Avoid Phenoxy Herbicide Damage to Grapevines

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What are phenoxy herbicides?

Perhaps as many as one hundred or more herbicide formulations contain a phenoxy-type active ingredient. Some of the more commonly used phenoxy products include 2,4-D, MCPA, Weedone, Weedmaster, Crossbow, Banvel, Garlon, Grazon, Weed-B-Gone, and Brush Killer. The active ingredient of phenoxy-type herbicides may be listed on the label as 2,4-dichlorophenoxy-acetic acid, 2-methyl-4-chlorophenoxyacetic acid, triclopyr, or dicamba.

This family of herbicides is very effective and provides relatively inexpensive broadleaf weed control for lawns, golf courses, and right-of-ways. Phenoxy herbicides are also an important tool for broadleaf weed control in pastures and for production of peanuts, corn, sorghum, wheat and other small grain crops. Common target weeds for these herbicides are pigweed, morningglory, cocklebur, nightshade, and other broadleaf weeds.

These products come in containers ranging from 1-quart bottles of ready-to-use solution to 5-gallon drums of highly concentrated active ingredient. They do not require a pesticide license for purchase and are readily available from department stores, home improvement stores, co-ops, garden centers, retail nurseries, and farm chemical dealers.

Grapevines are highly sensitive

Grapevines are extremely sensitive to herbicides containing phenoxy-type active ingredients. Sensitivity to phenoxy herbicides exists throughout the grapevine's growing season, but they are most vulnerable from the early growing season through the bloom and fruit set period (early April through early June).

During the active shoot growth period, phenoxy damage often causes growth to stop temporarily and to be retarded for several weeks. If the effects are not too severe, normal growth will resume the same or following year. Growth may stop completely on severely injured shoots and heavily damaged vines may not recover for 2 years or more.

Flower clusters are particularly sensitive; exposure during bloom can greatly reduce fruit set. Injured vines also may have delayed fruit ripening. Severe injury can prevent complete maturation of the fruit. The delayed maturation effect may exist in a vine for 1 to 3 years before normal ripening resumes. Slight injury may have little or no effect upon fruit maturity.

Texas vineyards have experienced significant crop loss and long-term damage to vines inadvertently exposed to phenoxy herbicides applied to distant targets. In contrast, minor symptoms on grape leaves probably do not cause crop loss, but it can take significant time and energy to resolve the issue with a neighbor.

How damage occurs

Unintended off-target drift of herbicides can be caused by wind, shifting air currents, climatic inversions, or spraying at high pressure (which causes a very fine mist). Aerial applications can be especially subject to off-target drift and reports have been made of drift damage from phenoxy herbicides up to 40 miles or more from the area of application (Frazier, et al., 1970). Grapevines will exhibit damage symptoms when exposed to only minute amounts carried by the wind.

Grapevines in close proximity to a sprayed area are at highest risk. However, even grapevines some distance from a phenoxy-treated area can be damaged under certain conditions. Even slight winds can carry small spray droplets toward a vineyard. Temperatures above 70-75°F allow phenoxy herbicides, especially ester formulations, to volatilize (vaporize) and be carried by the wind, even several days after the spray application.

Symptoms of phenoxy injury

The symptoms of phenoxy herbicide damage are most dramatic on the youngest leaves and the tips of growing shoots (Figures 1 and 2). Affected leaves are small, narrow, and deformed, and have closely packed, thick veins that lack chlorophyll. Farther down the shoot, damage symptoms are progressively less severe; leaves have a distinctive fan-shape appearance with parallel, strap-like, clear veins (Figure 2). The leaves sometimes are cupped, and the leaf margins often terminate in sharp points. Small, puckered, interveinal spots retain some green chlorophyll. Damaged flower clusters set very few or no berries.

Figure 1. (Left) New leaves and growing tips show the most severe damage. Affected leaves are small, narrow and deformed.

Figure 2. (Right) Farther down the shoot leaves may have a fan-shape appearance. Leaves sometimes are cupped and margins often end in sharp points.

Reducing the risk of phenoxy damage

The most effective means of reducing the risk to your vineyard is to talk with your neighbors and commercial pesticide applicators in the area. Use this fact sheet to inform them of the high risk of damage to grapevines posed by phenoxy herbicide use. Encourage them to use herbicides with a different active ingredient. If they still prefer a phenoxy herbicide, suggest that they use an amine (dimethylamine salt) formulation instead of an ester formulation, which will decrease the risk of volatilization. Ask them to consider making applications in early spring (prior to March 15) before grapevines begin to grow or in the fall after their leaves have dropped.

Off-target drift can be minimized by careful application timing and methods. Wind speed and direction should be monitored closely and applications postponed until drift potential is very low. All label directions, restrictions and precautions should be read before using any pesticide. Spray-thickening agents (drift retardant) may help to reduce spray drift.

Finally, encourage a good neighbor relationship that will enable all parties involved to effectively conduct their operations.

References

Frazier, N.W., J.P. Fulton, J.M. Thresh, R.H. Converse, E.H. Varney, and W.B. Hewitt (eds.) 1970. Virus Diseases of Small Fruits and Grapevines. University of California Division of Agricultural Sciences, Berkeley, California. pp. 247-250.

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