

PROBLEM SOLVERS

by Balakrishna Rao, Ph.D

Why herbicides don't kill grass

Problem: Why don't broadleaf herbicides kill turfgrass? (Georgia)

Solution: Auxin herbicides (2,4-D, MCPP, dicamba) are able to selectively control broadleaf weeds without killing turfgrass because of basic morphological and physiological differences between the two types of plants.

The horizontally-oriented leaves of broadleaf weeds collect more herbicide than leaves of upright-growing turfgrasses. This vertical growth decreases the potential of toxic amounts of the herbicide reaching sensitive sites in the turfgrass plant.

The meristems, or growth points, of broadleaf weeds are located in the terminal portion of the stems—the top of the plant. This location exposes the meristems of broadleaf weeds to foliar sprays of herbicides. The meristems of turfgrasses, conversely, are close to the soil surface and protected by the leaf sheath.

Turfgrasses have meristems located at the collar and base of each leaf, while broadleaf weeds have no leaf meristems. Herbicides being translocated in the leaves of turfgrasses must pass through these meristematic areas where rapid metabolism detoxifies the herbicide before it reaches more sensitive areas of the plant. Broadleaf weeds, however, do not have the ability to detoxify herbicides before being translocated out of the leaf tissue since the leaves lack metabolic sites.

Turfgrasses can be severely injured by broadleaf herbicides under certain conditions. The immature leaves of seedlings cannot metabolize the herbicide before it is translocated to more delicate plant tissues. Heat- and drought-stressed turf is also more likely to be injured by herbicides because of reduced metabolic activity. Proper application of broadleaf herbicides to thriving, mature turf will selectively control broadleaf weeds without injuring the turfgrass.

Controlling undesirable plants

Problem: Can you tell me some uses of allelopathic plants for control of undesirable plants? (New York)

Solution: This is a very good question and concept in vegetation management. There is not much information on uses of allelopathic plants for control of undesirable plants. Most of the information is on the effect of allelopathic plants on desirable plants or crops. There is quite a bit of information on the allelopathic effect of the walnut plant on other plants. Ten- to 12-year-old walnut plants can produce juglone, an inhibitory chemical. I am not familiar with any studies showing juglone's effect on undesirable plants.

These allelopathic compounds released from plants are short-lived in the soil because they are subject to chemical or microbial decomposition. To be very effective, economical and practical to use,

these compounds should be safe on desirable crops and sensitive and specific to undesirable plant species like weeds.

Reports from Michigan State University suggest that crops, like cucumbers, sorghum and sunflowers, can produce allelopathic chemicals which inhibit weeds. Reports from Rhode Island indicate that leachates from perennial ryegrass, red fescue and Kentucky bluegrass can affect the growth of forsythia and dogwood plants. This study suggests the possibility of allelopathic compounds released from turfgrass affecting ornamental plants if turfgrass is grown very close to them.

The effect of these inhibitory compounds from turfgrass culture on undesirable weeds is unknown. It may already be working well in nature in some situations and poor in others. This area needs further research.

Nitrogen amounts on sandy soils

Problem: Is 1.2 lbs. of nitrogen per 1,000 sq. ft. per application excessive on bluegrass turf in west Michigan for a spring treatment on sandy soils? (Michigan)

Solution: The answer to your question is yes and no. It depends upon several factors such as the release characteristics of nitrogen source, temperature, soil moisture, growth cycle and activity of turf. If the temperature is cool and there is plenty of soil moisture, 1.2 lbs. of nitrogen from either quick- or slow-release sources can be applied without anticipating much problem.

As the temperature increases with less soil moisture, quick-release nitrogen sources, like urea or ammonium nitrate, will present a problem at that high a rate. If you are considering using low-burn potential nitrogen source materials, Formolene or FLUF may not present problems at that rate. Controlled-release products like sulfur-coated urea or ureaform materials would be the safest of all.

These fertilization practices should coincide with the growth cycle of turfgrass. Provide the proper amount of fertilization based on soil test results and the shoot growth activity in spring.

Other factors to consider are sandy soils and surface-rooted bentgrass. Sandy soils will leach the nitrogen faster and deeper than finer textured soils. Surface-rooted bentgrass may not be able to use all the nitrogen applied before it leaches below the root zone. Therefore, consider applying at lower rates and at shorter intervals to overcome these problems.



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Questions should be mailed to Problem Solver, Weeds Trees & Turf, 7500 Old Oak Boulevard, Cleveland, OH 44130. Please allow 2-3 months for an answer to appear in the magazine.