Drift and Rotational Restrictions of New Herbicides Affect Vegetable Crops

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Herbicide Residual Activity

- Most herbicides have soil residual activity.
  - Desirable the year of application to control later emerging weeds.
- Benefit becomes a liability to some rotational crops.
  - Stand reduction, crop injury, or illegal residues may render a vegetable crop unmarketable if planted too soon.

Herbicide Residual Activity

- Understanding crop rotational restrictions are critical for vegetable growers.
- The label lists restrictions.
- Don’t assume that similar herbicides have the same restrictions:
  - Roundup WEATHERMAX- 30 days to crops not listed vs. Touchdown IQ- none.
  - Authority vs. Spartan.

Crop Rotation Restrictions of Newer Herbicides

Herbicide	Snap beans	Sweet corn	Peas	Potato	Cabbage	Cucumber
Aim	12 M	0	12 M	30 D	30 D	12 M
Authority	30 M	18 M	30 M	30 M	18 M	30 M
Boundary	12 M	8 M	8 M	8 M	12 M	12 M
Callisto	18 M	FY	18 M	FY	18 M	18 M
Camix	18 M	FY	18 M	FY	18 M	18 M
Phoenix	None Listed					

Crop Rotation Restrictions of Newer Herbicides (cont.)

Herbicide	Snap beans	Sweet corn	Peas	Potato	Cabbage	Cucumber
Define	12 M	12 M	12 M	1 M	4 M	12 M
Domain	18 M	1 M	18 M	1 M	18 M	18 M
Extreme	4 M	18 M	4 M	26 M	10 M	40 M
Gauntlet	18 M	18 M	18 M	18 M	18 M	18 M
G-Max Lite	18 M	0	18 M	18 M	18 M	18 M

Crop Rotation Restrictions of Newer Herbicides (cont.)

Herbicide	Snap beans	Sweet corn	Peas	Potato	Cabbage	Cucumber
Lumax	18 M	FY	18 M	18 M	18 M	18 M
Option	60 D	60 D	60 D	60 D	60 D	60 D
Spartan	18 M	18 M	18 M	18 M	18 M	18 M
Ultra Blazer	AH	AH	AH	18 M	AH	AH
Valor	12 M	4 M	12 M	12 M	12 M	12 M

Drift

- Herbicide drift, or off-target movement, is the movement of the herbicide from the intended target to an adjacent area.
- ATCP 29 defines “significant” drift as:
  - Is readily visible or
  - Moves to areas outside the target area and either causes actual harm *or could conceivably cause harm to persons, property, or the environment.*

Factors That Influence Drift- Applicator

- Droplet size- large vs. small
  - Nozzle selection
    - Type- flat fan, air induction, turbo, flood, drift guard, extended range
    - Size
    - Angle
  - Application volume
  - Pressure
  - Boom height

Factors That Influence Drift- Environmental

- Temperature and humidity
  - The carrier (water) evaporates more quickly under high temps and low humidity resulting in a smaller droplets
- Temperature inversions
  - Reduces vertical air mixing
  - Droplets remain in a concentrated cloud
  - High drift potential in even the slightest breeze
- **Wind Speed**

Wind Speed Restrictions:

- ACTP 29 does not list a minimum or maximum weed speed.
- Most labels *recommend* wind speeds from 2-10 mph.
- EPA is proposing a maximum weed speed.

Label Wind Speed Restrictions- Ground Applications

Herbicide	Minimum	Maximum
Aim	3	None listed
Callisto	None listed	None listed
Camix	None listed	None listed
Phoenix	None listed	None listed
Extreme	None listed	None listed
G-Max Lite	None listed	15
Harmony GT	None listed	None listed
Lumax	None listed	None listed

Label Wind Speed Restrictions- Ground Applications (cont.)

Herbicide	Minimum	Maximum
Option	2	10
Roundup WeatherMax	None listed	None listed
Spartan	None listed	10
Ultra Blazer	None listed	None listed
Valor	None listed	None listed
Yukon	2	5 and toward sensitive plants

Herbicide MOA's and Injury Symptoms

Herbicide	MOA	Activity	Symptoms
Aim, Phoenix, Ultra Blazer	PPO inhibitor	Contact	Green tissue necrosis
Callisto, Camix, Lumax	4-HPPD inhibitor	Systemic	Bleaching
Extreme	ALS+EPSP inhibitors	Systemic	Reddish veins, crinkled leaves; chlorosis to necrosis
Option	ALS inhibitor	Systemic	Reddish veins, crinkled leaves, stunting

Herbicide MOA's and Injury Symptoms (cont.)

Herbicide	MOA	Activity	Symptoms
Authority, Spartan	PPO inhibitor	Contact	Green tissue necrosis
Valor	PPO inhibitor	Contact	Green tissue necrosis
Roundup WeatherMAX	EPSP inhibitor	Systemic	chlorosis to necrosis
Yukon	ALS inhibitor + growth regulator	Systemic	Reddish veins, crinkled leaves, cupped/rolled leaves

Conclusions:

- Read the label for *current* crop rotational restrictions.
- Conduct a bioassay if in doubt.
- Follow best management practices to minimize herbicide drift.
- Check the label for wind speed restriction.