pest management: the good and the bad

Agronomy Society of America Webinar

January 26, 2017

11:00 a.m.

Who am I?

- Chelsea Harbach
  - Ph.D. student at Iowa State University
  - Dr. Greg Tylka, adviser
  - SCN x cover crop interaction
    - How do cover crops affect SCN population densities in the soil?

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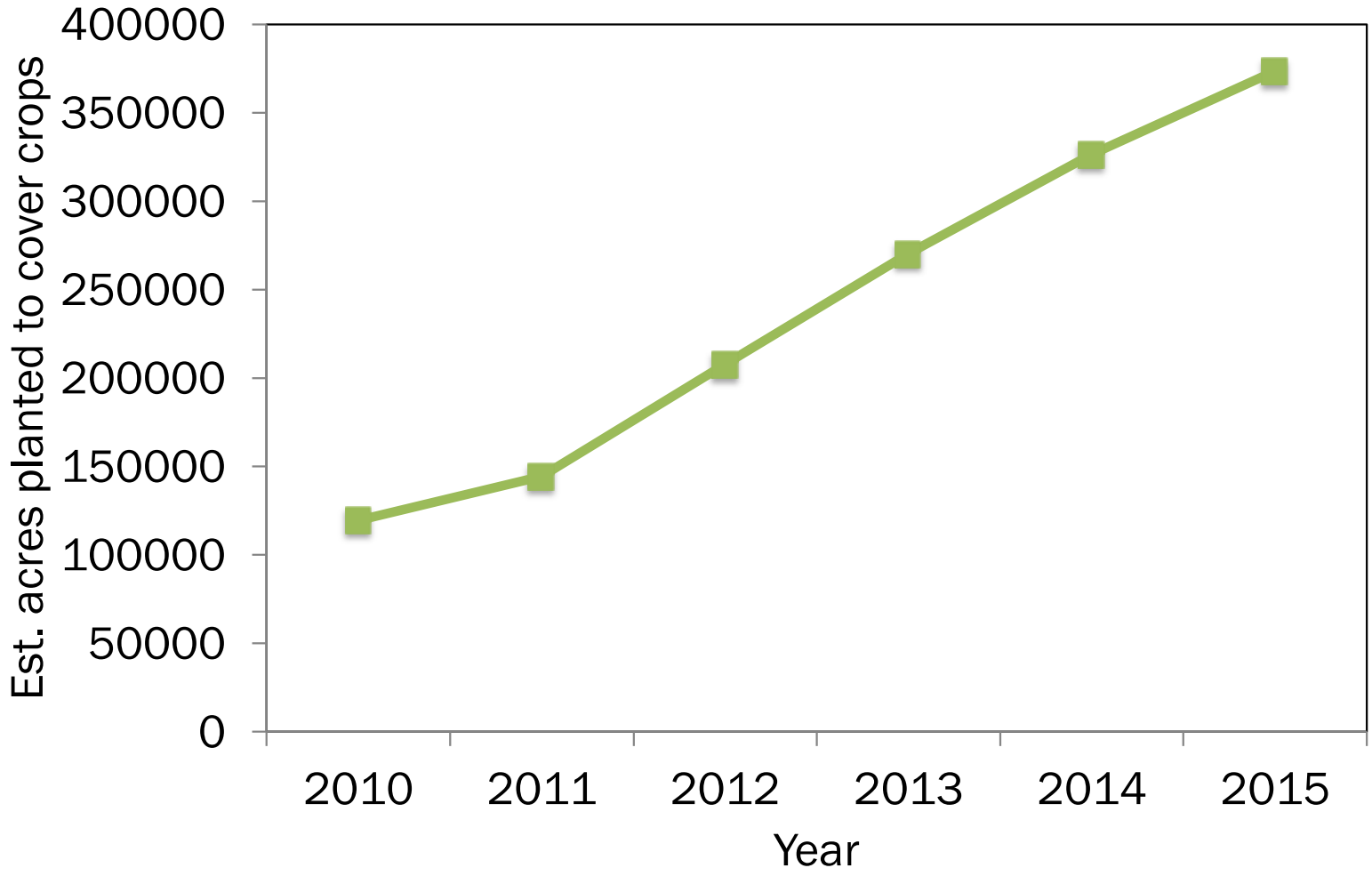
Cover crops

- Increasingly implemented throughout the United States



SARE 2015 Cover Crop Survey, 2015

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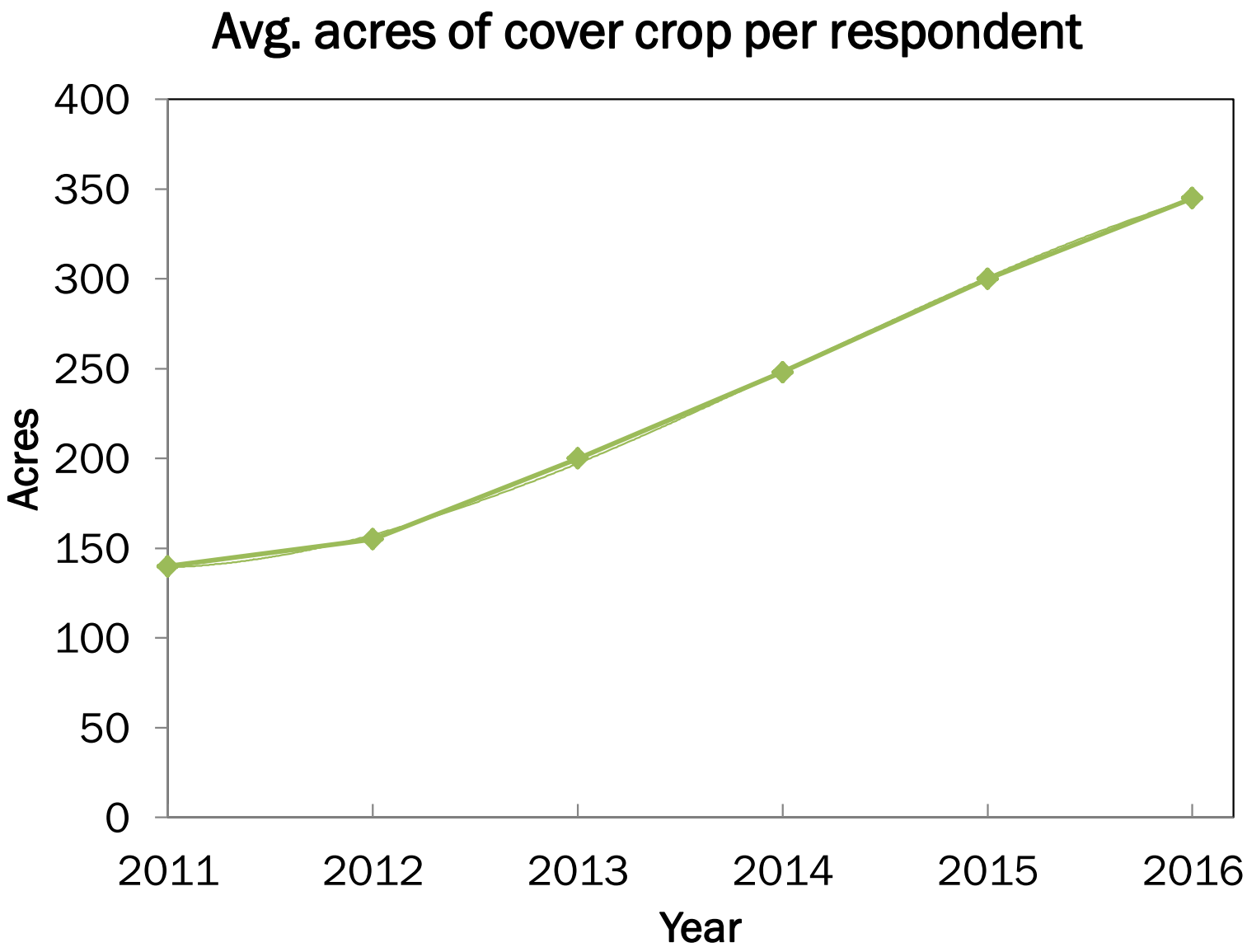
Why cover crops?



SARE 2016 Cover Crop Survey, 2016

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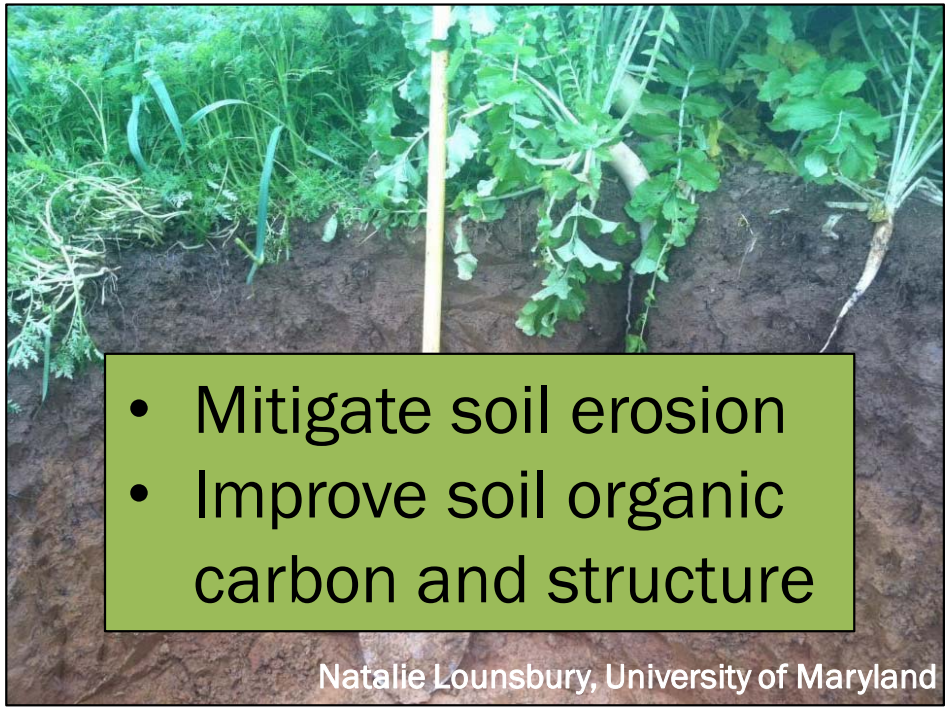
Benefits of cover crops



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Clark, 2007.

Cover crops & plant pests

- Sudden death syndrome
- Soybean cyst nematode

- Root rot pathogens
- Corn insect pests
- Soybean insect pests

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Soybean root rot pathogens x CC

University of Illinois cover crop experiments

- Inconsistent results for:
  - Sudden death syndrome
  - Septoria brown spot
  - Soybean cyst nematode
- Rhizoctonia root rot on soybeans following cereal rye
  - Increased stand
  - Smaller lesions

Eastburn. 2014. Resilient Agriculture.

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Fusarium virguliforme (SDS) x CC

Cover crops susceptible to Fv?

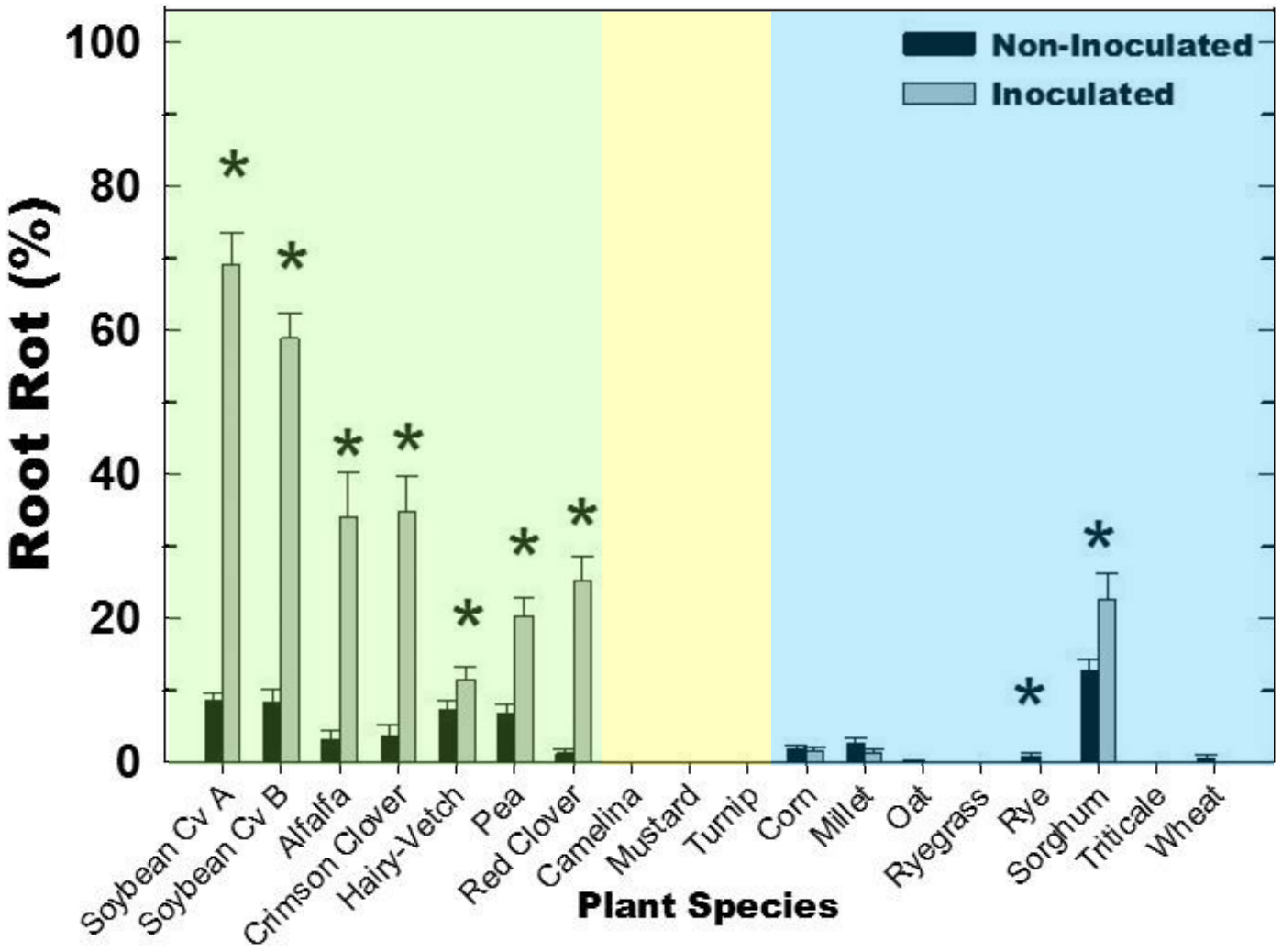
- Alfalfa, crimson clover, red clover, pea and hairy-vetch are hosts

- Corn and sorghum - may be asymptomatic hosts
  - ✓ Biomass reduction; Fv DNA roots

- False flax, millet, mustard, oat, rye, ryegrass, triticale and wheat are non-hosts
  - ✓ No symptoms; Low or no Fv DNA in roots

Kobayashi et al., accepted

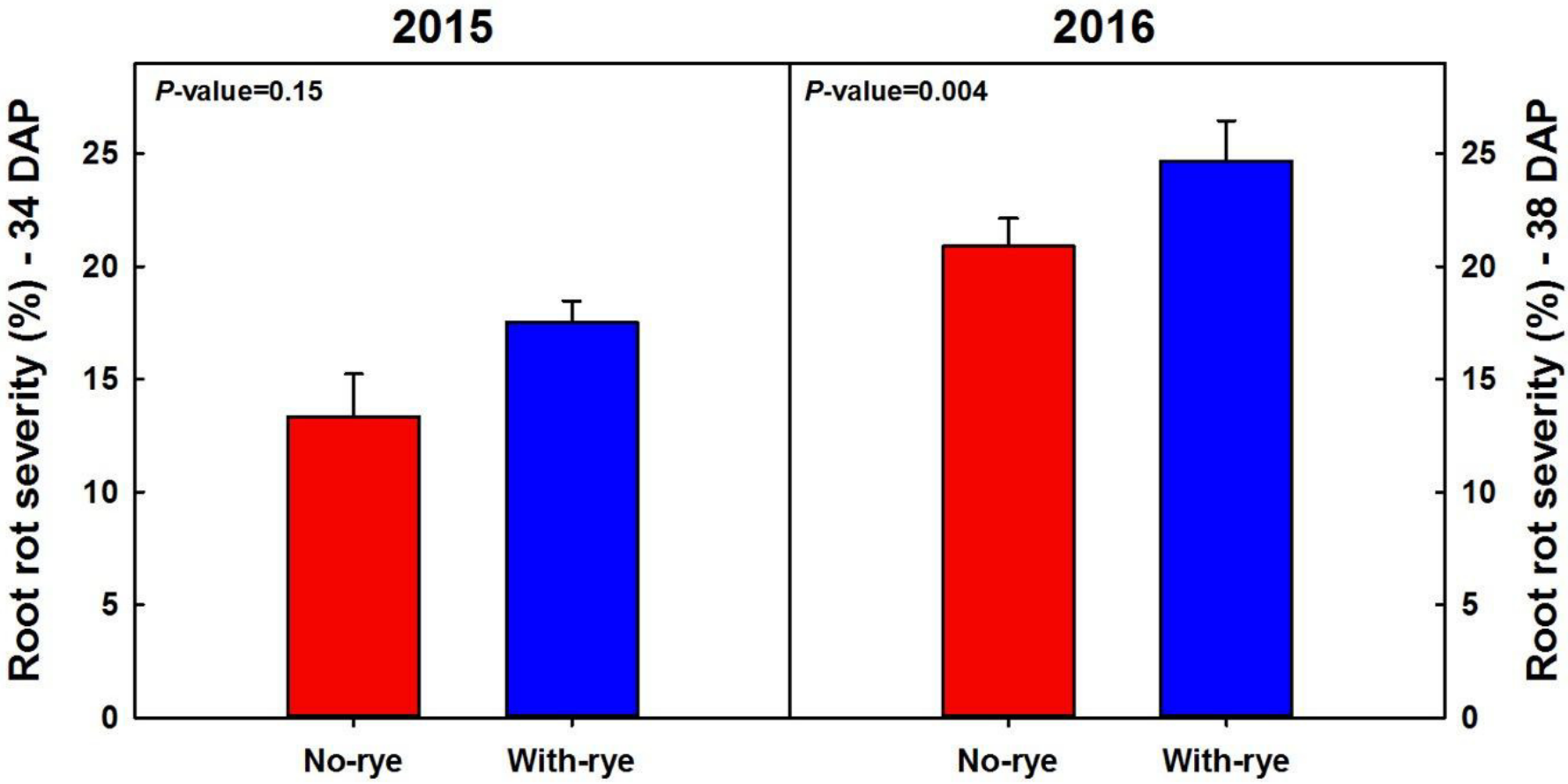
Fusarium virguliforme (SDS) x CC



Kobayashi et al., accepted

Fusarium virguliforme (SDS) x CC

Field experiments



No effect of cover crop either year on:

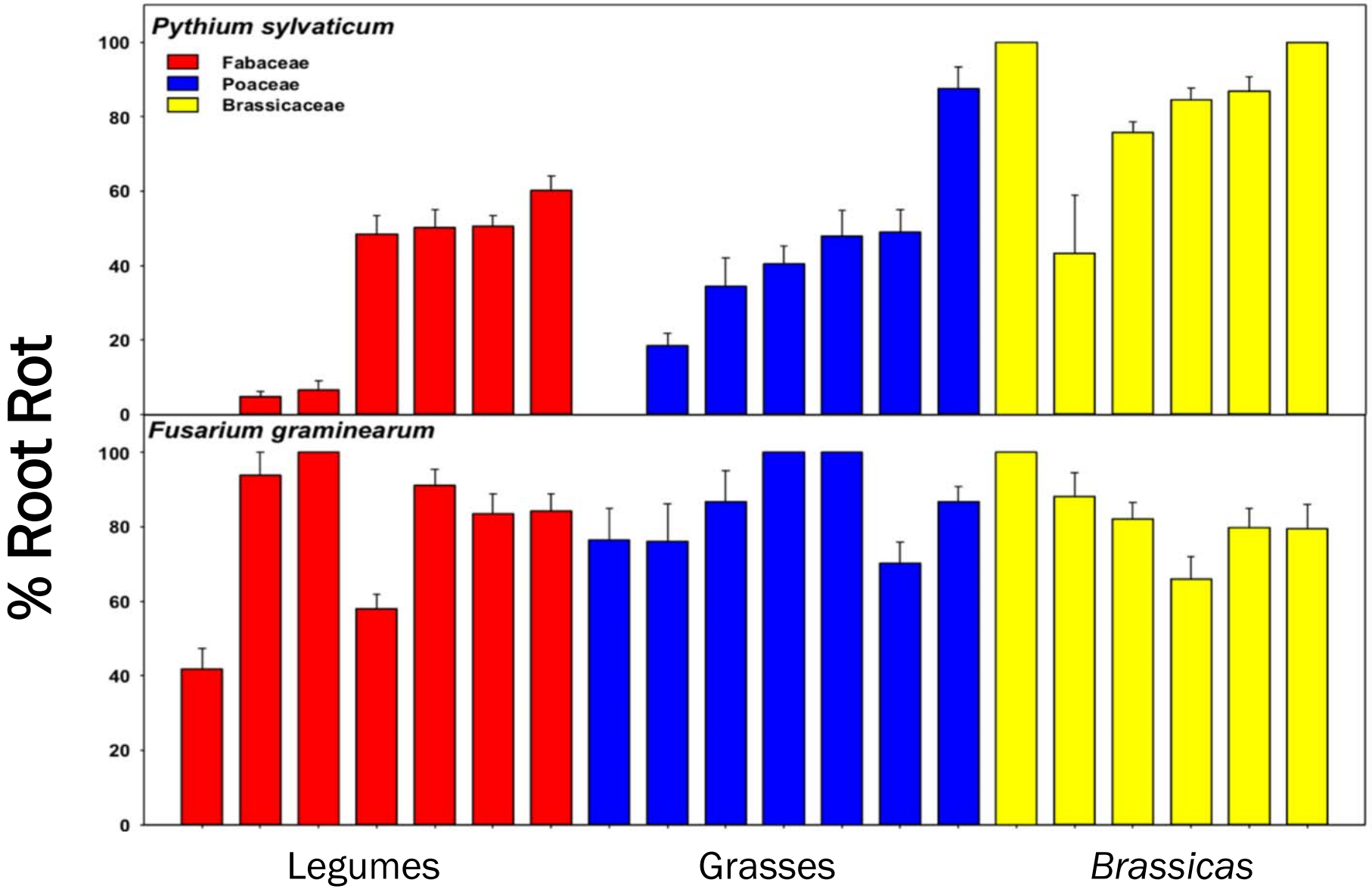
- Foliar disease
- Root rot
- Yield

2016 cover crop growth was abundant and:

- Reduced plant population
- Increased plant height
- Reduced root weight

Silva, G. 2016

Root rot pathogens x CC



Silva, G. 2016

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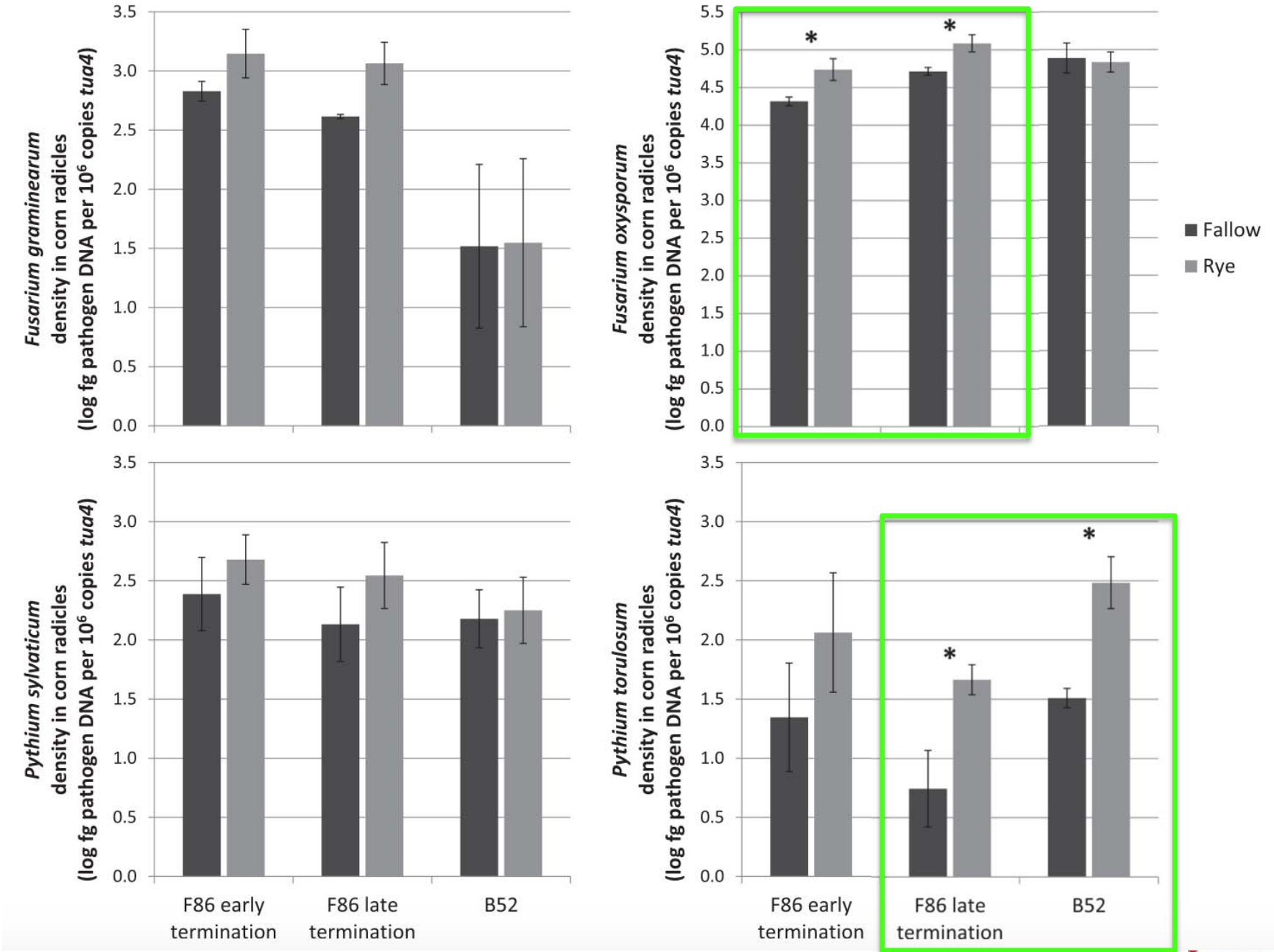
Corn root rot pathogens x CC



Bakker et al. 2016. Phyopathology 106.

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Soybean cyst nematode x CC

Increase SCN population density in soil if cover crops are hosts

Decrease SCN population density by one of four methods

- trap crop
- stimulate hatch
- allelopathy
- kills nematodes

No effect

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Soybean cyst nematode x CC

Cover crops as SCN hosts

Results from 30-day bioassay experiments

- Leguminous cover crops-
  - Poor hosts (1-5 SCN females/plant)- crimson clover, hairy vetch, Austrian winter pea, field pea
  - Non-hosts (0-1 SCN female/plant)- alfalfa, berseem clover, red clover, white clover
- Non-leguminous cover crops-
  - All cover crops tested were non-hosts
  - Included 2 annual ryegrass variety, 1 cereal rye variety, 1 canola variety, 3 radish varieties, and one mustard variety

Kobayashi et al., accepted

Soybean cyst nematode x CC

Now what?

- Current experiments at ISU to determine if/how cover crops affect population densities of SCN
  - Field, greenhouse, lab experiments
- This work takes a lot of work and time! Excited to get results and share!
- Follow me and my progress on twitter @chelseaharbach

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Cover crops and corn insect pests

Increased abundance of true army worm and injured corn following cereal rye cover crop

No difference in abundance of corn stalk borer between cereal rye and winter fallow

Dunbar et al., 2016 J. Econ. Ent. 109.

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Cover crops and soybean insect pests


Jessica Louque, Smithers Viscient, Bugwood.org


Christina DiFonzo, Michigan State University, Bugwood.org

One of two sites showed decreased abundance of bean leaf beetle

Cereal rye significantly suppressed soybean aphid compared to no cover crop

No significant differences for other defoliating insect pests

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Koch, et al., 2012. J. Environ. Ent.; Koch et al., 2015. Agricult. and Forest Ent.

Management

Crop disease

- DON'T rely solely on cover crops to reduce diseases
- DON'T plant immediately after cover crop termination
- DO use multiple management practices

Insect pests

- DO commit to scouting
- DON'T treat unnecessarily
- DO wait 10-14 days to plant after cover crop termination

http://cropprotectionnetwork.org/wp-content/uploads/2017/01/CPN-4002-Cover-Crops-Dos-Donts.pdf

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Thank you!


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