A WEB-BASED HERBICIDE INJURY DIAGNOSITIC KEY
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Many factors influence the growth, development, and final yields of corn and soybean. Of all these factors, suspected or actual herbicide injury may cause the greatest emotional response for a grower. Herbicide injury may also ultimately involve a large number people besides the grower, potentially including the consultant, agronomist, custom applicator, and chemical representatives. We developed a user-friendly, internet-based herbicide injury diagnostic key as a useful tool to aid in the diagnosis of herbicide injury. The diagnostic key can be found at http://ipcm.wisc.edu/uw_weeds/extension/herbinjury.htm.

The herbicide injury diagnostic key uses a three-step approach. These three simple steps will separate our numerous herbicides into eleven modes of action. Then, the herbicides within a mode of action can be investigated further. The first step in the key is to determine the timing of the herbicide injury, whether preemergence or postemergence. If injury occurs preemergence or during emergence, the herbicide's source may be from carryover or from the current year's application. Postemergence herbicide exposure can result from a direct application, tank contamination, or drift. The second step is to determine if the herbicide has contact activity or if it is translocated in the plant. A contact herbicide affects the leaves that were treated while a translocated herbicide affects new leaves. The final step in the key is to match the injury symptom to the herbicide mode of action. The following table lists the eleven modes of action included in the key, several examples of herbicides for each mode of action, and types of crop injury that are generally observed.

Mode of Action	Example[a]	Injury Symptoms
Growth regulators	2,4-D, Banvel, Clarity, Stinger	Corn: pruned roots, epinasty, onion leafing, deformed brace roots. Soybean: pruned roots, epinasty, leaf puckering.
ALS inhibitors	SU's: Classic, Harmony GT, Permit, Accent, Beacon IMI's: Raptor, Pursuit Triazols: FirstRate, Python	Corn: lateral root pruning, shortened internodes (stacking), seedling stunting, yellow flash in whorl, pinched ears. Soybean: seedling stunting, shortened internodes, vein reddening.
Glyphosate	Roundup products, Gly-Flo, Glyfos, Glyphomax, Touchdown	Corn and soybean: chlorosis leading to necrosis. Drift to corn: white seedlings, white regions on the leaf.
ACCase inhibitors	Assure II, Fusion, Poast Plus, Select	Corn: chlorosis leading to necrosis, growing point easily pulled from whorl. Soybeans: may get white leaf flecking in rare instances.
Dinitroanilines	Pendimax, Prowl, Treflan	Corn: stunting, purple shoots, swollen roots. Soybean: swollen hypocotyl, brittle stems.

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Mode of Action	Example[a]	Injury Symptoms
Acetamides	Degree, Harness, Surpass, Lasso, Frontier, Outlook, Dual II Magnum	Corn: leafing out underground, buggy whipping. Soybean: stand reduction, drawstring, stunting.
Photosynthesis inhibitors	Atrazine, Bladex, Princep, Sencor, Lorox, Buctril, Basagran, Tough	Soil-applied: chlorosis and/or necrosis on leaf tips or margins. First leaves more affected than later leaves, symptoms may first become evident after the first sunny day. Postemergence: contact burn.
PPO inhibitors	Blazer, Cobra, Flexstar, Resource, Aim, Authority, Valor	Soil-applied to corn: chlorotic veins. Soil-applied to soybean: chlorotic veins and stand reduction. Postemergence: contact burn.
Bipyridiliums	Gramoxone Extra, Reward	Corn and soybean: rapid contact activity, water-soaked lesions followed by necrosis, leaf speckling caused by drift.
Glufosinate	Liberty	Corn and soybean: chlorosis leading to necrosis.
Pigment inhibitors	Command (Balance and Callisto are not registered in WI at this time)	Soil-applied and postemergence to corn: bleached leaves. Drift: bleached new growth.

[a] The examples given are not a complete list and do not include premixes.