

THE PURDUE LANDSCAPE REPORT

Diagnosing Phytotoxicity on Landscape Plants

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Phytotoxicity is damage to plants caused by chemicals, fertilizers, or pesticides. Phytotoxicity can be a positive (killing weeds) or a negative (damage from pesticides on ornamental plants), depending on the intended results. Some of the common phytotoxic effects can show symptoms such as stunting of leaves and whole plant, necrosis (death), chlorosis (yellowing), abnormal growth (i.e. twisting/epinasty, cupping), discoloration, root damage, or bark cracking.

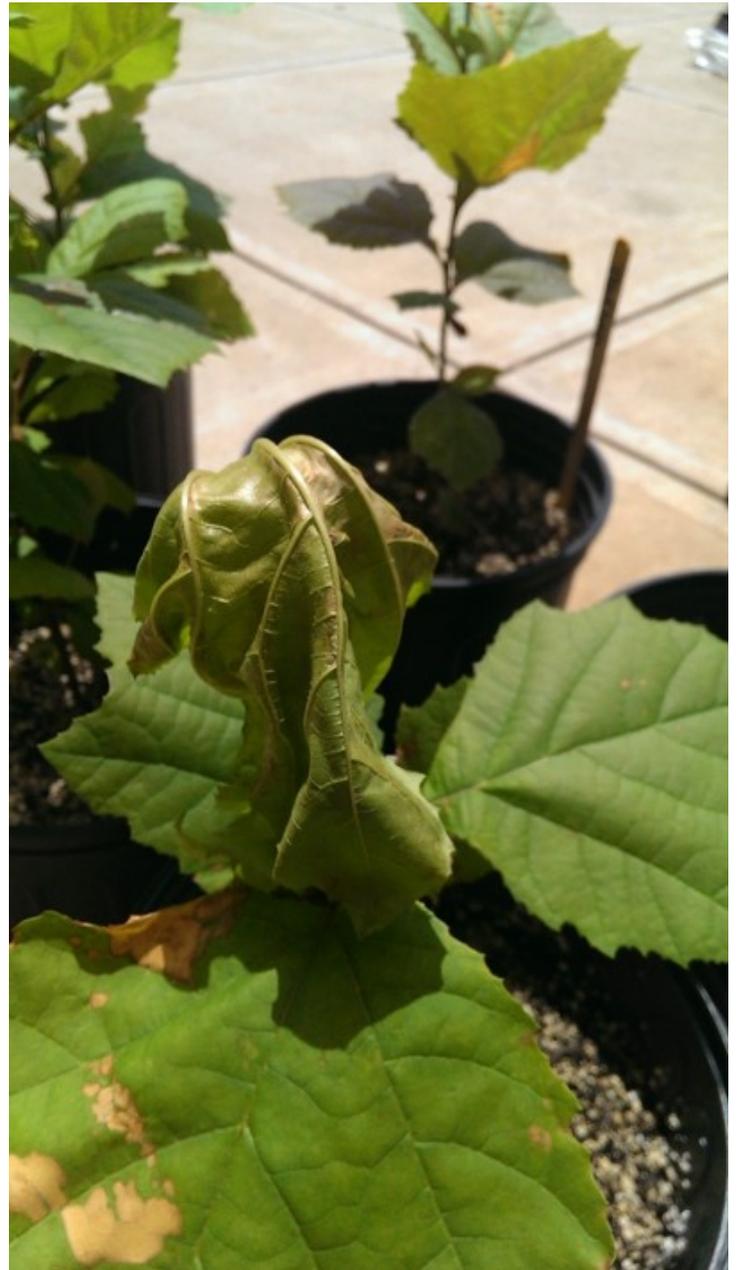


Figure 1. Herbicide phytotoxicity to sycamore from 2,4-D.

The most common reasons for phytotoxic symptoms include:

- Herbicide injury
 - Herbicide phytotoxicity can occur when drift, volatilization, or other misapplication occurs when a herbicide is applied. The symptoms vary widely depending on the herbicide mode of action and the plants that are damaged. All of the symptoms mentioned above can occur when damage is caused by herbicides.
- Fertilizer burn
 - Fertilizer phytotoxicity can occur when a liquid fertilizer is applied to leaves during hot temperatures and low humidity. Fertilizer burn can also be caused by high electrical conductivity (EC) (salts from the fertilizer) in the soil. Typical symptoms include necrotic (dead) plant tissue at the margins of the leaves. To correct the high EC in the soil, deep irrigation can be applied to leach out the salts or gypsum can be applied around the root system to deactivate the salts.
- Insecticide/Fungicide applications
 - Typically insecticide and fungicide applications don't cause any type of phytotoxicity to plants, though when applied during extremely hot temperatures they can cause some damage. To prevent this from occurring, apply during the early morning hours and avoid any of these applications in the middle of the day during the hottest days of the summer. Typical symptoms include necrotic and/or chlorotic damage to the entire leaf area.
- Improper tank cleaning
 - Proper tank cleaning is essential when using multiple types of pesticides (i.e. herbicides, insecticides, etc.) or modes of actions of herbicides in one tank. You would typically observe the worst damage where the application began and decrease in damage as the spraying continues through the

landscape/plants.



Figure 2. Insecticide phytotoxicity from an application made in an urban area while temperature were in the 90's.

To diagnose phytotoxicity, there are some key steps:

- Find out the history of the site.
 1. Previous pesticide and fertilizer usage in the area.
 2. Weather conditions when applications were made to the site.
- Diagnose abiotic vs. biotic symptoms.
 1. Are the symptoms random (biotic) or in a pattern (abiotic)?
 1. If abiotic, whole plants and/or multiple plants will be affected.
 2. If biotic, symptoms will be on various parts of the plant with no pattern.
- What are the symptoms?
 1. Does the history of the site indicate the cause could be due to past applications?
- If a determination can't be made, send samples to the Purdue Plant and Pest Diagnostic Lab.

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