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HERBICIDE INJURY TO TREES[1]

by John A. Meade

A herbicide is a chemical used to kill unwanted plants. Often these plants are growing in association with desirable plants. To kill one plant growing in close association with another is difficult and relies on the property of selectivity. This selectivity depends on several things, such as the herbicide, temperature, rainfall, and species of plant involved. When selectivity fails, we have tree injury.

Those herbicides generally involved in tree injury fall into two classes: 1) compounds used to kill broadleaf weeds in turf; and 2) total vegetation control agents.

The first group causes injury in three ways:

Drift. Movement of spray particles through the air. These particles contact the leaves of desirable plants and injury results. This, of course, shows up only during the growing season. Conifers are more resistant that deciduous plants.

Volatility. These compounds are usually used when air temperatures are high (60-85 deg. F). At elevated temperatures, some formulations will evaporate into a gas. This gas then moves through the air to contact desirable plants. The herbicide is absorbed and injury occurs.

Root absorption. While the life of these compounds in soil is short (2-3 weeks) and they do not penetrate deep into the soil (1-4"), tree roots can intercept some of these compounds and move them up into the tree where injury symptoms show up.

The second group causes injury usually by root absorption. These herbicides are designed to be long-lived in the soil and indeed some persist for a year or more. Since they are there longer, they move deeper into the soil with rainfall. Hence, they have more chance of coming into contact with tree roots.

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Appearance of injury symptoms

Herbicides in the first group, 2,4-D, 2,4,5-T, silvex, MCPP (Mecoprop), Banvel, and Tordon, all affect plants in a similar fashion. They generally move from the point of contact to the growing points. Hence, injury symptoms most often show up in young leaves first. These compounds cause malformation of the leaves and petioles. The edge of the leaf may curl up to form a cup or it may curve downward. If the leaf has points on it, these points become elongated and often look like strings. The petiole quite often will curl also. With some species, the leaves assume a "strap" shape, long, and narrow.

The total vegetation control materials generally enter trees through the root system, either because the tree roots were growing into the treated area or because the herbicide had washed across the surface of the soil and then penetrated into the root zone. Incidentally, once herbicides have moved downward into the soil, they do not move sideways to any significant degree. One of the problems in using these herbicides is trying to determine how far tree and shrub roots grow out away from the trunk. This varies considerably with the species and soils.

These materials, such as Hyvar, Pramitol, Urox, Spike, Telvar, and various other trade names, enter the root system and move up into the tree. The injury symptoms are manifested first at the edge or tip of the leaf and then generally move back to the base. The leaf first turns yellow and then brown. Hyvar sometimes blackens the leaf. Depending on the dosage, the tree defoliates the year of treatment and then refoliates. The second year, the tree will put out weak foliage and then death occurs.

Treatment and prognosis

Trees quite often recover from exposure to the first group. The leaves will be misshapen and will often drop, but depending on species and dosage will appear normal in two years or so. However, death can occur if the dose is high. There is no specific treatment to alleviate the injury symptoms. Pruning the branches will often help the appearance of the tree. It would probably be best not to fertilize the trees although additional water would be helpful. Don't be in too much of a hurry to remove the tree the first year since they can make surprising comebacks from the action of these herbicides.

Trees reacting to exposure to the second group of herbicides, however, have shown a smaller rate of recovery. Once again, after the material is in the tree, there is little that can be done to aid the tree. Pruning is of little value since the materials are distributed throughout the tree. It would be best to wait for a year or two to see if the tree comes back. If it does not put out foliage the year after exposure, it can be assumed that it is dead and should be removed.

Where did the herbicide come from?

One must be a detective sometimes to trace down the source of herbicide injury. Quite often the person doing the application is not aware that he is using a compound which hurts trees. Don't accept the statement, "I'm not using anything which hurts trees." Ask (diplomatically) to see the container and check the ingredients statement. If it's unfamiliar, copy it down and check with your county agent. If the injury is typical of group 2, look uphill to see if perhaps the chemical was carried by rainwater run-off.

Some sources of injurious herbicides are municipal and state highway departments, homeowners, power line clearance crews, railroad, and electric substations.

It is also beneficial to check the area around the injured tree to see if the weeds are curled up or if other trees or shrubs in the area are injured.

Don't forget that plants can grow and change color in only so many ways and other things can cause injury similar to herbicide injury symptoms.

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