

Tuesday, January 21
Session A: Trees and Vines
Moderator: Ben Faber

AFFECTS OF SPRAY DRIFT ON TREES AND VINES

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Herbicide application through spray nozzles results in some herbicide droplets potentially moving off target, with droplet size being the most important factor influencing spray drift. In some cases, herbicide drift reaches nearby crops in concentrations sufficient to cause injury. The relative tolerance of adjoining crops to the herbicide being used, might be used to help set buffer zones needed to insure crop safety. In a series of field studies, we observed the response of grape vines and various tree species to simulated drift of herbicides commonly used for weed management.

The most common postemergence herbicides associated with drift are glyphosate (Roundup or Touchdown), oxyfluorfen (Goal), halosulfuron (Sanda or Sempra CA), sulfometuron (Oust), paraquat, or 2,4-D. Glyphosate blocks production of aromatic amino acid which leads to growth inhibition → chlorosis → necrosis → and finally plant death. Symptoms of glyphosate first appear in immature leaves and growing points. Glyphosate applied in the fall to young trees with green stems can be stored in the stems and symptoms appear the following spring when new leaves are emerging. When this occurs, internodes are often shortened and leaves yellowed - sometimes only one or a few branches are affected. Glyphosate drift onto established trees and vine crops causes a yellowing of the leaves, but internode length is not generally affected.

ALS type herbicides, such as Sandea, Oust, and Pursuit act by blocking production of branched chain amino acid, which leads to growth inhibition → chlorosis → necrosis → and plant death. Symptoms first seen in immature leaves and growing points. The pattern of yellowing is often blotchy. Like glyphosate, ALS herbicide symptoms can persist for a long period of time.

Growth regulator type herbicides, including 2,4-D and dicamba (Banvel), cause a twisting of stems → swelling at nodes → leaf cupping → leaf abnormalities → and can result in crop death. When a growth regulator type herbicide is suspected of drift, check for twisting of the stems of any weeds in the field, as few broadleaf plants can escape without showing some symptoms.

Contact herbicides, such as paraquat (Gramoxone), disrupt cell membranes, which leads to chlorosis → necrosis. Injury is limited to exposed tissue, with no damage to later emerging tissue. Drift symptoms often appear as spots on leaves, with little or no long lasting effects.

Preemergence herbicides can also cause injury to trees and vines, although this injury is rarely the result of drift. In most instances, excessive rates of application for the soil conditions or adverse weather conditions can move the herbicide into the root zone of the crop.

Conclusions: Don't assume that abnormal crop growth is always herbicide injury – other factors such as disease, nutrient deficiencies, water stress, or adverse weather conditions can also cause injury similar to herbicide injury. Take pictures and compare symptoms to those observed on other plants. For pictures of common herbicide injury symptoms on crop plants, see the University of California, Weed Research and Information website at <http://wric.ucdavis.edu/>.