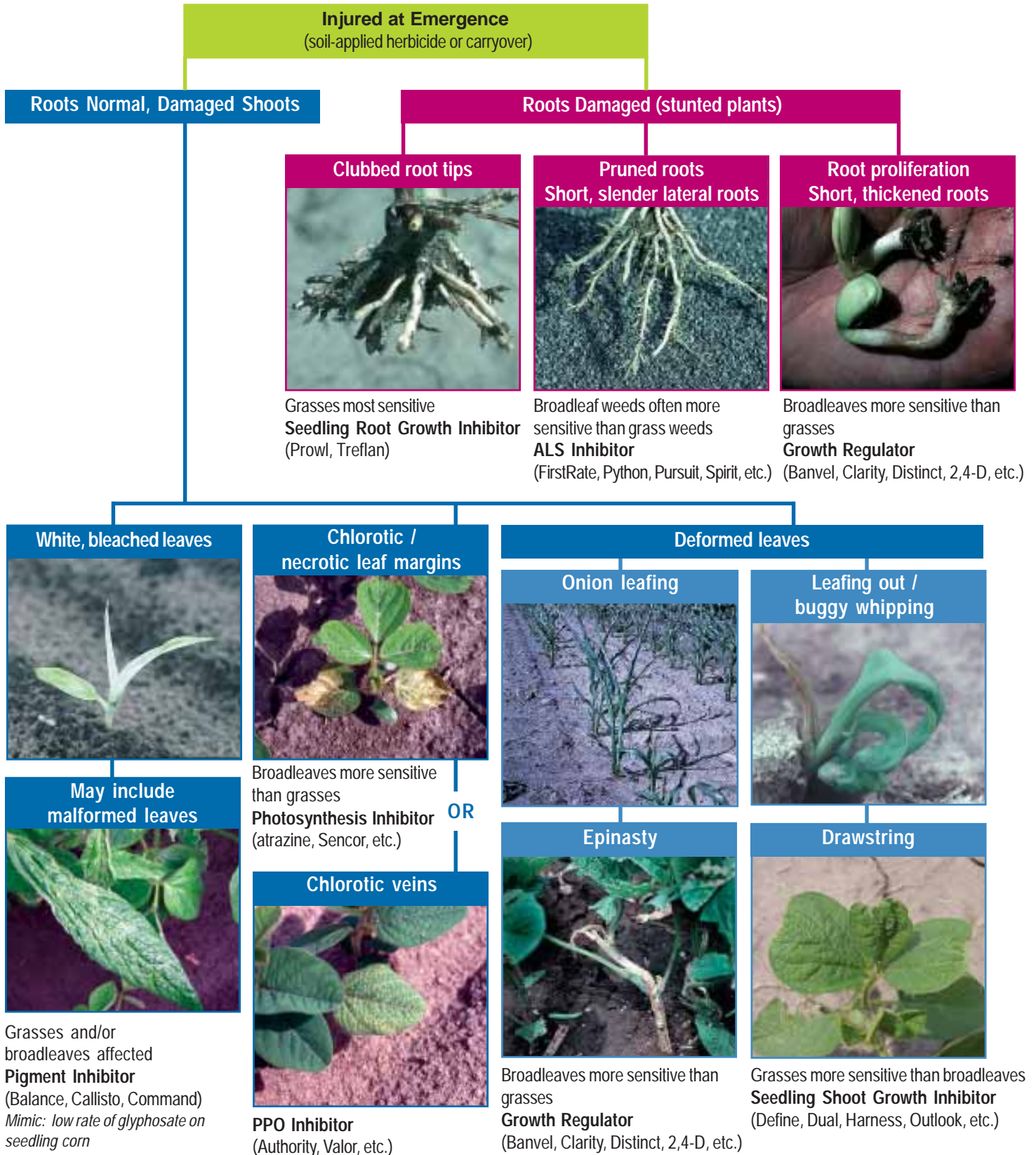


# Herbicide Mode of Action Key for Injury Symptoms

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 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



**Pigment Inhibitor**  
(Balance, Callisto, Command)

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

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

**Leaf cupping, strapping, epinasty**




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

**New leaves chlorotic, plants stunted**

**Grass meristems rot**



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

**Chlorotic, crinkled leaves, shortened internodes**



**Chlorosis, reddened veins**



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

**Variable injury, chlorosis, purpling, necrosis**




Nonselective  
**Glyphosate**  
(Roundup, Touchdown, etc.)

<b>Herbicide group</b>	<b>Herbicide examples</b>	<b>Site of uptake</b>	<b>Translocation</b>	<b>Selectivity</b>	<b>Classic symptoms</b>
Growth regulators	Banvel/Clarity (dicamba) Distinct, 2,4-D, Stinger	primarily post	phloem mobile (with sugars)	broadleaves	Distorted growth of new leaves, callus growth on stem
Lipid synthesis inhibitors (ACCase inhibitors)	Assure II, Fusion, Poast Plus, Select	post	phloem mobile (with sugars)	grasses	Growing point rots, new leaves pull out easily, white flash in corn
Amino acid syn. inhibitors (ALS inhibitors)	Accent, FirstRate, Harmony GT, Option, Pursuit, Python, Raptor, Steadfast	post or soil	phloem mobile (with sugars)	grass or broadleaf	Chlorotic new growth, shortened internodes, reddened veins on soybeans, yellow flash in corn, bottle brush roots
Amino acid syn. inhibitors (EPSPS inhibitor)	glyphosate (Clearout 41/ Roundup/Glyphomax/ Touchdown)	post	phloem mobile (with sugars)	nonselective	Chlorotic new growth to death depending on rate, white flash in corn
Pigment inhibitors (HPPD or diterpene inhibitors)	Balance Pro, Callisto, Command	post or soil	xylem mobile (with water), acts contact post	grass or broadleaf	Bleaching (white) of existing leaves
Photosynthesis inhibitors (Photosystem II or PSII)	Atrazine, Basagran, Buctril, Princep, Sencor, Velpar	post or soil	xylem mobile (with water), acts contact post	broadleaves more than grasses	Contact burn of existing leaves, chlorosis of oldest leaf margins of seedlings if soil uptake
Cell membrane disruptors (PPO inhibitors)	Aim, Authority, Cobra, Flexstar, Valor	post or soil	xylem mobile (with water), acts contact post	broadleaves more than grasses	Contact burn of existing leaves, chlorosis of veins if soil uptake
Nitrogen metabolism inhib. (GS inhibitor)	Liberty	post	primarily contact	nonselective	Chlorosis of entire plant in 4-5 days
Cell membrane disruptors (Photosystem I or PSI)	Gramoxone Max, Diquat	post	contact	nonselective	Rapid water soaking of existing leaves
Seedling root growth inhib. (Cell division inhibitor)	Balan, Prowl, Treflan	soil	minimal	grasses more than broadleaves	Clubbed root tips
Seedling shoot growth inhibitors (Acetamides)	Define, Dual II Magnum, Harness, Intro, Outlook	soil	minimal	grasses more than broadleaves	Leafing out underground, wrapped leaves, buggy whipping