Fall Herbicide Applications: Are They Worth It?
Winter annual weed prevalence in the southern corn belt appears to be greater in recent years due to:

– 1) rapid adoption of Roundup Ready soybean
– 2) fewer residual herbicide applications
– 3) relatively mild winters
Shifts in Corn Herbicide Usage

Atrazine

Metolachlor

2,4-D

Glyphosate

% of Total US Corn Production Area

Shifts in Soybean Herbicide Usage

- Treflan
- Prowl
- Pursuit
- Glyphosate

% of Total US Soybean Production Area

Impact of Winter Annual Weeds

• Interfere with planting equipment (Dahlke et al. 2001).

• Provide alternative hosts for soybean cyst nematode (*Heterodera glycines*) (Venkatesh et al. 2000).

• Provide oviposition sites for the black cutworm (*Agrotis ipsilon*) (Sherrod et al. 1979).

• Actively compete with the developing crop (Buhler 1995).
Henbit
Purple Deadnettle
Horseweed

• annual that produces 1000s of seed per plant

• germinates over a wide time period

• especially troublesome in reduced tillage cropping systems

• paraquat-resistant biotypes

• triazine-resistant biotypes

• several glyphosate-resistant biotypes identified throughout the eastern United States
Horseweed
Yellow Rocket
Wild Mustard
Virginia Pepperweed
Chickweed
Field Pennycress
Purslane Speedwell: *Veronica peregrina*
Corn Speedwell
Field Violet (Viola arvensis)
Downy Brome
Downy Brome
Cheat

• less hairy than downy brome
• open panicle unlike downy brome
• short awns vs. downy brome
Annual or Italian Ryegrass
Wild Garlic
Wild Onion
Star-of-Bethlehem
“Claims” About Fall Herbicide Applications

- Good time to control winter annuals and perennials
- Larger winter annuals need higher rates of burndown herbicides in spring
- Clean fields are less likely to attract Black Cutworm moths and other insects
- Winter annual weeds take nutrients away and can compete with the emerging crop
- Weeds keep the ground wet
- Warmer soils leading to quicker crop emergence
Soil Moisture 1 Week After Planting: Corn

*Means with different letters indicate significant differences
Soil Moisture 2 Weeks After Planting: Soybean

*Means with different letters indicate significant differences
Soil Moisture Summary

• The presence of winter annual weeds caused significant reductions in soil moisture in all corn and soybean experiments.

• Since soybean are generally planted later than corn, we did not see any differences in application timing.
Figure 1. Influence of winter annual weed removal with fall herbicide applications on soil temperature prior to corn planting as compared to untreated plots with a dense cover of winter annual weeds. Asterisks indicate significant differences in soil temperature within a day.
Figure 2. Influence of winter annual weed removal with fall herbicide applications on soil temperature prior to soybean planting as compared to untreated plots with a dense cover of winter annual weeds. Asterisks indicate significant differences in soil temperature within a day.
Soil Temperature Summary

• Soil temperature corresponded with soil moisture one week after planting in corn experiments.

• Winter annual weed removal increased soil temperatures when above 50°F in corn experiments and 68°F in soybean experiments.
Insect Injury at V2 Stage: Corn

*Means with different letters indicate significant differences
Insect Injury at V6 Stage: Corn

*Means with different letters indicate significant differences
Negro Bug (*Corimelaena pulicaria*)

- An emerging pest of no-till soybean in Missouri (W.C Bailey; Personal Communication).

- Soybean damage is caused by removal of plant juice (Gray 2001).
Total Insects 5 Weeks After Planting: Soybean

- Soybean samples
- A total of 10 insects were observed
- Number of insects per sample:
  - Canopy XL+2,4-D: 2
  - Canopy EX+2,4-D: 2
  - ROM+2,4-D: 2
  - Untreated: 12

*Means with different letters indicate significant differences
Insect Summary

• Winter annual weeds apparently act as alternative hosts for corn flea beetle and some lepidopteran insects

• We did not observe black cutworm damage in any corn trial, but the black cutworm-winter annual weed interaction is a known relationship that should be considered when thinking about fall herbicide applications

• Removal of winter annual weeds decreased total insect and negro bug populations after planting in soybean experiments
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Fall-Applied Herbicides for Winter Weed Management in Corn
Winter Annual Weed Control in Corn

• Residual herbicides like Princep and Basis usually do an excellent job of controlling most of our common winter annual weeds through planting.

• Nonresidual programs like glyphosate + 2,4-D provide good control of winter annual weeds present at the time of application, but offer no control of weeds that may emerge after the initial application.
Summer Annual Weed Control in Corn

• Our data indicate that early spring applications of residual herbicides provide better control of emerging summer annual weed seedlings than fall applications of these same treatments
Fall-Applied Herbicides for Winter Weed Management in Soybean
Winter Annual Weed Control in Soybean

- Most current herbicidal options provide similar control of winter annual weed species
- Glyphosate or Glyphosate + 2,4-D applied in the fall provides inadequate control of later emerging winter annuals........in some years this can be significant.
Influence of Fall and Spring Herbicide Applications on Common Waterhemp Control 4 Weeks After Planting (Columbia 2005)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>C. Waterhemp Control</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Fall</td>
</tr>
<tr>
<td>Canopy XL + 2,4-D</td>
<td>68</td>
</tr>
<tr>
<td>Canopy EX + 2,4-D</td>
<td>43</td>
</tr>
<tr>
<td>Roundup Original Max + 2,4-D</td>
<td>39</td>
</tr>
<tr>
<td>LSD (0.05) treatment x timing:</td>
<td>5</td>
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LSD (0.05)
Fall Herbicide Applications: Are They Worth It?
• The answer lies in what you want out of your fall herbicide program:

  – The impact of fall herbicide applications on other factors within the “agroecosystem” should not be overlooked. What are the value of these other agronomic factors to you?

  – Winter annual weed control only or some summer annual weed control as well?

• Our data indicate that early spring applications of residual herbicides provide better control of emerging summer annual weed seedlings than fall herbicide applications. But......how many years will we be able to get on the land and do that?

• Ultimately, are we adding a cost to the weed management system or eliminating one?