Herbicide Mode of Action Key for Injury Symptoms

This key is designed to help you determine which herbicides may be responsible for suspected herbicide injury. This key uses herbicide mode of action because herbicides with the same mode of action cause similar symptoms. After reaching a specific mode of action, you can check if any of the herbicides from that group are the culprit. Also, remember to observe weeds for injury symptoms.

This key is based on three traits of injury symptoms, which can be used to distinguish different herbicide modes of action.
1—If the plant absorbed the herbicide from the soil or if it was absorbed postemergence.
2—If the herbicide translocated to growing points (root tips or meristems) or if the herbicide had contact activity.
3—If the herbicide is selective for grasses or broadleaves or is nonselective.

Injured at Emergence (soil-applied herbicide or carryover)

**Roots Normal, Damaged Shoots**
- Clubbed root tips
- Pruned roots
- Root proliferation

**Roots Damaged (stunted plants)**
- Grasses most sensitive
  - **Seedling Root Growth Inhibitor**
    - (Prowl, Treflan)
- Broadleaf weeds often more sensitive than grass weeds
  - **ALS Inhibitor**
    - (FirstRate, Python, Pursuit, Spirit, etc.)
- Broadleaves more sensitive than grasses
  - **Growth Regulator**
    - (Banvel, Clarity, Distinct, 2,4-D, etc.)

**White, bleached leaves**

**Chlorotic / necrotic leaf margins**
- Broadleaves more sensitive than grasses
  - **Photosynthesis Inhibitor**
    - (atrazine, Sencor, etc.)

**May include malformed leaves**

**Deformed leaves**
- Onion leafing
- Leafing out / buggy whipping
- Epinasty
- Drawstring

**Chlorotic veins**

Grasses and/or broadleaves affected

**Pigment Inhibitor**
- (Balance, Callisto, Command)
  *Mimic: low rate of glyphosate on seedling corn*

**PPO Inhibitor**
- (Authority, Valor, etc.)

Grasses more sensitive than broadleaves

**Seedling Shoot Growth Inhibitor**
- (Banvel, Clarity, Distinct, 2,4-D, etc.)
Injured after Emergence
(postemergence application, tank contamination, drift)

Translocating herbicide
New leaves (meristem) injured, older leaves not injured

Intermediate
White, bleached leaves

Contact activity
Older leaves injured, new leaves not injured

Leaf cupping, strapping, epinasty

New leaves chlorotic, plants stunted

Grass meristems rot

Chlorotic, crinkled leaves, shortened internodes

Variable injury, chlorosis, purpling, necrosis

Broadleaves affected more than grasses
Growth Regulator
(Clarity, Distinct, 2,4-D, etc.)

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

Chlorosis, reddened veins

Broadleaves and/or grasses affected
ALS Inhibitor
(Accent, Option, Steadfast, Classic, Harmony GT, Raptor, etc.)

Nonselective
Glyphosate
(Roundup, Touchdown, etc.)

Pigment Inhibitor
(Balance, Callisto, Command)

Broadleaves more sensitive than grasses
Photosynthesis Inhibitor
(atrazine, Buctril, Basagran, etc.)
or
PPO Inhibitor
(Aim, Cobra, Flexstar, etc.)

New leaves chlorotic, plants stunted

Variable injury, chlorosis, purpling, necrosis

Nonselective
Cell Membrane Disrupter
(Gramoxone Max, Diquat)
or
Glufosinate
(Liberty)

Intermediate
White, bleached leaves

Nonselective
Cell Membrane Disrupter
(Gramoxone Max, Diquat)
or
Glufosinate
(Liberty)

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