UNIVERSITY OF ILLINOIS Plant Clinic
Illinois Extension
UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN
S-417 Turner Hall • 1102 S. Goodwin • Urbana, IL 61801 • extension.illinois.edu/plantclinic • (217) 333-0519 • plantclinic@illinois.edu

Plant Herbicide Collateral Damage

The University of Illinois Plant Clinic has received numerous plant samples exhibiting symptoms of herbicide injury in 2023. Samples have included field crops, trees, and ornamentals. The application of herbicides plays a crucial role in sustaining food production and protecting natural and recreational areas. However, it is not uncommon to observe collateral damage to non-target plants that are sensitive to herbicides.

Herbicide damage manifests with a variety of symptoms depending on the herbicide applied and the mode of exposure (drift vs. carryover, for example). In addition, symptoms depend on the type of plants affected (for example, woody vs. herbaceous or dicot vs. monocot). Common herbicide damage symptoms include leaf cupping, twisting, epinasty, chlorosis, necrotic or bleached blotches, stunting, and overall tissue deformation. Herbicide injury can be difficult to visually distinguish from other causes of similar damage such as insect feeding, pathogen infection, and adverse environmental conditions. Further complicating diagnosis, symptoms may develop within a few days to over a week after the herbicide contact depending on the chemistry of the product and the degradation of the product in the environment or plant tissue.

When we receive these types of samples at the Plant Clinic, we first eliminate biotic causes (pathogens such as viruses, bacteria, and fungi, and pests such as aphids, mites, and thrips). Based on the symptoms and the information provided with the sample we attempt to identify potential abiotic factors which could be affecting the plants, including environmental issues such as drought, flooding, nutrient deficiencies, and pollution, and assess if the symptoms are consistent with exposure to herbicides. The more complete information is provided with the sample, the more accurate of a diagnosis we can provide.

Some of the circumstances that make us suspect potential herbicide injury include proximity of production agriculture fields; recent herbicide applications to nearby field crops, turf, or ornamentals; and a history of herbicide applications from the previous year from which the herbicide may not have fully degraded in the soil.

Unfortunately, there are limited solutions to reverse unintentional herbicide damage to plants. The ultimate results of herbicide damage can range from mild discoloration or deformation to plant death. Timing, dosage, and type of herbicide applied, along with the sensitivity of the off-target plants all contribute to what type and how severe the damage will be. The best course of action is to provide optimal care of the plants: watering during periods of dryness, fertilizing in moderation, and managing pests and pathogens while waiting for plant recovery.

The University of Illinois Plant Clinic does not perform testing to confirm the presence or identity of herbicides in plant tissue. We examine the submitted sample to determine if pests or cultural factors may have contributed to or are responsible for the symptomology displayed by the plants.

Figure 1. Fomesafen carryover in corn. Note the yellowing and browning of the main vein with the side veins slightly affected.

Figure 2. HPPD inhibitor herbicide damage on soybean. Note the bleached margins of the newer leaves.

Figure 3. Group 3 herbicide damage on soybean. Note the thickened and brittle hypocotyls.

Figure 4. HPPD inhibitor carryover damage on soybean. Note the yellowing newer leaves and brown veins on the undersides of the leaves. Random patches of affected plants were scattered among healthy plants in the field.

Figure 5. Group 27 herbicide carryover in soybean. Left: Plants with physiological growth affected (stunted). Right: Healthy plants with no symptoms.

Figure 6. Plant growth regulator herbicide damage to hibiscus. Herbicides containing 2, 4-D, dicamba, and MCPA were reportedly applied nearby. Note the curling leaf tips, especially in the newest growth.

Figure 7. Plant growth regulator herbicide injury on tomato. Note the extremely distorted (elongated, curled, and twisted) leaves.

Figure 9. Suspected atrazine and HPPD inhibitor damage on soybean. A POST application was made to a corn field across the road; the atrazine symptoms (yellowing and browning) usually show up on the leaves that were present when the application was made, while the HPPD inhibitor symptoms (bleaching of leaf margins) tend to show up on leaves that develop after the exposure occurred.

Figure 10. Suspect clopyralid damage on soybean. As a synthetic auxin it causes deformation of the newest leaves. These leaves tend to curl along the lateral margins (red circles).

Figure 11. Suspected PPO inhibitor damage to crabapple. An herbicide containing PPO inhibitors was reported as being applied nearby. The spotting symptoms appear similar to those caused by PPO inhibitors on strawberries and other plants.

Figure 12. Plant growth regulator herbicide injury on redbud. Note the unaffected older leaves and the distorted new growth with wavy margins.

Figure 13. Suspected herbicide damage to white oak. Note that the older leaves are affected (red circle) while the newest growth appears healthy.

Figure 14. Suspected herbicide damage to white oak. Note the distorted leaves with “humpbacked” main veins and curled leaf margins.

More information about this topic:

- https://www.youtube.com/watch?v=3OWyaDPk1n0
- https://extension.illinois.edu/sites/default/files/pc_factsheet_on_pgr_herbicide_injury.pdf
- http://weeds.cropsci.illinois.edu/extension/Other/Soyinjury.pdf

Created by: Esneider Mahecha[1] and Diane Plewa[1] **Reviewed by:** Dr. Aaron Hager, Extension Professor[2] and Michelle Wiesbrook, Extension Specialist[2]. [1]University of Illinois Plant Clinic, [2]Department of Crop Sciences and U of I Extension. July 2023.

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