Synergizing cover crops and herbicide use

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Outline

- Terminating different cover crops successfully with herbicides
- Ensuring efficacy with residual herbicides
- Can cover crops replace herbicides?



TERMINATING COVER CROPS SUCCESSFULLY

Using a herbicide doesn't guarantee success.



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Photos by Rebecca Vittetoe and Meaghan Anderson

Goals of herbicide termination

- Effective, timely kill to avoid complications with seasonal crop
- 2. Correct herbicide and adjuvant choice for the species and environment
- 3. Maximize efficiency by incorporating multiple passes together



Herbicides

- Termination success depends on several factors:
 - Cover crop species and growth stage (size)
 - Herbicide, rate & spray technique used
 - Environment
- Other important considerations:
 - Crop to be planted next
 - Weed species present in field

- Choices:
 - Glyphosate (grasses)
 - Glyphosate + 2,4-D or dicamba (legumes)
 - *Gramoxone (paraquat)
 - *Liberty (glufosinate)

Herbicide treatments for cereal rye termination



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Kevin Bradley. U of Missouri.

Herbicide treatments for wheat termination



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Kevin Bradley. U of Missouri.

Herbicide treatments for hairy vetch termination



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Kevin Bradley. U of Missouri.

Use of UAN with burndown may cause termination failures in poor conditions.



- UAN improves burndown of small weeds
 - Causes quick contact burn to plants, similar to a contact herbicide
 - Contact burn may reduce movement of glyphosate necessary to kill large cover crops

SE IOWA WORK – HERBICIDES FOR COVER CROP TERMINATION

Glyphosate, paraquat, or glufosinate?

1 week following treatment



What are pounds acid equivalent?

Requires some math, but helps you accurately choose a rate with differently formulated products

1.0 INGREDIENTS

per U.S. gallon (39.8% by weight).

For a list of patents, if any, covering this product or its use, please go to www.monsantotechnology.com.

What are pounds acid equivalent?

1 fl oz = 0.035 lb ae 1 lb ae = ~28 fl oz of this formulation INGREDIENTS

5.5 pounds per U.S. gallon, which is equivalent to 540 grams of the acid, glyphosate, per liter or 4.5 pounds per U.S. gallon (39.8% by weight).

For a list of patents, if any, covering this product or its use, please go to www.monsantotechnology.com.

Glyphosate, paraquat, or glufosinate?

3 weeks following treatment



Glyphosate, paraquat, or glufosinate?

2 weeks following treatment



ENSURING EFFICACY WITH RESIDUAL HERBICIDES

Mixing residual herbicides with burndown *may* slow or prevent effective cover crop kill.



Penn State Weed Science

- Many farmers incorporate preemergence (residual) herbicides with a burndown for cover crops
 - Many preemergence herbicides have some activity on emerged weeds (usually contact burn)
- 12" tall rye sprayed with metribuzin + glyphosate
 - Plots with metribuzin took longer to die

Do residual herbicides reach the soil surface?

- Residual herbicides must reach soil surface to kill germinating weeds
- When do residual herbicides applied to tall cover crops reach the soil?
- Likely not a big concern if cover crop is small and terminated early



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Penn State Weed Science

Do residual herbicides reach the soil surface?

• Amount of herbicide reaching soil surface is inversely related to biomass accumulation



Sampling date (days after application)

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Whalen et al. 2019. Weed Technology.

Should we change herbicide programs for big cover crops?

Effect of residual application timing on waterhemp control



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Whalen et al. 2019. Weed Technology.

CAN COVER CROPS REPLACE HERBICIDES?

Key question: Can the cover crop sufficiently replace a herbicide pass?



Biomass is key to physically suppressing weeds!

In Iowa: planting date matters



Does the cover crop alone control weeds?



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Whalen et al. 2019. Weed Technology.

Cereal rye biomass vs weed suppression



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Webster et al. 2013

Effect of rye cover crop on lowa waterhemp emergence patterns



How can we reduce cost? Layered residual herbicide program



Can the cover crop act as a first herbicide pass?

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Bob Hartzler, 2017

Program with early cover crop termination



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Bob Hartzler, 2017

Program with later cover crop termination



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Bob Hartzler, 2017

Can this actually work?

- Yes, but:
 - Requires even stand of cover crop
 - High biomass accumulation
 - Late planting of crop (?)
- Real potential to make this work in soybean!
 - May be field-specific or specific to parts of fields



Summary

- Terminating an overwintering cover crop is not hard but requires appropriate prep
 - Many ways to "get the job done" but efficiency can add risk
- We now know that the residual herbicide can get "hung up" in large cover crops
- If your cover crop stand is even, it can act as a short-lived "residual herbicide"
 - This can mean money in your pocket and fewer weeds!





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