

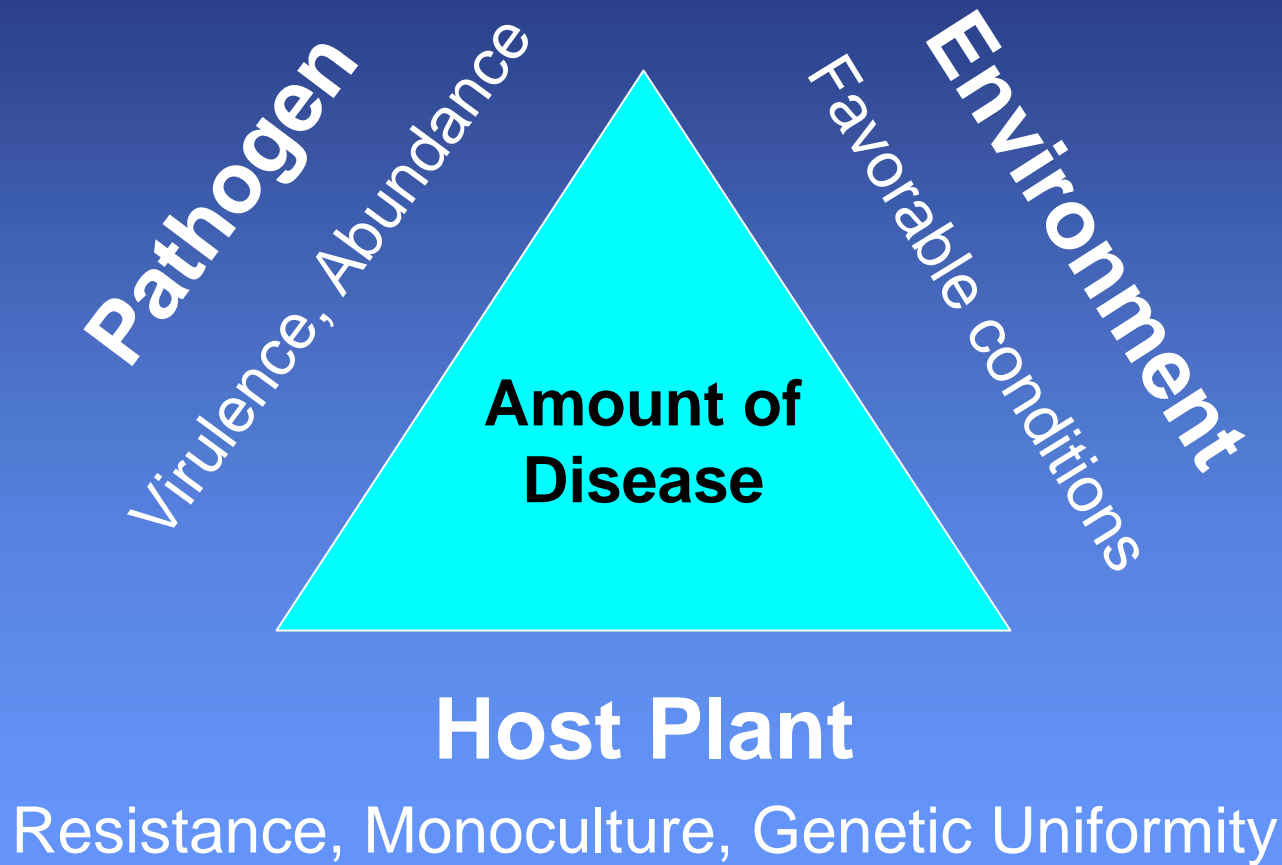
Plant disease impacts associated with crops for fuel ethanol production

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THE DISEASE TRIANGLE

Stevens, R.B. 1960



Direct effect of diseases

Yield and quality of fuel ethanol crop



Important Plant Diseases

Switch grass

- 42 fungal pathogens
- 13 common in IA '02
- Rust serious in SD '00 – '01
- Smut 50% loss IA late '90's
- ?

Tall wheatgrass

- Ergot
- Anthracnose
- Fusarium head blight
- Fusarium & Rhizoctonia root rot
- Leaf, stem & crown rust
- ?

Important Plant Diseases

Corn

- Gray leaf spot
- Stewart's bacterial leaf blight
- Northern corn leaf blight
- **Gibberella stalk rot**
- Anthracnose stalk rot
- **Gibberella ear rot**
- Diplodia ear rot
- Fusarium ear rot

Corn

Disease Control

Seed rots and seedling blights

- Rotations with non-hosts
- Reduce infected stubble

Foliar diseases

- Rotations with non-hosts
- Reduce infected stubble

Stalk and ear rots

- Rotations with non-hosts
- Reduce infected stubble



Indirect effect of diseases

Yield and quality of existing crops important to ND



Important small grain crops in North Dakota in 2006

Crop	% of US production
Spring Wheat	46%
Durum Wheat	59%
Barley	27%

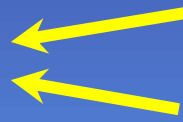
Important Plant Diseases

Small Grains

- Fusarium head blight

Corn

- Gibberella stalk rot
- Gibberella ear rot



Small Grains Disease Control

Fusarium Head Blight

- Rotation with non-hosts
- Reduce infected stubble
- Fungicides



Research needed – biomass crops

- Assessment of diseases present
- Evaluation of varieties for resistance
- Determination of disease cycle
- Management recommendations

Opportunities

Fuel ethanol crops

- Collaboration on “Evaluation of Perennial Herbaceous Biomass Crops for Ethanol” project at the REC’s ?
- Disease component in future agronomic trials on fuel ethanol crops

Existing crops

- Research to ameliorate disease impacts caused by increased acres of fuel ethanol crops



Summary

With greater area of fuel ethanol crops, diseases will increase in the fuel ethanol crops as well as the small grain crops currently important within the state

Any agronomic studies on biomass crops needs to include a plant pathology component

