Effect of Soybean Row Spacing on Weed Competition

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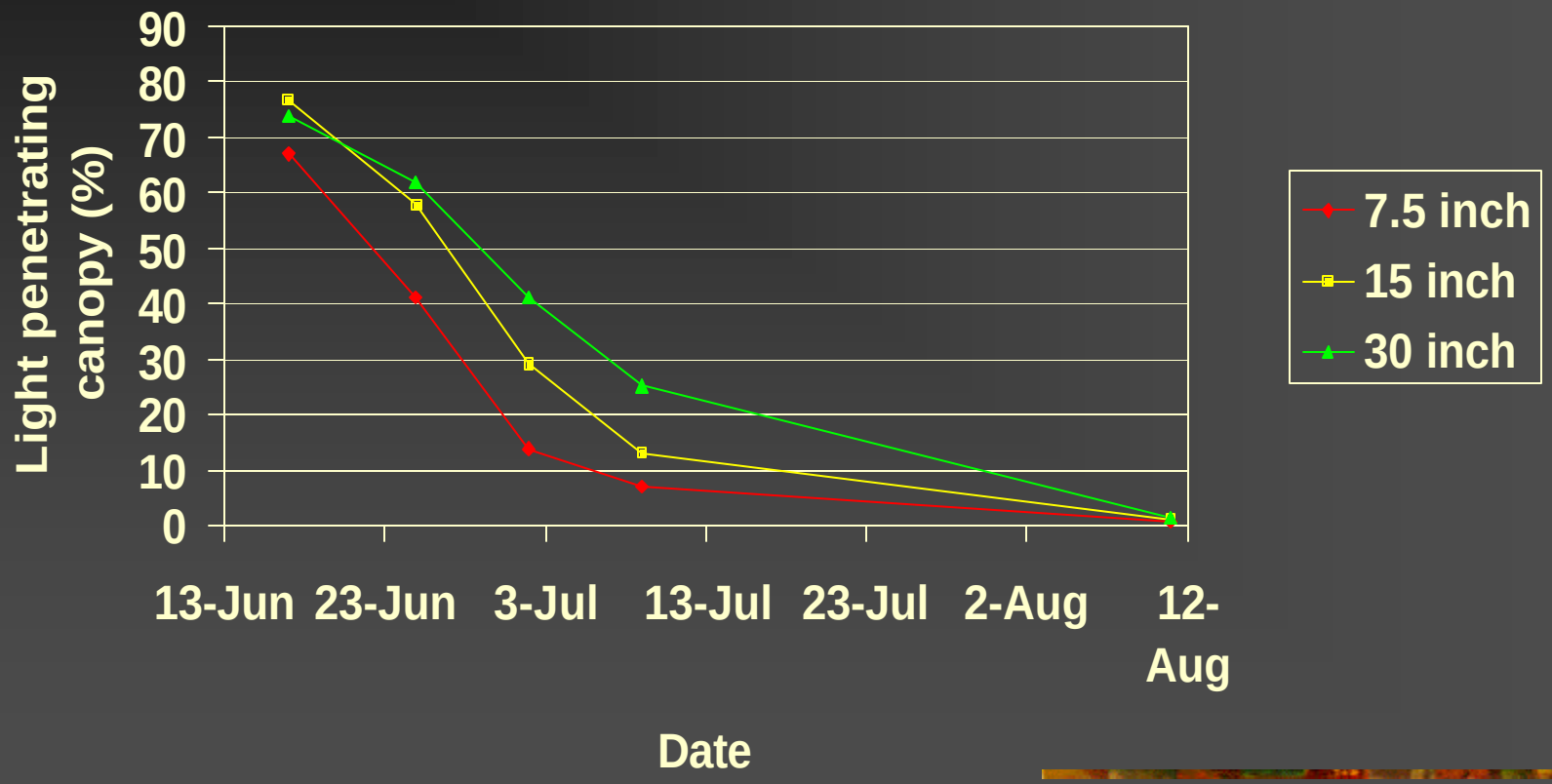
Benefit of Narrow Row Soybean

Canopy Characteristics

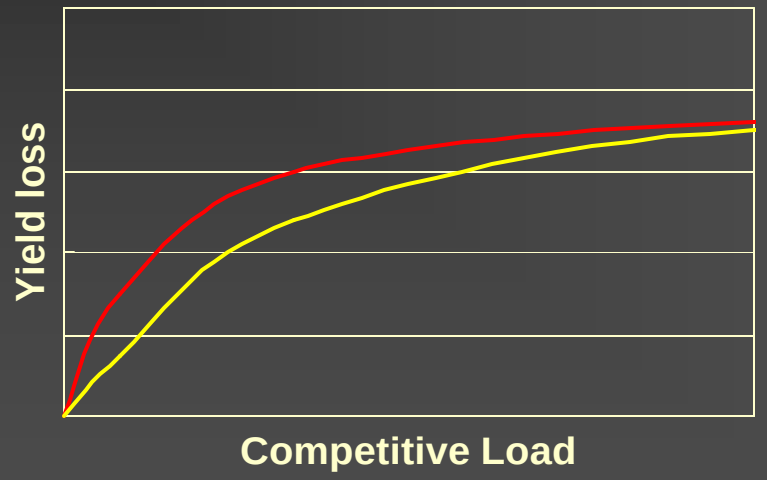


The Soybean Row Spacing Effect

- Greater weed suppression due to shading
  - See proceedings
- Lower inputs needed for weed control
- Little research on actual effect of row spacing on weed competitive ability

The Soybean Row Spacing Effect

- Incorporation into bioeconomic weed management models
  - WeedSOFT



Objectives

- Determine if soybean row spacing affects weed competitive abilities
- Quantify the magnitude that soybean row spacing has on weed competitive ability

WeedSOFT Validations

- Several Midwest states participated in validating yield loss predictions
- WeedSOFT versions were developed for individual states
- Several sites were established that included both narrow and wide row soybean

Location of Experiments

- 5 experiments established
  - Arlington, WI (2000) – 7.5 and 30 in
  - Columbia, MO (2000, 2001) – 15 and 30 in
  - East Lansing, MI (2000) – 7.5 and 30 in
  - Lancaster, WI (2000) – 7.5 and 30 in

Treatments

- Treatments chosen from WeedSOFT, based on yield loss predictions
  - Narrow rows
    - #1 recommendation (PMY)
    - 10% yield reduction
    - 20% yield reduction
    - Dealer recommendation
    - Weed free
    - Nontreated
  - Wide rows
    - #1 recommendation (PMY)
    - 10% yield reduction
    - 20% yield reduction
    - Dealer recommendation
    - Weed free
    - Nontreated
- Herbicide treatments were site specific

Data Collection

- Weed biomass
  - Dry weight sampled prior to soybean harvest
- Soybean yield
  - Combine harvested

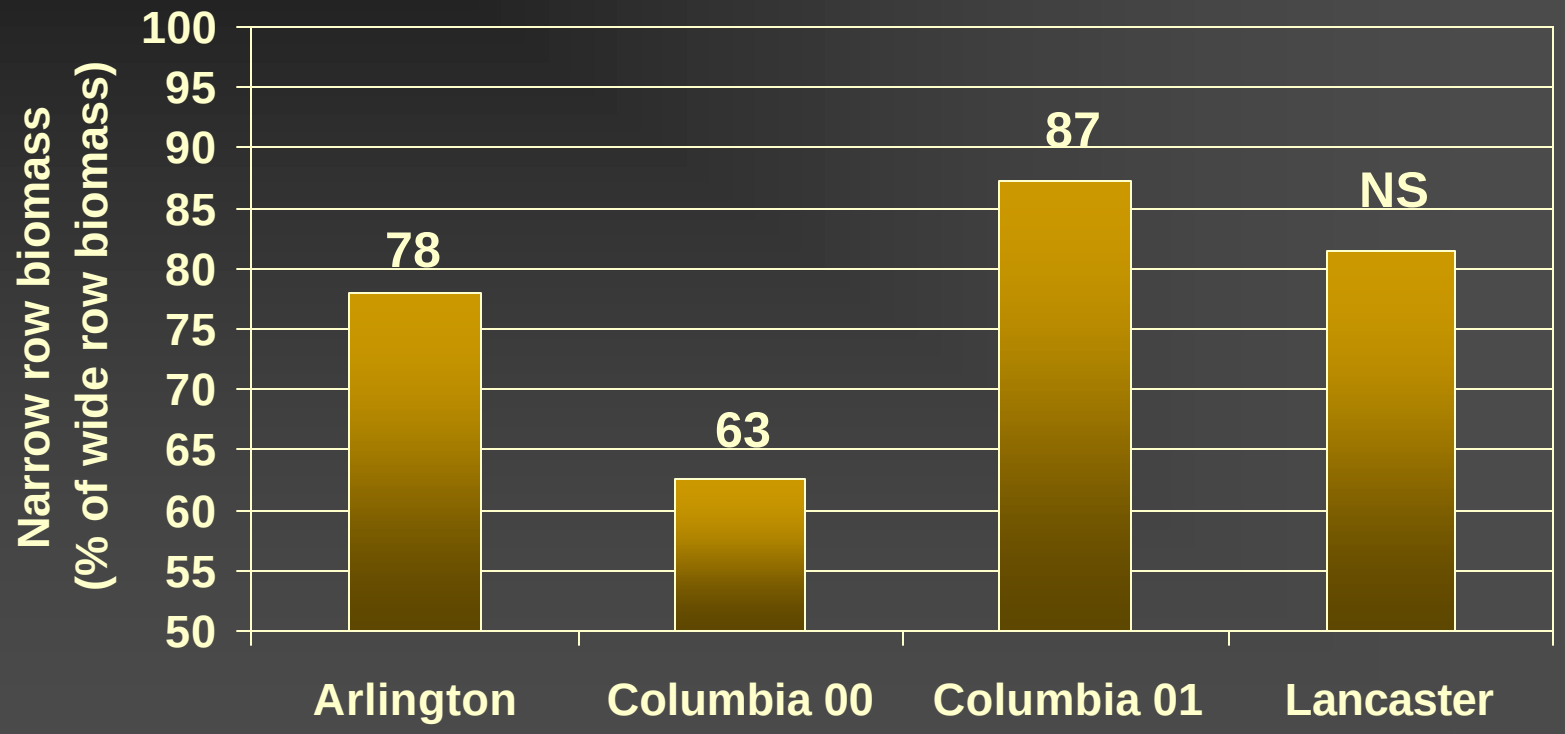
Data Analysis

- Direct effect of soybean row spacing on weed biomass
  - Compared weed biomass between row spacings averaged across herbicide treatments
- Indirect effect of soybean row spacing on soybean yield
  - Yield expressed as percent of weed free yield
  - Compared relative soybean yield between row spacings averaged across herbicide treatments

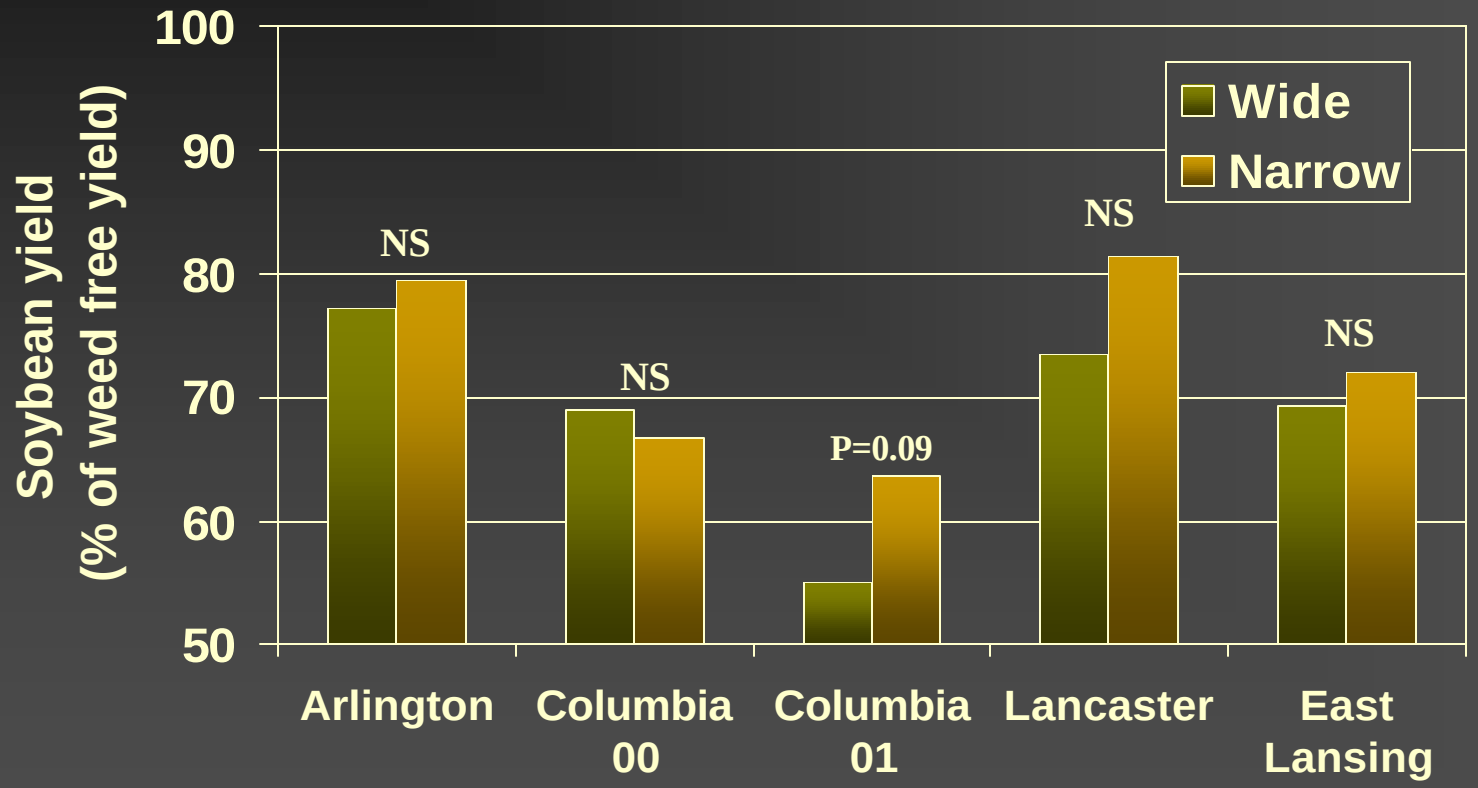
Direct Effect: Weed Biomass

- Weed biomass in narrow rows was less than wide rows at 3 of 5 sites (P=0.1)
  - Arlington
  - Columbia 2000
  - Columbia 2001
  - East Lansing – NS
  - Lancaster – NS
- Weed biomass in narrow rows was 12 – 37% less than biomass in wide rows

Direct Effect: Weed Biomass



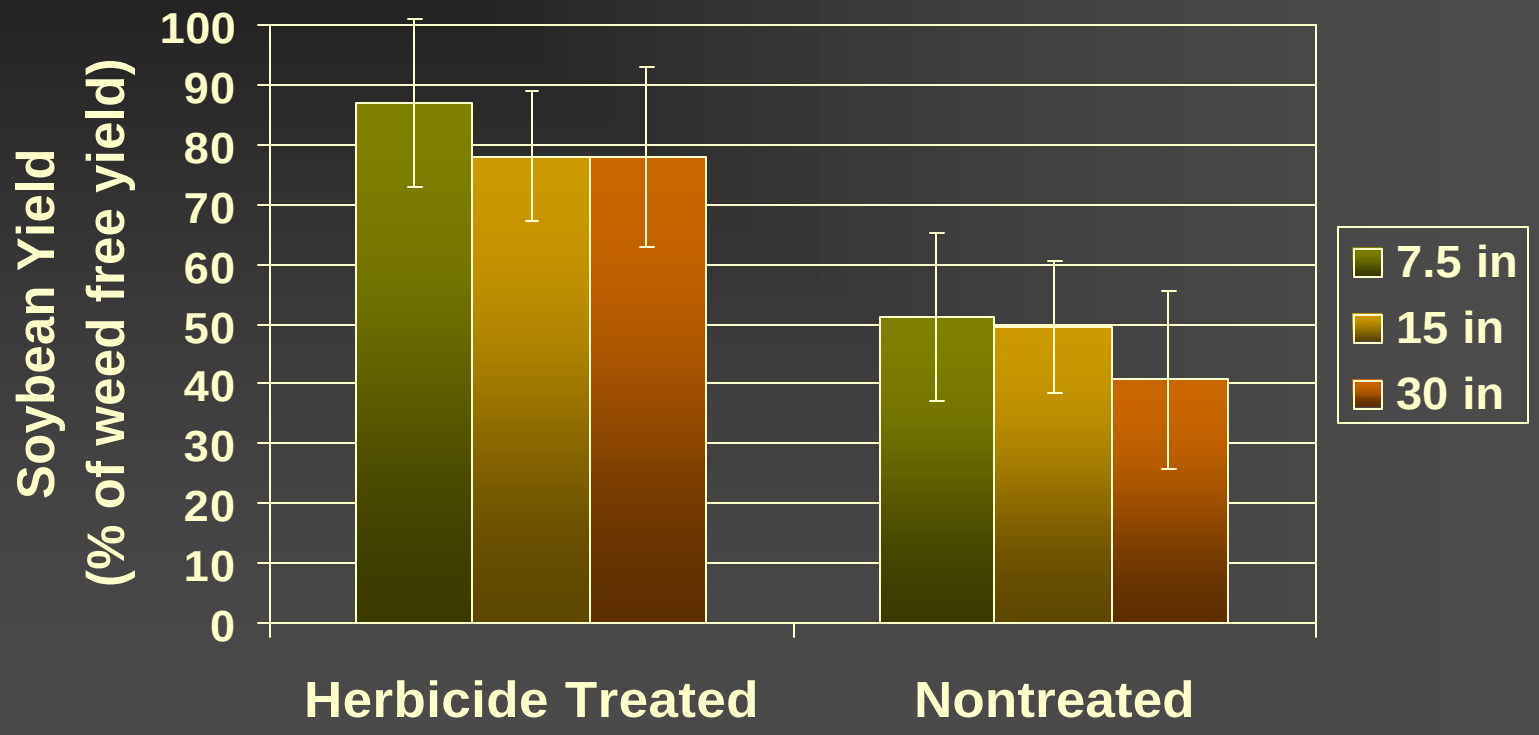
Indirect Effect: Soybean Yield



Prior Research

- Young et.al (2001) studied weed management in narrow (7.5 and 15 in) and wide row soybean (30 in)
- Recorded yields of weed free, treated, and nontreated plots at 3 locations in Illinois over 3 years
- Analyzed data to determine if narrow row spacing had less yield loss than wide row

Indirect Effect: Soybean Yield



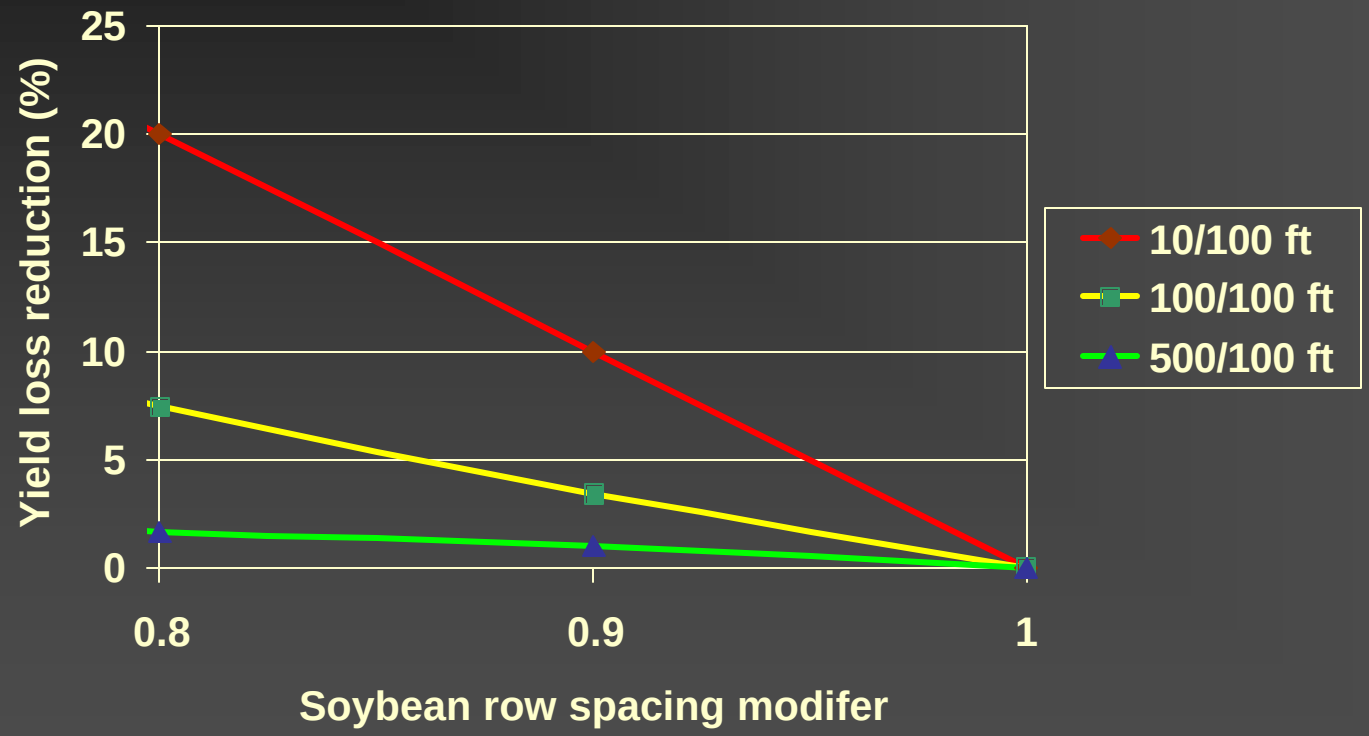
Summary of Results

- Soybean row spacing had a direct effect on weed biomass at 3 of 5 sites
- The effect of weed competition on soybean yield between row spacings occurred at 1 of 5 sites
- Data suggests that narrowing soybean row spacing can reduce weed competitive ability

WeedSOFT

- Current WeedSOFT row spacing modifiers
  - 7.5 in – 0.8
  - 15 in – 0.9
  - 30 in – 1
- Experimental results (weed biomass)
  - WI 7.5 in - 80%
    - Mean of Arlington (78%) and Lancaster (82%)
  - MO 15 in - 75%
    - Mean of Columbia 00 (63%) and Columbia 01 (87%)

Effect of Row Spacing Modifier as Influenced By Weed Density



Conclusions

- Current soybean row spacing modifiers in WeedSOFT are reasonable estimates
- At low weed densities, the row spacing effect is important because it will affect economic thresholds
- At high weed densities, the row spacing effect has little affect on the treatment decisions, but narrow row soybeans will still provide greater shading of late emerging weeds