



ABOVE, grape leaves and stems with 2,4-D injury.

Weed Killers are Plant Killers

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While many of the samples of ailing plants examined by the plant pathology laboratory for diagnosis are suffering from attacks by parasitic fungi, bacteria, or nematodes, in almost an equal number of cases no organism is involved.

Each disease has its distinctive symptom, and the diagnosis can be verified by examination of the organism directly from the tissues or from isolations on culture media. Where no organism is involved, diagnosis is more difficult. Often there are no clear cut and distinctive symptoms and the malady is the result of too much or too little of such environmental factors as water, salts, fertilizers, heat, cold, wind, sunlight and the various sprays and dusts administered by man.

When 2,4-D Wanders

A case in point is the great variety of plants coming to our laboratory in increasing numbers where damage from weed killing chemicals is indicated. One of the first chemicals used was 2,4-D which in the volatile ester formulation affected distant plants like a plant-twisting blight. This chemical causes distinctive distortions of the new growth of cotton, grapes, trumpet vine and zinnias.

The amine salt of 2,4-D now used is much less volatile and much safer.

In most cases, however, the chemical is applied to weeds growing within the root zone of trees and shrubs, is leached into the soil by watering and is picked up by tree and shrub roots. The average garden owner or garden worker is not aware that the roots of large or long established trees and shrubs are widespread in lawn areas, flower gardens, pathways and driveways.

Selective weed killers applied to lawns have been picked up by tree roots and have caused serious damage. Care must be taken to apply selective chemicals at the recommended dosage as they are selective only when sufficiently dilute.

Killers On the Loose

The so-called "permanent" weed killers such as arsenate and borate mixtures being used so freely now present problems as serious as those caused by the selective weed killers.

Weed killers applied to driveways, gutters, alleys and to soil under brick or tile terrace and patio pavements are intended to sterilize the soil permanently or for a long time. On that account dosage is usually heavy to "do a good job." Any roots so unfortunate as to be reached by rain or irrigation water percolating through treated soil are injured and the toxic chemical is carried to the growing shoots where symptoms may appear.

Symptoms Reveal Cause

While the symptoms of injury from different weed killers and on different hosts vary, those produced by 2,4-D formulations are typical. New leaves and shoots developing after the application of chemical to kill weeds in lawns or plant beds are first to show injury. Weed killer applied in the fall, after new growth on trees and shrubs has ceased, will cause no visible injury in the fall but may strongly distort the new foliage the next spring. Umbrella trees have developed a very lacy foliage following fall application of 2,4-D.

The mildest form of injury is a downward rolling of the new leaves, developing within a few weeks after weed killer has been applied. In more severe injury the leaves are stunted and yellow and often fall.

Another form of injury occurs when the chemical acts on the very tiny primordia leaves. In this case the leaf blade is greatly reduced, the leaf becoming very narrow and almost grass-like. Flowers and fruits are often shed. In most severe injury and in very sensitive plants like the olive, the twigs become defoliated and die and branches several inches in diameter become dry and cracks develop in bark and wood. When weed killers are applied to the soil surface and are leached into the root zone, the cortex of the root

tips becomes swollen and elongation stops. The roots may die unless the dosage is very small.

These Are Most Sensitive

Among the more sensitive shade trees and ornamentals are olive, umbrella tree, pines, privets, trumpet vine, roses, grapes, and zinnias. No doubt many other kinds of plants are injured but have not come to our attention.

Owners are concerned with saving their injured trees but there is no quick cure at present. If drainage is good, heavy watering to leach out as much of the toxic chemical as possible is advisable. A light to moderate watering may only move more chemical down into the main root zone and cause further injury. The injured tree should be considered "in the hospital" and watered regularly and fertilized moderately in March and July to stimulate additional root growth. Some trees have died, others which looked just as sick have survived and in one to three years appear to have fully recovered.

In yards and ornamental plantings where root systems intermingle everywhere, chemical weed killers should be used with great caution — if at all. Applied to soil or plant growth within fifteen feet of valuable trees or shrubs, they often cause serious injury.

BELOW, privet showing injury due to soil application of a "permanent" weed killer.

