Rotation Effect on Brown Stem Rot and Soybean Yield

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Background

- **Brown Stem Rot (BSR) is caused by the fungus *Philophora gregata***
- **Was first reported in Illinois in 1944**
- **Is found in all soybean producing areas of Wisconsin and the Midwest**
- **Yield losses can be up to 40%**

Disease cycle

- **BSR survives in soybean stem residue and in organic matter in the soil**
- **Host range is limited to azuki bean, mung bean, and soybean**
- **Severity of BSR is related to inoculum densities in previous season soybean residue**
- **Severity of BSR increases at cooler temperature (64-75°F)**

Symptoms

- **Appear late in the growing season (early pod set (R3-R4))**
  - **Leaf symptoms (vary - may not develop in some environments)**
  - **Stem symptoms (a dark reddish-brown discoloration of the stems vascular elements and pith)**

Management

- **Crop rotation**
- **Resistant varieties vs low/high yield environment**
- **Monitor field if a no-till system is used**
- **Planting date, row spacing, and maturity group → BSR benefit to high yield management practices**
- **Soil pH**

Crop rotation

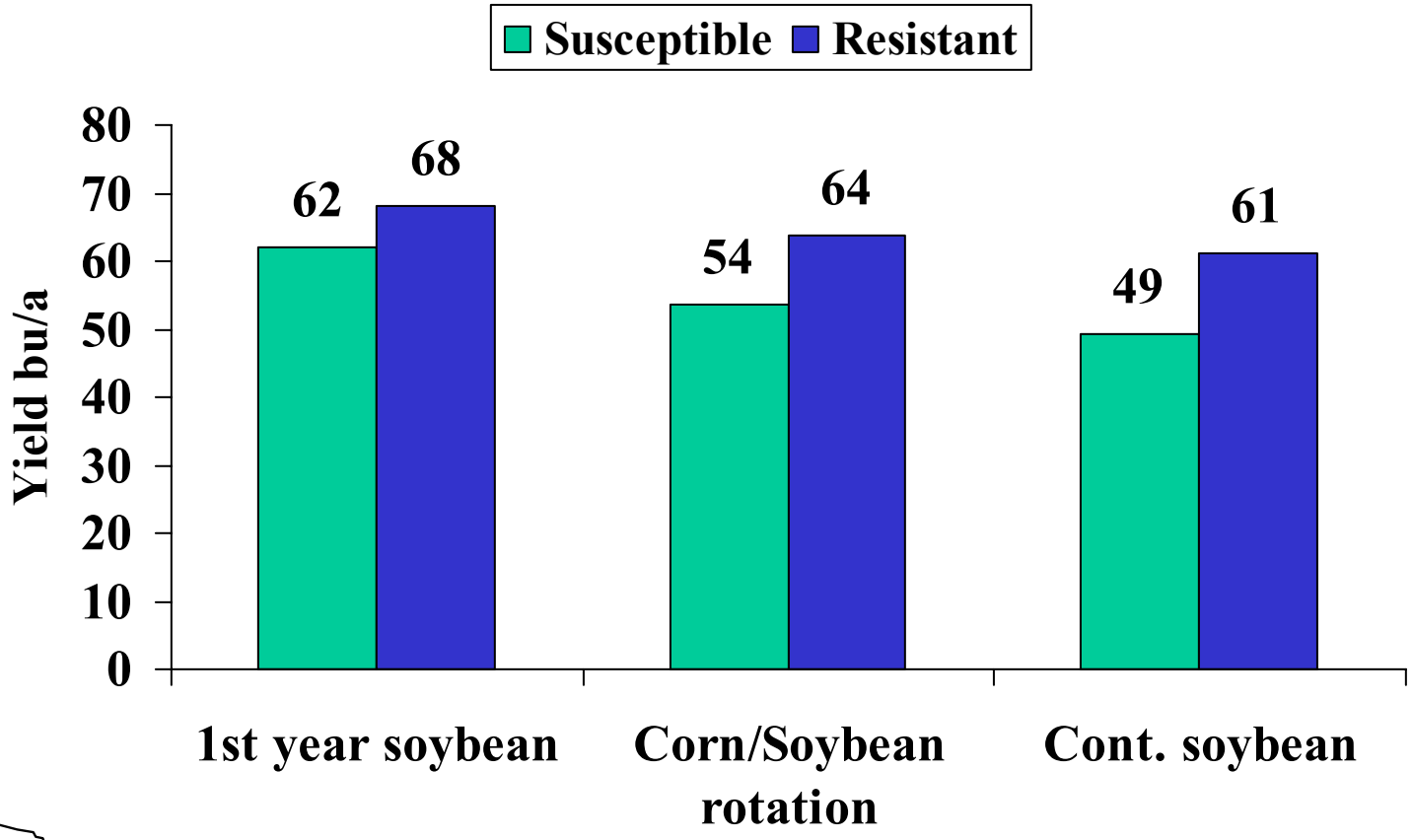
- **Nonhost crop (corn, small grains, forage legumes) should be grown for 2 years or more**

- **Annual rotation of soybean with nonhost crops does not provide long-term reduction in the incidence and severity of the disease → other management practices are needed**

Material and Methods

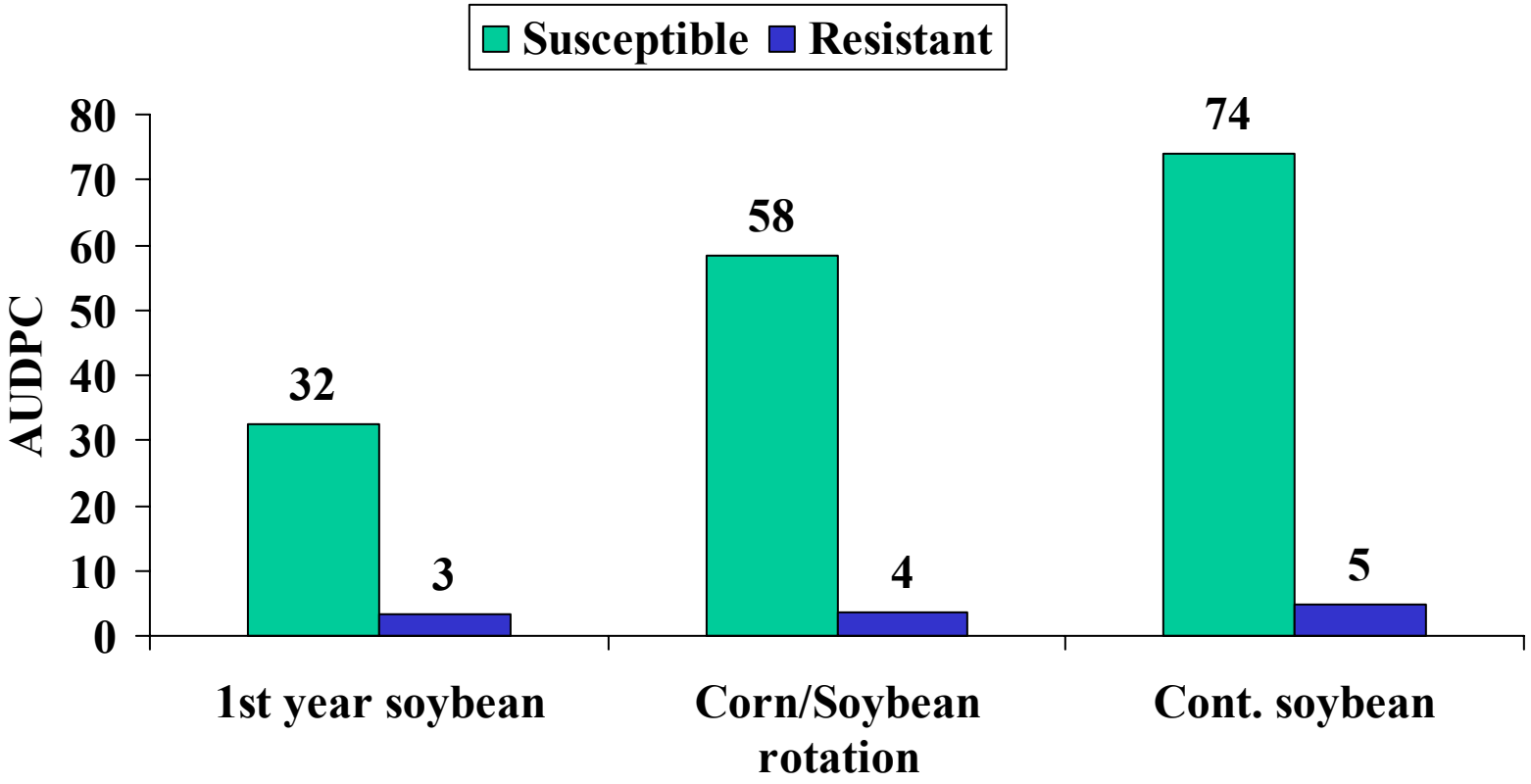
- **Rotation sequences**
  - **1st year soybean**
  - **2nd year soybean**
  - **3rd year soybean**
  - **4th year soybean**
  - **5th year soybean**
  - **Corn/soybean rotation**
  - **Continuous soybean**
- **Conv. tillage and no-till tillage system**
- **Row spacing (7.5”, 15”, and 30”)**

BSR Resistant vs. Susceptible Variety

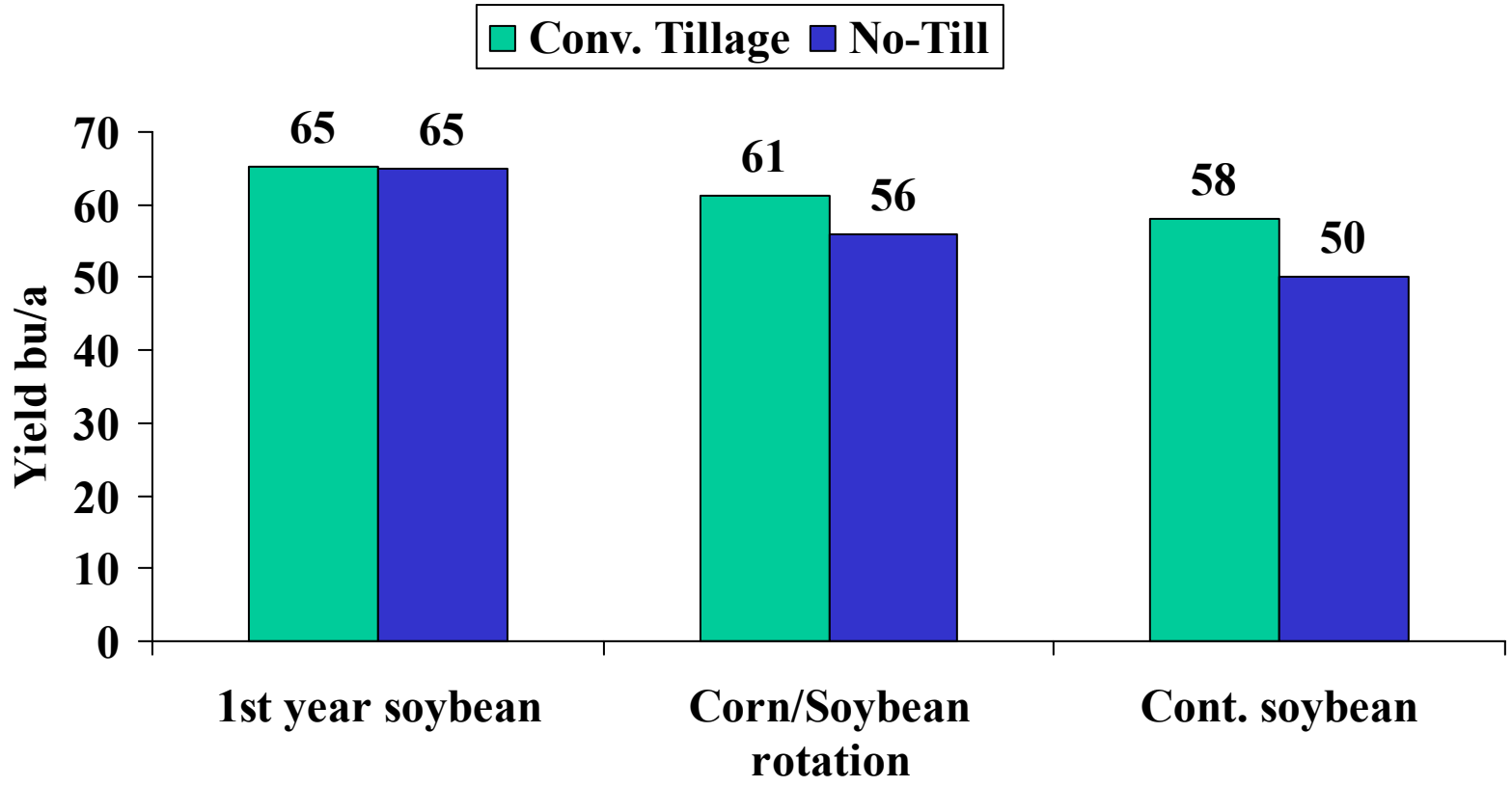


BSR Disease Incidence

(Resistant vs. Susceptible Variety)

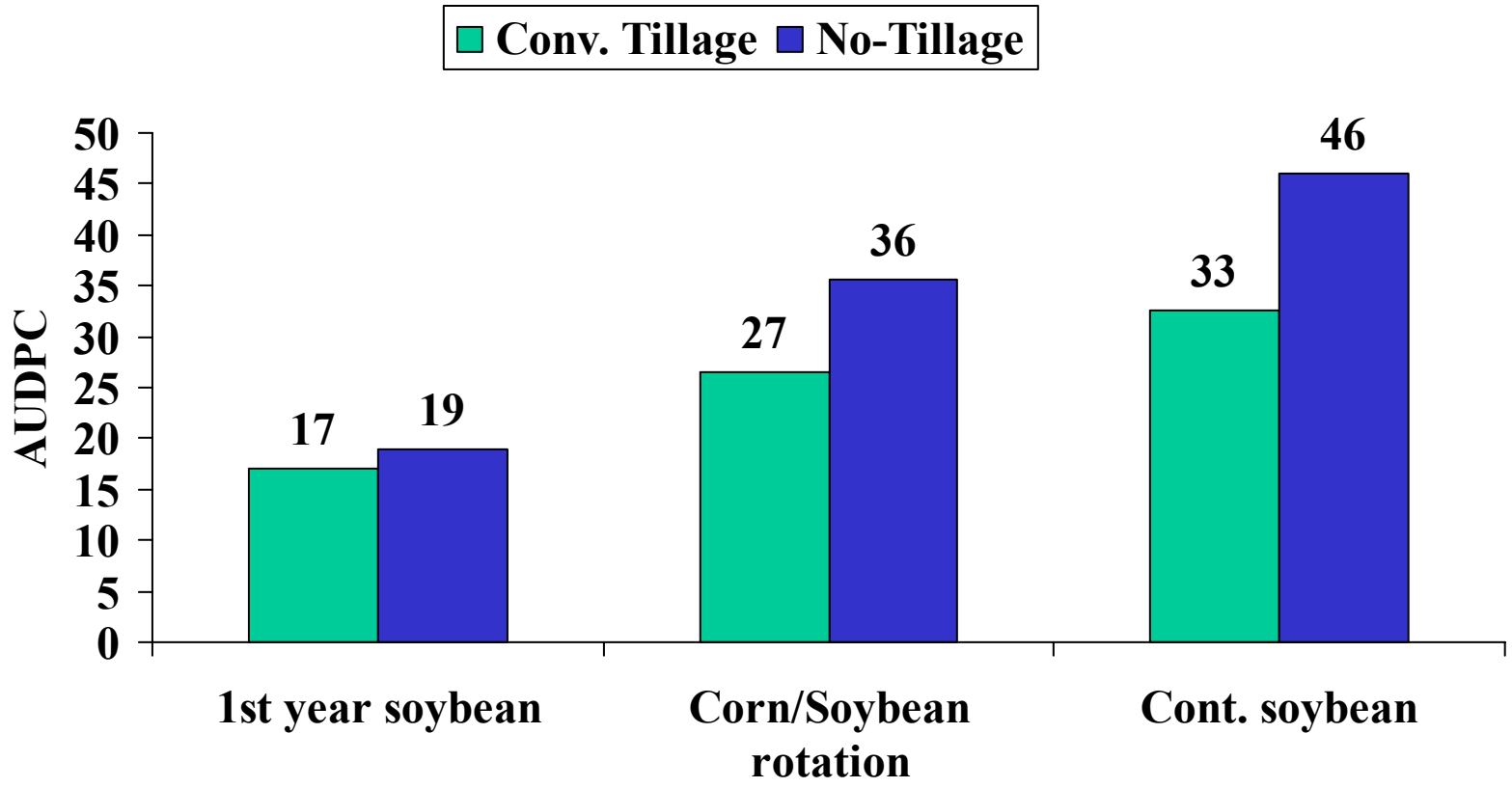


Soybean Yield in Different Rotation and Tillage Systems



BSR Disease Incidence

(Conv. Tillage vs. No-Tillage System)



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Conclusion

- **Use a multifaceted approach:**
  - **Nonhost crop should be grown for 2 years or more to minimize the risk of yield loss caused by BSR**
  - **Use resistant cultivars (if necessary)**
  - **Less tillage increases the risk of yield loss caused by BSR**
  - **BSR can negate the benefits of management practices intended to maximize soybean yield**