HERBICIDE RESISTANCE

CONTROLLING DINITROANILINE RESISTANT GOOSEGRASS IN TURF

Patrick McCullough, Ph.D.

Prodiamine is a dinitroaniline (DNA) herbicide that is widely used in turfgrass management for preemergence weed control. However, overuse of prodiamine has increased the spread and establishment of weeds resistant to DNA herbicides. Goosegrass is a particularly problematic weed that has developed resistance to prodiamine and other DNA herbicides in the southern U.S., and turf managers may need to rotate herbicides with different modes of action in order to control these DNA-resistant biotypes.

Research was conducted at the University of Georgia to evaluate resistance levels to prodiamine for a susceptible goosegrass compared to a suspected resistant biotype from Griffin, Ga. Field experiments were also conducted to evaluate efficacy of preemergence herbicides with different modes of action for control. In greenhouse experiments, prodiamine rates required for 50% control of DNA-resistant goosegrass was >32x greater than susceptible biotypes.

In field experiments, sequential applications of Dimension (dithiopyr) and Barricade (prodiamine) provided <20% control of the resistant goosegrass over 2 years. A single application of Tower (dimethenamid) provided <50% goosegrass control in 2011, but provided excellent control (>90%) in 2012. Single and sequential applications of Specticle (indaziflam) provided >90% control of DNA-resistant goosegrass in both years, while Ronstar (oxadiazon) provided >85% control. Single and sequential Dismiss (sulfentrazone) applications controlled goosegrass <60% in 2011, but averaged 94% control in 2012.

If resistance to DNA herbicides is suspected in goosegrass populations, indaziflam and Ronstar may be good choices to consider for preemergence control. Dimethenamid and sulfentrazone may also control DNA resistant goosegrass, but efficacy may be inconsistent.

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CIVITAS ONE GETS OMRI LISTING

Civitas One, the latest advancement from the makers of Civitas, is now listed by the Organic Materials Review Institute (OMRI) for organic golf course maintenance practices. New OMRI listed Civitas One provides an effective solution for today’s progressive superintendents, the company says.

“We all have a social responsibility to work towards innovative solutions that will provide product efficacy and help build a sustainable future,” explains Oriana Persechini, Lawncare Category Portfolio Manager, Petro-Canada Lubricants Inc., a Suncor Energy business. “Acquiring OMRI listing for Civitas One is just one more way that we’re going beyond today’s standards to transform plant protection for more resourceful growth and continuing to help superintendents do more with less.”

Civitas One is a premix of the Civitas mineral oil — synthetic Isoparaffin and Civitas Harmonizer in one 2.5-gallon jug, which superintendents can expect to protect about 18,800 to 37,600 square feet of turf when used at label rates.

NEWS UPDATES

ADDING 2 TO 6 OZ/acre (OF DIMISS) AS A SPRAY TANK ADDITIVE PROVIDES QUICKER HERBICIDE ACTIVITY, BUT ALSO "HEATS UP" THE TANK-MIXTURES IN TERMS OF WIDER AND MORE COMPLETE WEED CONTROL.”

Bert McCarty, Ph.D.
(see full story on page 30)
A university researcher and one who frequently makes agronomic recommendations, I’m often asked, “Dr. McCarty, what can I add to my spray mix to heat things up?” This can be translated to mean, “What can I add to my tank-mixture to provide quicker and better weed control?”

Over the years, many products have been promoted to provide this added control, including various wetting agents, adjuvants, stickers, emulsifiers, soaps, seed oils, vegetable oils, humectants, humic acids, ammonium sulfate/nitrate, urea and others. Although these products do sometimes improve the performance by being synergistic or additive, they can also become antagonistic and/or cause the spray formulation to be incompatible, meaning the spray tank components separate out (will not stay in suspension) or worse, cause turf burn.

However, one potentially positive additive to most postemergence herbicide spray mixtures is Dismiss 4L from the FMC Corporation. Dismiss contains sulfentrazone, a member of the aryl triazinone herbicide family. It has both pre- and post-emergence activity. The majority of preemergence activity is on small seeded broadleaf weeds plus some grass and sedge weeds while postmergence activity is greatest on sedges and kyllinga. When used as a preemergence herbicide, Dismiss is absorbed by roots of germinating weeds. Postemergence activity is by foliar absorption, which causes rapid desiccation and necrosis of treated tissue. Dismiss controls plants by inhibiting an enzyme (called protox or PPO) of chlorophyll biosynthesis in chloroplasts, eventually causing cell membrane disruption.

Since its introduction to the turfgrass market, Dismiss has carved out a niche, especially for postemergence yellow nutsedge and kyllinga control. However, from my research and experiences, it can be added to just about any postemergence weed control application. Some reasons for adding Dismiss would be to provide more rapid weed control, improve weed control at lower air temperatures and increase the range of weed species that are controlled. In our what-have-you-done-for-me-lately society, people become impatient when they hire someone to control weeds or use herbicides and don’t see almost immediate results. How many times have you heard the accusation that only water was applied since results are not almost instantaneous?

Though numerous wonderful herbicides exist in the turfgrass market, many of these are slow acting. Some herbicides may take two to four weeks to show activity, as these often disrupt normal food production/accumulation in

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Heat up the tank
Looking for a spray addition for broader weed control and faster action? Dr. McCarty has the answer.

By Bert McCarty, Ph.D.
plants, basically starving treated weeds to death. This slow-to-work characteristic is manifested when temperatures are cool (<50 F). Dismiss, being more of a contact herbicide, is influenced more by available sunlight vs. warmer temperatures, offers activity within hours of application. Treated plants start to turn off-color, leaf margins are damaged, and plants start to wilt and eventually lead to shoot burndown. Figure 1 demonstrates hastened control of creeping Charlie (also known as ground ivy) when Dismiss is added to metsulfuron (several trade names). For example, one week after treatment, weed control was less than 5% without Dismiss, while it was almost 60% when Dismiss was added to metsulfuron. This trend was also evident two weeks after treatment where metsulfuron alone provided almost 60% control but when tank-mixed with Dismiss, 90% control was achieved.

Dismiss 4L also offers additive control to many problematic weeds in turf, including many broadleaves, grasses and sedges/kyllingas. Adding 2 to 6 oz/acre as a spray tank additive provides quicker herbicide activity as previously discussed, but also “heats up” the tank-mixtures in terms of wider and more complete weed control. This is especially true for tough-to-control weeds such as perennial broadleaf weeds, grasses such as goosegrass and many sedges and kyllingas. For example, when controlling goosegrass (Figure 2), adding Dismiss to either Acclaim Extra (fenoxaprop-p-ethyl) or Revolver (foramsulfuron) again hastened control and also helped provide better long-term results. When tank-mixed with Dismiss, Revolver provided better goosegrass control after 13 weeks than without it (Figure 2). With Acclaim, adding Dismiss provided quicker and better short- and long-term goosegrass control. Figure 3 demonstrates quicker and longer term purple nutsedge control when Dismiss was tank-mixed with Certainty (sulfosulfuron).

So, if you are looking for a spray addition to “heat things up,” Dismiss often not only provides a wider spectrum of weed control, but is also less temperature dependent than other products. Mixtures with Dismiss often work much quicker, providing an increased sense of security that the applicator is indeed treating the problem and dismissing the idea that only water has been applied.

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