

Workshop Title:

Weed Adaptation to Climate Change

Speakers:

Eric Gallandt

Executive Summary:

The session covered the speaker's research in identifying weeds and identified the impact climate change will have on weeds. Weeds are likely to adapt quicker to climate change and will thrive in more extreme climates.

Main Notes:

Climate

Increased CO₂ -> Advantage: C3 species

Warmer temps -> Advantage: C4 species and Perennials

Greater extremes -> Advantages: Plastic species

Northern New England Weeds and Climate Change

Species-Maine (most abundant and invaders)

There is a negative correlation with latitude

Traits of Invaders:

- Photosynthetic pathway
- Annual/perennial
- Fecundity/seed mass
- Dispersal
- Specific leaf area

- Polyploidy

Rare weeds field sampling summer 2015:

- Revisited 31 farms
- 3 fields per farm
- Surveyed transects for:
 - o Pre identified rare species,
 - o Unknowns
- Asked farmers about unknowns

Management Implications

- Changing climate likely to benefit weeds more than crops
- Weed management likely will become more challenging
- Herbicides: resistance a greater concern than climate
- Physical weed control: field working days likely fewer, more variable
- Field-scale variability in cultivation efficacy
 - o Measuring efficacy (proportion of seedlings killed)
 - o Density of surviving weeds is proportional to initial density

Factors affecting efficacy

- Tool
- Weed
- Crop
- Site
- Timeliness
- Field working days

- Stacking tools to improve efficacy and reduce variability*

*He says that stacking is better than single tool use

Weed seed banks:

-Solarization? Covering the soil to help germinate the weeds in the soil.

- Tilled
- Tilled and cultipacked-had the most weed emergence
- Tilled and solarized
- Tilled and cultipacked and solarized
- Till, irrigate, wait 2 weeks, and pull up the plastic

Cultivation zero seed rain mulching:

- Seedling focus
- Seed focus
- Prevention

-Half-life for weeds is less than a year!

-Trying four different methods

-Critical weed free period, zero seed rain, plastic mulch, organic mulch

-Spider plot: good is on the outside edge on the web (good variables)

Summary points

Weed communities are changing and will continue to change. Difficult to predict problematic species, but northwards progression is likely.