# Common Ragweed (*Ambrosia artemisiifolia* L.) Interference in Nebraska Soybeans

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## INDRODUCTION

**Common ragweed**

- Competitive weed in soybean production fields
- Grows up to 2 meters tall
- Produces 3,000 to 62,000 seeds per plant [1]
- Emerges from mid-April through May in Nebraska
- 50% cumulative emergence is obtained in mid-April to early-May (Figure 1)
- Recently a population of glyphosate resistant common ragweed has been confirmed in Nebraska [2]

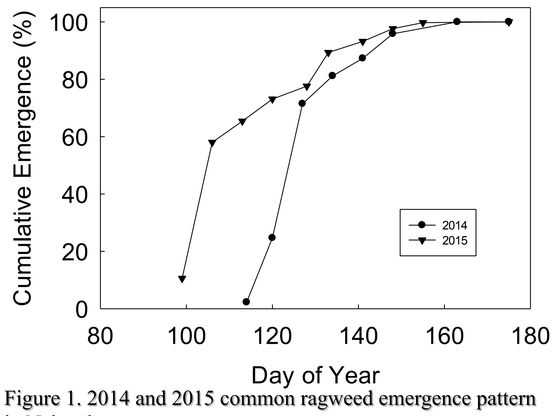



Figure 1. 2014 and 2015 common ragweed emergence pattern in Nebraska

## OBJECTIVE

**Objective**

- To assess common ragweed interference in soybean at varying weed densities as influenced by variable water supply

## MATERIALS, METHODS, AND ANALYSIS

**Treatment Design**
- Split plot
- Four replications

**Irrigation Main Plot**
- Full (predicted ET replacement)
- Half (50% replacement)
- Zero

**Common Ragweed Density Sub Plot**
- 0/m[1] in soybean
- 2/m[1] in soybean
- 6/m[1] in soybean
- 12/m[1] in soybean
- 2/m[1] without soybean

Figure 2. plot layout of the field

**Measurements**

Weekly
Height, stage, soil moisture

V3, R1, R4, R6
LAI, biomass

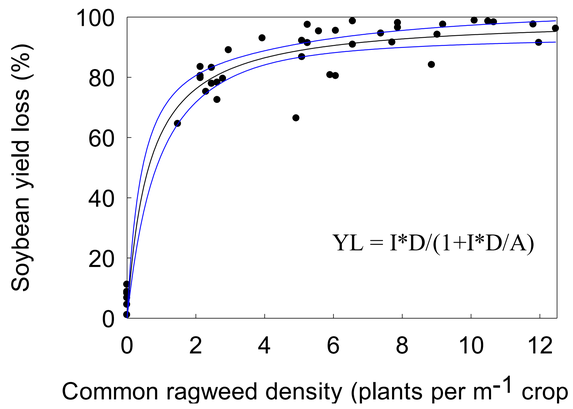
Harvest
Soybean yield, common ragweed biomass

Figure 3. common ragweed leaf in leaf area meter

- Common ragweed was seeded on April 30th by hand
- Soybeans were planted on May 13th
- Common Ragweed was thinned by hand to desired density
- PROC NLIN procedure in SAS 9.4 was used to fit the hyperbolic yield loss model: [3]
- Parameter I is the initial slope and A is the maximum yield loss constrained to a number between 0 and 100

$$YL = \frac{I * N}{1 + \frac{I * N}{A}}$$

## RESULTS

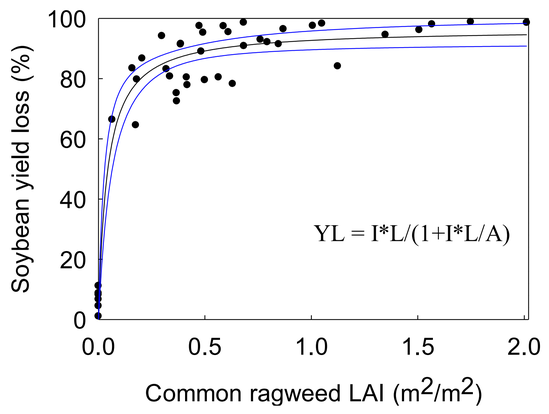



Because of adequate rainfall in 2015, there was no significant effect of irrigation treatment

**Yield loss- common ragweed density interaction**

| | |
|---|---|
| Residual sum of squares | 2049.3 |
| Parameter I | 159.5 |
| Pseudo $R^2$ | 0.97 |

Figure 4. Soybean- common ragweed interference relationship




**Yield loss- common ragweed LAI interaction at R1 sampling**

| | |
|---|---|
| Residual sum of squares | 2435.3 |
| Parameter I | 2347.2 |
| Pseudo $R^2$ | 0.97 |

Figure 5. Common ragweed LAI drives soybean yield loss

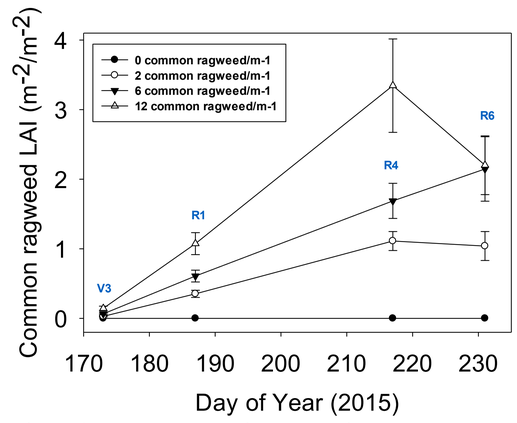



Figure 6. common ragweed LAI over time

Figure 7. 2 common ragweed/m² on DOY 205 (July 24th)

Figure 8. 12 common ragweed/m² on DOY 205 (July 24th)

**Yield loss- common ragweed biomass interaction at R1 stage**

| | |
|---|---|
| Residual sum of squares | 3135.8 |
| Parameter I | 91.2 |
| Pseudo $R^2$ | 0.96 |

## CONCLUSIONS

- Yield loss was correlated to common ragweed density, LAI, and total aboveground biomass
- Common ragweed densities of 6/m[1] resulted in yield loss of greater than 90%
- A common ragweed LAI of .57 $m^{-2}/m^{-2}$ at the R1 stage resulted in 90% soybean yield loss
- Low common ragweed densities impacted soybean yield greatly
- The study will be repeated in 2016

## LITERATURE SITED

1) Jordan T, et al. (accessed Feb 18, 2015) The Glyphosate, Weeds, and Crop Series. Purdue Extension
2) Heap I, (accessed Dec 10, 2015) weedscience.org
3) Cousens R, et al. (1987) Weed Science