

# Herbicide Site of Action Key for Crop Injury Symptoms

To help you determine which herbicide(s) may be responsible for suspected injury on crops, this key uses the herbicide's site of action (SoA) and respective Weed Science Society of America group number; herbicides within the same SoA can cause similar symptoms. After reaching a specific SoA, you can check if any of the herbicides from that group are the source of crop response. Herbicide control (selectivity) is specified for broadleaf and/or grass weed species and remember to also observe weeds for injury symptoms.

This key is based on two traits of injury symptoms that can be used to distinguish different herbicide SoA:

**Injured at emergence.** The plant absorbs the herbicide from the soil either as soil-applied herbicide or carryover. The roots are normal with damaged shoots or the roots are damaged resulting in stunted plants.

**Injured after emergence.** The herbicide has contact activity with the older leaves, resulting in injury, or the herbicide translocates (systemic activity) to the growing points (root tips or meristems) with new tissue showing injury.

## INJURED AT EMERGENCE: SOIL-APPLIED HERBICIDE OR CARRYOVER

### ROOTS NORMAL, DAMAGED SHOOTS

Chlorotic /  
necrotic leaf margins



Broadleaves most sensitive

**OR Photosynthesis II Inhibitor (5&7)**  
Atrazine, Diuron, Metribuzin, etc.

Burning / interveinal chlorosis



Burned cotyledon / hypocotyl



Broadleaves more sensitive than grasses  
**PPO Inhibitor (14)**

Authority, Flexstar, Valor, etc.

Deformed leaves

Leafing out / buggy whipping



Malformed new leaves



Grasses and/or broadleaves affected

**OR HPPD Inhibitor (27)**  
Balance, Callisto, Laudis, etc.

White, bleached leaves



Grasses and/or broadleaves affected  
**HPPD Inhibitor (27)**, Balance, Callisto, Laudis, etc.  
**Diterpene Synthesis Inhibitor (13)**, Command, etc.

*Note that a low rate of glyphosate can also cause white, bleached leaves on seedling corn.*

Drawstring



Grasses more sensitive than broadleaves  
**Long-chain Fatty Acid Inhibitor (15)**  
Dual, Outlook, Zidua, etc.

Leaf cupping



Broadleaves more sensitive than grasses  
**Synthetic Auxin (4)**  
2,4-D, Dicamba, Status, Stinger, etc.

### ROOTS DAMAGED, STUNTED PLANTS

Clubbed root tips



Grasses most sensitive  
**Microtubule Inhibitor (3)**  
Prowl H2O, Treflan, etc.

Root proliferation  
Short, thickened roots



Broadleaves more sensitive than grasses  
**Synthetic Auxin (4)**  
2,4-D, Dicamba, Status, Stinger, etc.

Pruned roots  
Short, slender lateral roots



Grasses and/or broadleaves affected  
**ALS Inhibitor (2)**  
Accent, Classic, FirstRate, Pursuit, Resolve, etc.



*Note that the nematicide/fungicide Fluopyran (ILevo) can mimic PPO injury symptoms (halo effect) on soybean cotyledons.*



# INJURED AFTER EMERGENCE: POSTEMERGENCE APPLICATION, TANK CONTAMINATION, DRIFT

## CONTACT ACTIVITY: Older leaves injured, new leaves not injured

### Broadleaves more sensitive than grasses



**Photosynthesis II Inhibitor (5,6 & 7)**  
Atrazine, Basagran, Butril, etc.



**PPO Inhibitor (14)**  
Aim, Cobra, Flexstar, etc.

### Nonselective



**Glutamine Synthesis Inhibitor (10)**  
Glufosinate, Liberty, etc.



**Photosystem I Electron Diverter (22)**  
Diquat, Gramoxone, etc.

## TRANSLOCATING HERBICIDE WITH SYSTEMIC ACTIVITY: New leaves (meristem) injured, older leaves not injured

### Leaf cupping, epinasty, leaning



Broadleaves more sensitive than grasses  
**Synthetic Auxin (4)**  
2,4-D, Dicamba, Status, Stinger, etc.

### New leaves chlorotic/reddish, plants stunted

#### Chlorotic, crinkled leaves, shortened internodes



#### Chlorosis, reddened veins



Grasses and/or broadleaves affected  
**ALS Inhibitor (2)**  
Accent, Classic, Harmony, Resolve, Pursuit, etc.

#### Variable injury, chlorosis, purpling, necrosis



Nonselective  
**EPSP Synthase Inhibitor (9)**  
Glyphosate, Roundup, etc.

### White, bleached leaves



Grasses and/or broadleaves affected  
**HPPD Inhibitor (27)**  
Callisto, Impact, Laudis, etc.

### Grass meristems rot



Only grasses affected  
**ACCase Inhibitor (1)**  
Assure, Poast, Select, etc.



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