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C R A B G R A S S C O N T R O L

Postemergent Treatments for Crabgrass Vary in Effectiveness

By Dr. John R. Street and Pam J. Sherratt

Postemergent crabgrass (*Digitaria* spp.) control has been primarily limited to organic arsenicals (MSMA, DSMA) in the past. The organic arsenicals usually required repeat applications for effective postemergent crabgrass control, were most efficacious on younger seedling crabgrass and caused some discoloration and phytotoxicity to desirable turfgrasses, especially in hot weather.

Acclaim (fenoxypop ethyl) and Acclaim Extra have shown good-to-excellent efficacy for postemergent crabgrass control, but some discoloration and stunting of Kentucky bluegrass may occur, and efficacy drops off under drought conditions.

Dimension (dithiopyr) also provides early postemergent crabgrass control with the additional benefit of pre-emergent residual activity. A new postemergent herbicide, Drive (quinclorac), was released into the market in 1999.

Over the last several years, The Ohio State University has conducted numerous research trials to assess the performance of Acclaim, Acclaim Extra, Dimension and Drive for pre-emergent and postemergent crabgrass control. This article will briefly highlight results and recommend herbicide use from those studies.

Acclaim/Acclaim Extra in previous Ohio State research has exhibited good efficacy for postemergent crabgrass control. Acclaim efficacy on crabgrass has been good to excellent up to the intermediate stage where soil moisture was adequate and crabgrass was not under stress. Efficacy has been found to drop off dramatically under drought conditions, sometimes causing erratic and variable results in the field. Acclaim efficacy also is significantly reduced when used in combination with phenoxy herbicides like 2 and 4-D. Acclaim is absorbed through the leaves, so adequate foliar coverage is essential for best results (Table 1).

Maximum efficacy from Acclaim requires:

- Mowing prior to treatment to open the canopy for maximum contact of liquid spray with crabgrass foliage; and
- Spraying with sufficient water to assure good foliar coverage.

Irrigation or rainfall shortly after an herbicide application will reduce the efficacy significantly. Some stunting and discoloration of Kentucky bluegrass may occur, especially in the early season when bluegrass is rapidly growing. Our research has observed stunting and discoloration after most applications during the season.

In most cases, the discoloration amounts to a lightening of the blue-green or dark-green color of Kentucky bluegrass. Bentgrass can be severely discolored by Acclaim applications. Light, multiple applications are recommended for bentgrass. Iron and/or nitrogen will help mask the discoloration without any negative effect on the efficacy of the herbicide.

The recommended rate range for Acclaim is .12 to .25 pounds active ingredient/acre (ai/A), with the higher rate targeted for more mature crabgrass. The rate of Acclaim's kill in our research is described as moderate, with crabgrass kill typically

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TABLE 1

Efficacy of Herbicides Applied for Early Postemergence for Crabgrass (*Digitaria*) Control

Herbicide	Formulation	Rate (lbs. ai/A)	Not Watered In					Watered In			
			7/25	8/3	8/8	8/20	9/5	8/3	8/8	8/20	9/5
Dimension	2 EC	.25	50	40	26.7	18.3	16.7	60	60	40	28.3
Dimension	2EC	.38	50	40	20	6.7	5	63.3	60	28.3	15
Dimension	2EC	.50	50	40	16.7	33.3	3	63.3	60	28.3	6.7
Dimension	0.164 FG	.25	53.3	43.3	33.3	30.3	33.3	63.3	63.3	21.7	18.3
Dimension	0.164 FG	.38	53.3	40	21.7	13.3	13.3	60	50	13.3	10
Dimension	0.164 FG	.50	53.3	40	13.3	5	2.3	56.7	46.7	5	1.3
Acclaim Extra	0.57 EW	.06	53.3	33.3	13.3	10	3	50	40	20	20
Acclaim Extra	0.57 EW	.09	53.3	40	6.7	0	0	50	46.7	8.3	8.3
Drive	75 DF	.25	50	4	0	5	10	41.7	31.7	31.7	36.7
Drive	75 DF	.50	50	0	0	0	10	46.7	40	26.7	28.3
Drive	75 DF	.75	50	0	0	0	10	40	30	26.7	25
Daconate	6 F	2	53.3	36.7	23.3	16.7	20	60	60	50	50
Untreated	—	—	53.3	63.3	66.7	68.3	73.3	60	66.7	68.3	73.3
LSD (0.05)	—	—	5.99	7.34	6.57	4.61	4.63	8.31	10.8	7.16	4.79

occurring in two to three weeks.

Crabgrass initially turns orange or purple in three to five days after an Acclaim application. This coloration response normally lasts for about seven to 10 days. Browning and necrosis occur over two to three weeks.

The new isomer formulation of Acclaim is Acclaim Extra (fenoxprop p-ethyl). It has provided good-to-excellent control of crabgrass with postemergent rates of .06 to .125 pounds ai/A. There has been essentially no noticeable difference in the efficacy, rate of activity or phytotoxicity between Acclaim and Acclaim Extra.

Dimension (dithiopyr) is unique in that it exhibits both pre-emergent and postemergent herbicide activity on crabgrass. Dimension, therefore, provides a wider window for application of a pre-emergent herbicide in the spring.

Postemergent activity of Dimension is slow, with a total kill typically ranging from three to five weeks. It does, however, stunt crabgrass in 10 to 14 days, making its presence in the turfgrass canopy less noticeable.

The stunted crabgrass is initially hidden in the canopy, and then eventually dies over a period of three to five weeks.

During the stunting phase, crabgrass initially turns yellow, then purple, followed finally by necrosis. We call this response the "hidden canopy effect."

Our research supports the claims that Dimension is most efficacious as an early postemergent herbicide. It certainly is not effective on well-tillered crabgrass. The Dimension rate for postemergent crabgrass treatment is .25 to .5 pounds ai/A, with the higher rate necessary for mature crabgrass. A surfactant is recommended for liquid (EC) post applications (Table 1).

Some research has observed a more rapid rate of activity on early tillered crabgrass when combined with MSMA/DSMA (see label for recommendation).

The principal uptake mechanism for pre-emergent activity of Dimension is root absorption. We initiated research to determine if irrigation shortly after a Dimension application to move the herbicide to the



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TABLE 2**Postemergence Herbicide Efficacy Activity Ranking**

Herbicide	Activity Mode	Common Name	Relative Activity Rate	Specific Activity Rate
Dimension	Pre/Post	Dithiopyr	Slow	3 to 5 weeks
Acclaim	Post	Fenoxypop p-ethyl	Moderate	2 to 3 weeks
Acclaim Extra	Post	Fenoxypop p-ethyl	Moderate	2 to 3 weeks
Drive	Post	Quinclorac	Rapid	7 to 10 days

soil/root zone might improve either the overall efficacy and/or rate of activity of post applications (Table 1).

Irrigation did not appear to have any significantly positive or negative effect on the overall activity or efficacy of Dimension postemergent control. In general, the EC, G, and FG formulations in our research have not shown any significant differences in postemergent herbicide efficacy except for a slightly more rapid rate of initial crabgrass stunting and kill with the liquid Dimension EC formulation.

Beyond the intermediate crabgrass stage, Dimension may cause some discoloration and slight stunting of crabgrass, but acceptable control should not be expected. Dimension, therefore, is certainly a great tool that widens the window for pre-emergent herbicide applications where the target date for crabgrass germination has been missed. Crabgrass control can be reliably handled through early postemergent treatments, with pre-emergent activity the remainder of the season.

Drive (quinclorac) is the most recent addition to the postemergent herbicide arsenal. Drive has been a good-to-excellent post crabgrass herbicide. The recommended label rate of Drive is .75 pounds ai/A. OSU research has shown that young crabgrass can usually be controlled with rates of .25 to .50 pounds ai/A (Table 1).

Most consistent and reliable results will occur at the .75 pounds ai/A rate where Drive is being applied postemergently under a range of environmental and landscape site conditions, and where crabgrass may be in various maturity stages. Drive efficacy does not appear to be as sensitive to soil moisture as Acclaim or Acclaim Extra.

However, the label recommends applying Drive when soils are moist. Drive can be applied in combination with broadleaf herbicides. Drive also exhibits some broadleaf herbicide activity, especially on legumes like black medic and clover.

Drive's rate of kill is rapid, with crabgrass kill usually occurring within one to two weeks after an herbicide application. Young crabgrass may turn brown and die in less than one week. Drive activity is obviously more rapid than Dimension or Acclaim (Table 2). Research showed that Drive provided excellent early postemergent crabgrass control and good-to-excellent late postemergent control.

Drive efficacy was somewhat variable at the intermediate crabgrass maturity stage. There are other research trials and field observations to suggest that Drive efficacy at the intermediate crabgrass maturity stage may be somewhat weaker and/or variable.

The authors suggest avoiding or delaying Drive applications on intermediate crabgrass to a later maturity stage. This approach should work effectively because Drive appears to be more efficacious on more mature crabgrass than on intermediate maturity crabgrass.

Drive is considered in the agricultural literature to have both foliar and root activity and is used in some crops as a pre-emergent herbicide. It has not performed well as a pre-emergent herbicide in turf due to perhaps soil biomass interactions not encountered in agricultural systems. In fact, our research indicates Drive is predominantly a foliar herbicide in turfgrass. Several research results that support its foliar activity include:

- Irrigation applied shortly after Drive applications significantly reduced efficacy.

- The addition of surfactants has significantly improved efficacy. Some surfactants enhance Drive's efficacy more than others do.
- Watered-in applications of Drive in OSU research have resulted in poorer efficacy than applications that were not watered in.
- A period with no rain of six to 12 hours was necessary to ensure acceptable control (Table 1).

Drive efficacy does not appear to be as sensitive to soil moisture as Acclaim or Acclaim Extra.

However, the label recommends applying Drive when soils are moist.

Therefore, Drive herbicide should be used as an herbicide that's absorbed through the leaves. Here are application techniques to insure maximum absorption:

- Apply when crabgrass is actively growing.
- Apply when soil moisture is adequate.
- Provide adequate spray contact/spray coverage using an appropriate water volume.
- Mow high grass before application to ensure the herbicide contacts the leaf surface.
- Use a surfactant. Best choices are methylated seed oil or crop oil concentrates.
- Avoid irrigation or rainfall within at least six to 12 hours after application (most labels call for 24 hours).

In tolerance studies, Kentucky bluegrass, tall fescue, and perennial ryegrass exhibited good-to-excellent tolerance to Drive. Finer grasses are less tolerant of Drive. Creeping bentgrass is sensitive to Drive herbicide with discoloration (primarily yellowing) occurring at rates of .5 to .75 pounds ai/A. Higher rates will not only discolor bentgrass but cause thinning.

Lower-cut crabgrass appears more sensitive to Drive, resulting in acceptable control at lower rates. Superintendents using Drive at half-rate or less can reduce discoloration and still get acceptable control. Sprayers must be operated carefully to eliminate overlap rates, and at constant speeds to ensure a proper application.

It is suggested that Drive not exceed one-half the recommended rate on creeping bentgrass.

Table 2 provides a ranking of relative activity and specific activity rate of four postemergent crabgrass herbicides based on six years of OSU research.

Drive and Acclaim Extra have no reliable pre-emergent activity. Where early post-emergent applications (i.e. early summer) are made with these latter herbicides, pre-emergent herbicides may also need to be applied to provide a pre-chemical barrier for the remainder of the season.

Drive and Acclaim Extra can be mixed with other pre-emergent herbicides or granular pre-emergent applications can be made separately. Remember, Dimension has both early post- and pre-activity. Drive can be mixed with phenoxy herbicides, but Acclaim Extra cannot.

In seedings, Drive herbicide can be used for postemergent crabgrass control with Kentucky bluegrass, perennial ryegrass, and tall fescue at 30 days after emergence or beyond. Fine fescues are more sensitive to injury than other cool-season grasses.

Drive will effectively control or severely stunt mature crabgrass, favoring the competitive edge of the desirable grass. Drive also provides some control or suppression of a variety of broadleaf weeds. It is more efficacious and safer than other postemergent annual grass options. For example, Acclaim will stunt and can severely injure young seedlings of cool-season grasses. Drive can be an interesting new tool for annual grassy weed control in spring and summer seedings.

Remember, annual grassy weed competition tends to be a major reason why spring and summer seedings of cool-season grasses fail.

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