



Super Science

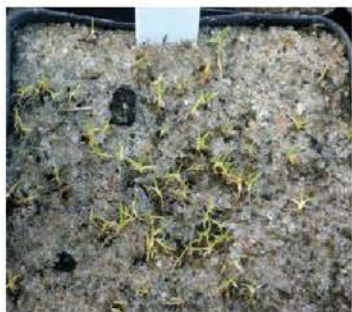
// HERBICIDE RESISTANCE

CONTROLLING DINITROANILINE RESISTANT GOOSEGRASS IN TURF

Patrick McCullough, Ph.D.

Prodimine is a dinitroaniline (DNA) herbicide that is widely used in turfgrass management for preemergence weed control. However, overuse of prodimine has increased the spread and establishment of weeds resistant to DNA herbicides. Goosegrass is a particularly problematic weed that has developed resistance to prodimine 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 prodimine 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, prodimine rates required for 50% control of DNA-resistant goosegrass was >32x greater than susceptible biotypes.



Initial germination of DNA-resistant and susceptible goosegrass biotypes following an application of Barricade (prodimine) at 1.5 lbs. a.i./acre in a greenhouse experiment at the University of Georgia.

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.

Patrick McCullough, Ph.D., is a turfgrass weed specialist at the University of Georgia and Diego Gómez de Barreda, Ph.D., is an associate professor at the Polytechnic University of Valencia, Spain; and Jialin Yu is a graduate assistant at the University of Georgia. Patrick McCullough can be reached at pmccull@uga.edu for more information.

NEWS UPDATES

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.

“**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)

// SPRAY MIX

Heat up the tank

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

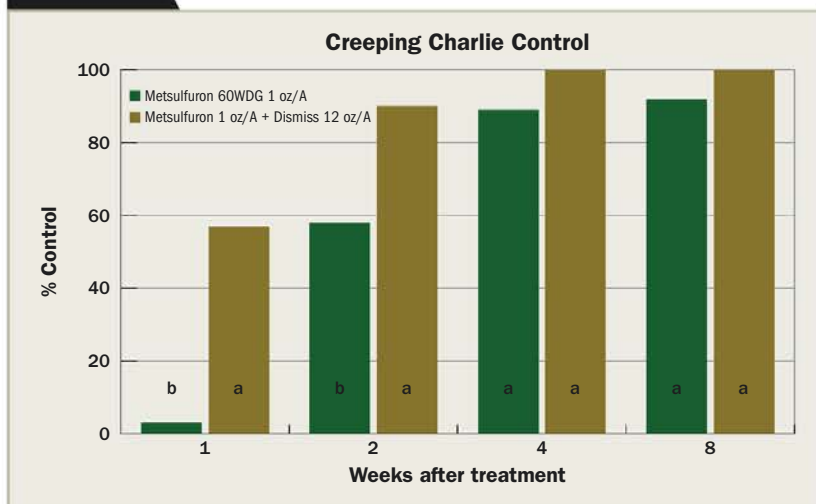
By Bert McCarty, Ph.D.

As 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 postemergence 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

FIGURE 1



Creeping Charlie (also known as ground ivy) control is hastened when Dismiss 4L (12 oz/acre) is added to metsulfuron (1 oz/acre). Dissimilar letters at a particular rating date indicate statistical difference at the 0.05 level of probability as determined by Fisher's protected LSD.

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.

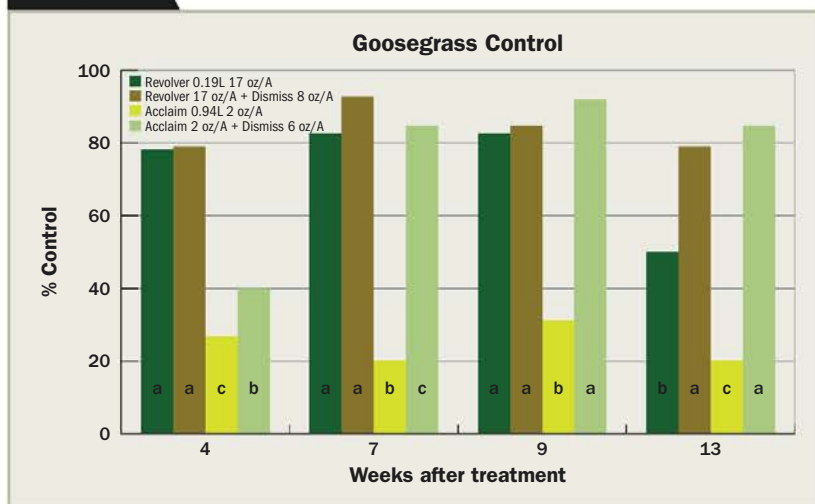
Since its introduction to the turfgrass market, Dismiss has carved out a niche, especially for postemergence yellow nutsedge and kyllinga control. However, from my research and experiences, it can be added to just about any postemergence weed control application. Some reasons for adding Dismiss would 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?

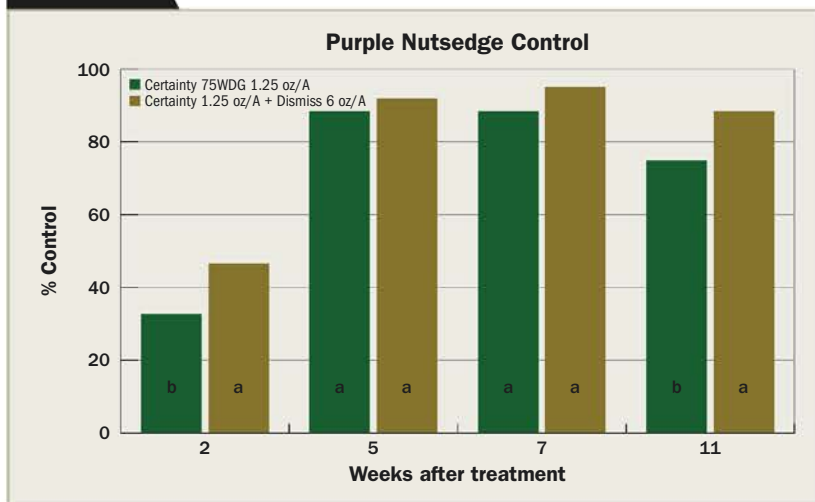
Though numerous wonderful herbicides exist in the turfgrass market, many of these are slow acting. Some herbicides may take two to four weeks to show activity, as these often disrupt normal food production/accumulation in

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/kyllingras. 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 kyllingras. 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).

FIGURE 2

Adding Dismiss to postemergence grass control products helps accelerate control and better extended control compared to not adding it. Shown are Acclaim Extra 0.94L at 2 oz/acre and Revolver 0.19L at 17 oz/acre with and without Dismiss 4L at 8 oz/acre for quicker and better long-term goosegrass control. Dissimilar letters at a particular rating date indicate statistical difference at the 0.05 level of probability as determined by Fisher's protected LSD.

FIGURE 3

Purple nutsedge control is hastened and longer-lasting when Dismiss 4L is added at 6 oz/acre to Certainty 75WDG at 1.25 oz/acre. Dissimilar letters at a particular rating date indicate statistical difference at the 0.05 level of probability as determined by Fisher's protected LSD.

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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