Herbicide Plant-back Concerns for Cover Crops

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What is a Cover Crop

USDA: ~~Cover crops are grasses, legumes, and other forbs that are planted for erosion control, improving soil structure, moisture, and nutrient content, increasing beneficial soil biota, suppressing weeds, providing habitat for beneficial predatory insects, facilitating crop pollinators, providing wildlife habitat, and as forage for farm animals~~.

Burdine:

Any plants that improves soil health, fertility and productivity; reduces soil erosion, etc.

Plant-back Restrictions

Days, months or years required between herbicide application and planting next CASH crop.

Is it legal to plant Cover Crop behind cash crop herbicides?

- Yes, it's legal
- Label is for harvested crops to prevent adulterated food or feed.
- Crop Destuction releases you from plant-back restrictions but……
- Grower assumes ALL responsibility

Plant-back Factor: Persistence

- How long does herbicide persist in the soil?
  - Half-life 50% dissipation of active ingredient
  - Short <30day half-life 4 month Plant-back
  - Long >90day half-life 15 month Plant-back
  - Foliar: short to medium
  - Pre-emerge: medium to long
    - *Grazon P+D (picloram)*

Plant-back Factor: Sensitivity

- How sensitive is the cover crop to residues?
  - Injury can occur from a small amount of residue.
  - Small seeded legumes (clovers, mustard) are very sensitive to many PRE's.
- Will you graze or destroy the cover crop?

Plant-back Factor: Microbes

– Microbial Activity #1 factor of dissipation

- Higher *temp* & *rainfall* = higher microbe activity
- Deep South has high temps, rain and microbes!!

Plant-back Factor: Soil Type

- High CEC soils = higher herbicide rates due to binding sites.
- Binding slows breakdown by soil microbes.
- Slow bond release may cause issues in cover crop.
- Clay soils hold residues longer than sandy soils.

Plant-back Factor: Organic Matter

- High organic matter ties up herbicides.
- Organic matter increases CEC.
- Silt loams break down herbicides relatively quick.
- Overall, herbicide carryover is not a major issue in most of the south.

Plant-back Factor: Soil pH

- Residues *generally* last longer in high soil pH
- High pH half-life: Atrazine, Classic, Ally, Permit, Simazine, Accent, Resolve
- Low pH half-life: Pursuit, Scepter, Metsulfuron

Plant-back Factor: Farmer's Risk Tolerance

- If Graze or Harvest: Follow the Label!
- If Crop Destruct the cover: you assume all risk
- Injury Vs Failure

  Can have injury and good results.

  Failure is rare from herbicide carryover.

  One species may not do well while others flourish.

- How much injury is acceptable? 1% 10% 20% 50%

Plant-Back Risk Factors

1. Herbicide persistence
2. Species sensitivity
3. Microbe activity
    - Higher temp & rainfall = higher microbe activity

2. Soil type
    - Higher the clay, longer the residual

3. Organic matter
    - Higher the OM, longer the residual

4. Soil pH
    - Higher the pH, longer the residual

5. Farmer's Risk Tolerance

Chemistry Sensitivity

- Residual herbicides cause more injury.

• Group 2	ALS inhibitors	pursuit, classic, firstrate, harmony
• Group 5	triazine	atrazine, simazine, metribuzin
• Group 14	PPO inhibitors	reflex, cobra, authority, sharpen
• Group 27	pigment inhibitors	callisto, command

Species Sensitivity

Most to least sensitive:

tillage radish

Austrian winter pea

clovers, annual ryegrass

winter wheat, winter oats

hairy vetch, cereal rye

Soybean Products to watch

- Higher risk of injury:
  - Fomesafen — Flexstar, Prefix
  - Pyroxasulfone — Zidua
  - Imazethapyr — Pursuit
  - Acetochlor — Warrant
  - Sulfentrazone — Authority

Corn Products to watch

- Higher risk of injury:
  - Mesotrione — Callisto, Halex GT
  - Clopyralid — Stinger
  - Isoxaflutole — Balance
  - Pyroxasulfone — Zidua
  - Nicosulfuron — Accent

Test for Carry-over

- Bioassay
  - test each species in the field or a pot.
  - If they germinate and grow a few days, field is probably safe.

On-Farm Demonstrations

Plot Plan

Rye	Rye + Persian	Rye + Crimson	Rye + Crimson + Radish	Rye + Vetch + Radish	Rye + Vetch	Rye + Winter Pea	Rye + Mustard
Black Oat	Black Oat + Persian	Black Oat + Crimson	Black Oat + Crimson + Radish	Black Oat + Vetch + Radish	Black Oat + Vetch	Black Oat + Winter Pea	Black Oat + Mustard
Wheat	Wheat + Persian	Wheat + Crimson	Wheat + Crimson + Radish	Wheat + Vetch + Radish	Wheat + Vetch	Wheat + Winter Pea	Wheat + Mustard

Seed Rates & Costs per Acre

Specie	USDA lb/acre	Burdine lb/acre	USDA $/acre	Burdine Savings
Rye	120	25	$38.50	$32.30
Wheat	100	25	$29.00	$21.75
Black Oat	80	25	$44.00	$30.25
Persian Clover	8 PLS	5 PLS	$22.00	$8.25
Austrian Pea	75	50	$45.00	$22.50
Tillage Radish	10	6	$21.00	$14.00
Mustard	10	6	$42.00	$28.00
Crimson Clover	15 PLS	15 PLS	$34.5	--
Hairy Vetch	25	25	$68.75	--

Erosion Simulator

Drainage Issues

Sediment/Organic Matter
- 962 lbs lbs/acre

Nitrogen
- 3.61 lbs/acre

Phosphorous
- 1.87 lbs/acre

Water (runoff)
- 2.62 inches/acre

February 7-8, 2018 – 2.7" rainfall

Sediment/Organic Matter
- 131 lbs lbs/acre

Nitrogen
- 0.41 lbs/acre

Phosphorous
- .30 lbs/acre

Water (runoff)
- 0.72 inches/acre

My Publications

- 3330 Cover Crops: Benefits and Limitations
- 3417 Cover Crops: Establishment & Termination Guide
- 3425 Cover Crops: Seeding Rates & Planting Depths for Cool-Season Species

Questions

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