

Soil health in alfalfa receiving full and deficit irrigation

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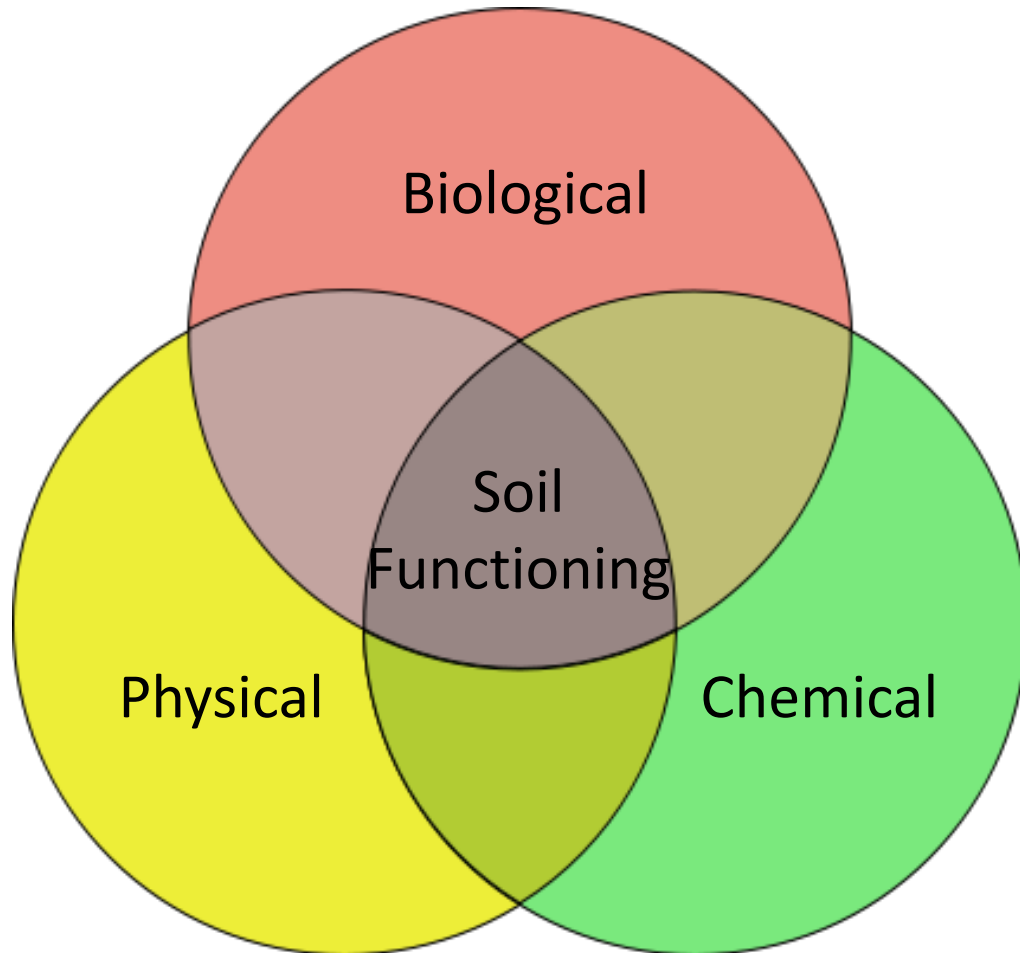
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UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

Cooperative Extension

What is soil health, and how is it influenced by land management?



Does soil health degrade under deficit irrigation? How does the deficit amount and timing impact soil properties?

Treatments applied by Low Elevation Spray Application (LESA)

Full irrigation (100% ET_c)

Full early-season irrigation with a sudden cutoff later in the season (60 percent ET_c, CT)

Sustained deficit where each irrigation imposes restriction (60 percent ET_c, SD)

More-severe sustained deficit throughout the season (40 percent ET_c, SD)

Summary and broader implications

- Soil health properties are impacted by deficit irrigation.
- The level and timing of deficit are both important and have disparate impacts on soil properties.
- To make informed decisions, growers need to know the trade-offs among water savings, alfalfa yield, and soil health properties.
- It is important for policy-makers and regulators to understand how prioritization of water uses may impact soil conservation outcomes.



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Microbial community analysis for identification of novel alfalfa pathogens

Deborah A. Samac; USDA-ARS

Leta J. Larsen; University of Minnesota

Daniel C. Schlatter; USDA-ARS

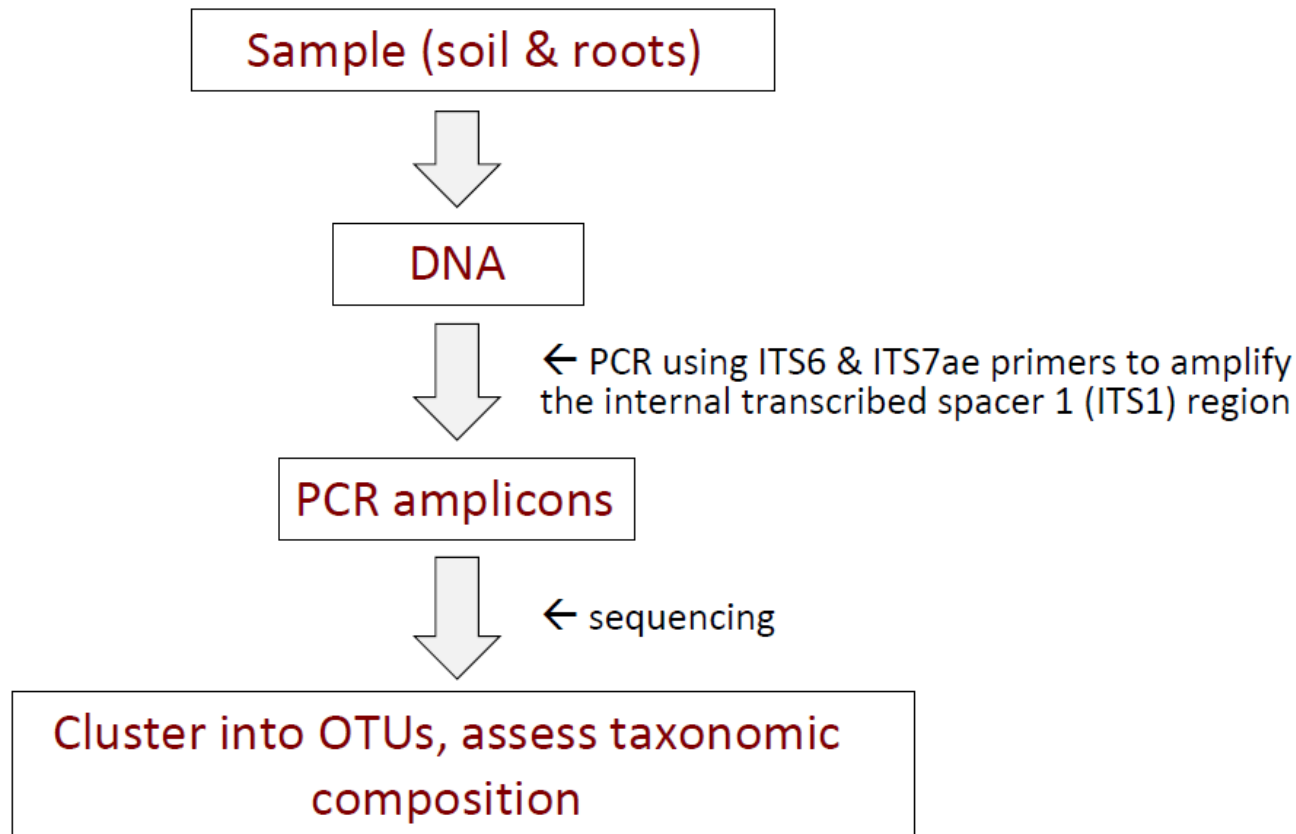


Problem: Diseases continue to reduce seedling establishment



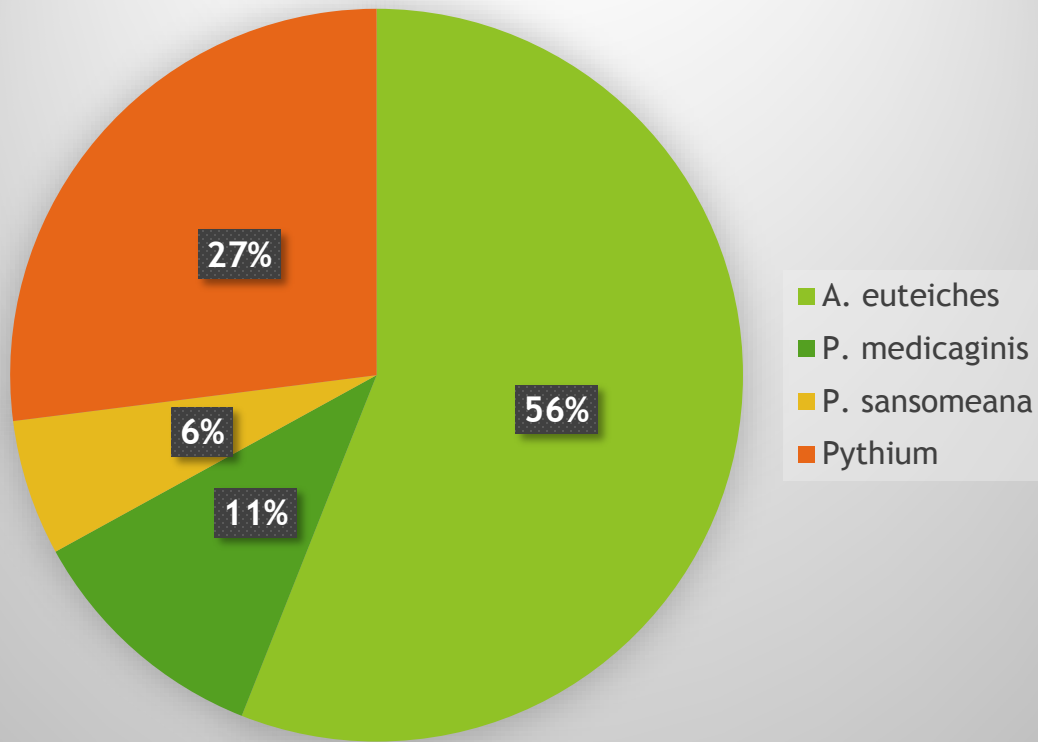
- ▶ *Pythium* spp.: seed rot and damping off
 - ▶ seed treatment: Apron/ApronXL
- ▶ *Phytophthora medicaginis*: damping off and root rot
 - ▶ Resistant cultivars and Apron/ApronXL
- ▶ *Aphanomyces euteiches*: root rot
 - ▶ Resistant cultivars, QoI fungicide
- ▶ *Fusarium* spp.? Other pathogens?

Approach: Identify the community of microbes in rhizosphere soil and roots of plants from 8 problem sites

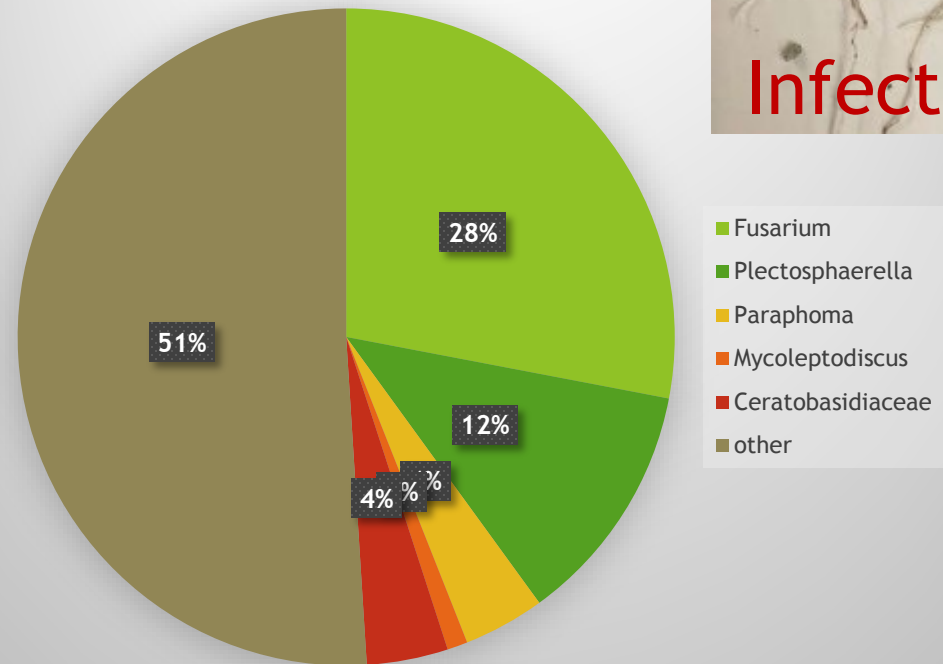


Results: Known and novel pathogens identified

Oomycetes



Fungi





Conclusions and future prospects

- ▶ Populations of *A. euteiches*, *P. medicaginis*, *Pythium irregulare*, *P. ultimum*, and *P. sylvaticum* confirmed by *qPCR* and *bioassays*.
 - ▶ *A. euteiches* race 2 most abundant.
- ▶ Community analysis is an efficient and robust method for identifying and quantifying pathogens causing poor seedling establishment.
- ▶ Target novel organisms for isolation and pathogenicity tests.
- ▶ Investigate communities at earlier stages in establishment.
- ▶ Develop bulk soil testing method to predict disease risk.