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The best thing about Acclaim is that you can use it anytime you have a problem with emerged crabgrass. Acclaim is effective as a rescue or as part of your early crabgrass control program. Either way, Acclaim gives you more confidence in controlling crabgrass than you've ever had before. Read and follow label directions.



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emergence herbicides include early weed control and control of certain weed species not susceptible to post-emergence herbicides.

Pre-emergence turfgrass herbicides have limitations: they usually have little or no post-emergence activity; they do not control established perennial weed species; their residues from applications to control winter annual grass weeds in dormant Bermudagrass turf may be phytotoxic to overseeded cool-season turfgrass species; they must be leached downward in the soil to the weed seed germination zone, usually within the upper one-half inch soil layer. Sometimes, pre-emergence herbicides are lost in the turf thatch and unavailable for weed control.

Examples of pre-emergence herbicides include benefin, bensulide, DCPA, ethofumesate, napropamide, oxadiazon, oryzalin, pendimethalin, prodiamine, siduron and trifluralin.

Post-emergence herbicides are applied directly to the aboveground shoot of actively growing weeds, with the leaves the primary target. During application, post-emergence herbicides are also, unavoidably, applied to the turfgrass foliage, except when applied over dormant warm-season species such as Bermudagrass. Thus to avoid turfgrass injury, the turfgrass itself must be tolerant to the applied herbicide.

Examples of post-emergence herbicides include bentazon, bromoxynil, dicamba, DSMA, fenoxapropethyl, MSMA, paraquat and the phenoxy herbicides 2,4-D, dichlorprop, MCPA and mecoprop.

Contact or systemic?

Post-emergence herbicides are either contact or systemic. Contact herbicides are those that undergo little or no translocation in plants. They are most effective in the control of seedling weeds (broadleaf and/or grass) less than two inches tall.

Advantages of contact herbicides are their relatively quick kill (within hours to a few days), less damage to desired plants in the event of slight spray drift onto these plants during application and no persistent herbicidal soil residues. Characteristics that may be considered disadvantages are the lack of soil persistence (thus, failure to control later emerging weeds) and, since they do not translocate in plants, poor control of established perennial weeds and large established annuals.

Examples of contact turfgrass herbicides are bentazon, bromoxynil and paraquat (for dormant

Bermudagrass).

Systemic herbicides translocate (move) within plants from their sites of absorption to their sites of phytotoxicity. Foliar-applied systemic herbicides are transported from the leaves, along with the sugars manufactured during photosynthesis, to other parts of the shoot and to underground plant parts.

The principal advantage of systemic herbicides is that they will move within plants to their sites of phytotoxicity. Thus, complete coverage of the targeted weeds is not as important with systemic herbicides as it is with contact herbicides. Systemic herbicides are used to control seedling and established annual and perennial weeds.

A disadvantage of systemic herbicides is that care must be taken during application to avoid contact of the herbicides with susceptible desired plants, as they will also translocate within these plants from sites of contact and absorption to sites of phytotoxicity. A soil-applied systemic herbicide may be root absorbed and transported upward into the shoot. This can pose a problem when a selective post-emergence systemic herbicide is leached into the soil and subsequently root absorbed and transported to sites of phytotoxicity in aboveground parts of susceptible desired plants. Problems have arisen in this manner following applications of 2,4-D and dicamba.

Examples of systemic turfgrass herbicides are dicamba, DSMA, glyphosate, MSMA and the phenoxy herbicides 2,4-D, dichlorprop, MCPA and mecoprop.

Volatility

From a practical viewpoint, turfgrass herbicides are non-volatile, with a few exceptions.

Ester forms of 2,4-D are volatile, and their vapors pose a potential hazard to nearby susceptible ornamentals. The high volatile esters (methyl, ethyl, propyl, isopropyl and butyl) of 2,4-D volatilize at temperatures above 65° F. and, to avoid injury to desired plants via vapor drift, they should not be used in turfgrass.

The low volatile esters (butoxyethyl, isooctyl and others) of 2,4-D volatilize at temperatures above 95° F.. Their vapors pose a hazard to susceptible ornamentals and this hazard should be considered prior to their use in turf areas.

A few pre-emergence herbicides volatilize, but their vapors rarely have post-emergence activity, and they pose little or no threat to established ornamentals. However, unless

leached into the soil soon after application by rainfall or irrigation, such herbicides may be lost from soil and turf surfaces, with a corresponding loss in weed control.

Formulations

Herbicides are sold to the consumer as formulated products. Thus, the product in the paper, plastic or glass container is a formulation, with the herbicide as its active ingredient.

Turfgrass herbicide formulations are of two basic types: (1) granules or pellets that are applied directly (not mixed with water) to the turf, and (2) those designed to be pre-mixed (diluted) with water and applied in aqueous sprays.

Granular or pelleted formulations contain pre-emergence herbicides; they are not intended for foliar absorption. Pre-emergence herbicides are also formulated to be applied in aqueous sprays. All post-emergence turfgrass herbicides are formulated to be pre-mixed with water and applied in aqueous sprays.

Water-diluted formulations include emulsifiable concentrates, wettable powders, liquid and dry flowables, and those that contain water-soluble herbicides, such as DSMA, MSMA, glyphosate and salt forms of the phenoxy herbicides.

Water

Rainfall and irrigation can influence the effectiveness of turfgrass herbicides. Water encourages weed seed germination and seedling emergence. Water enhances the activity of pre-emergence herbicides, moving the herbicides into the zone of weed seed germination and seedling emergence.

In general, weed control is enhanced by one-half inch of rainfall or irrigation following soon after application of pre-emergence herbicides. Too much water may leach the herbicides too deeply in the soil, resulting in poor weed control.

Foliar-applied herbicides are often so quickly absorbed that they are not adversely affected by rainfall occurring 30 minutes or so after application. A few foliar-applied herbicides, especially water-soluble ones, may be partially washed from foliage by rainfall occurring soon after application, resulting in reduced phytotoxicity. **LM**

W. Powell Anderson has been a faculty member in the Department of Agronomy at New Mexico State University for 25 years. He is now retired, but still teaches two weed science courses with the academic title of Associate Professor Emeritus. Anderson is author of the textbook "Weed Science: Principles."

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108	122	136	150	164	178	192	206	220	234	248	262	276	290	304	318	332
109	123	137	151	165	179	193	207	221	235	249	263	277	291	305	319	333
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111	125	139	153	167	181	195	209	223	237	251	265	279	293	307	321	335
112	126	140	154	168	182	196	210	224	238	252	266	280	294	308	322	336
113	127	141	155	169	183	197	211	225	239	253	267	281	295	309	323	337
114	128	142	156	170	184	198	212	226	240	254	268	282	296	310	324	338

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MANAGEMENT CALENDAR: COOL-SEASON ATHLETIC FIELDS



Quality turf can make athletic fields safer for young athletes. Field managers should follow this general guide for safer turf.

by J. R. Hall III, Ph.D., Virginia Tech

Frequent evaluation of current athletic field management programs is important. Setting up annual management calendars helps increase administrative decision-making and personnel management decision-making efficiency.

Calendars let the professional plan ahead for equipment and material purchasing needs, as well as program seasonal labor needs. A generalized management scheme has been outlined for Kentucky bluegrass and tall fescue athletic fields to provide a basic outline for this planning process.

Specific dates, intensity and frequency of practices will vary with geographic location, traffic demands and facility resources.

January-February

The first step toward safer athletic turf is to begin the year with a soil test. Do this as soon as the ground is not frozen. Collect soil samples from the field from a zero to three-inch depth. Combine 20 to 30 core samples in a bucket to make up a single sample for each field.

The next step is to fill low spots. Surface drainage will improve by filling low spots or regrading fields with good topsoil. Let the soil settle for two to three weeks prior to repair. This will allow time for a few soaking rain-

falls to aggregate the new soil. Install internal drainage where needed.

Finally, plan ahead for the months to come. Do this by observing the field for winter disease activity and winter annual weed invasion. Determine the need for renovation and order seed, sod, fertilizer and pesticides. Line up equipment and personnel needed for the year.

March-April

Mowing will become necessary in

Keep the mowers sharp, since dull mowers injure turf, increasing water use and wasting stored food reserves.

these spring months. Begin mowing as soon as turf height exceeds the mowing height by one third. For instance, if your mowing height is two inches, begin mowing at 2 ²/₃ inches. Always use sharp mowers.

Aerify the field using a core aerifier. Make at least two passes to alleviate compaction. Use the ³/₄-inch diameter tines. Break up cores with chain link fence or chain drag. Time

the aeration during a period of rapid foliage growth to minimize weed invasion and to minimize the time the field shows aeration damage.

The next move is to apply pre-emergence herbicides. If crabgrass has been a problem in the past, use a pre-emergence herbicide such as benefin, bensulide, dacthal, napropamide, oxadiazon, pendimethalin or siduron. If goosegrass has been a serious problem, consider using oxadiazon. If early season seeding and crabgrass control are going to be necessary, use siduron.

May

Aerification is still important in late spring. Heavily-trafficked fields may benefit from light aerification in this time frame while the grass has healing potential.

Next, identify the weed and select the most effective herbicide for control. Consider the following alone or in combination: 2,4-D, MCPP (mecoprop), 2,4-DP (dichlorprop), dicamba or triclopyr. Follow label directions closely.

Fertilizing should be done lightly. Apply the equivalent of 0.5 lb. soluble nitrogen per 1000 sq. ft. (22 lb. nitrogen per acre). This can come from various sources of nitrogen. Irrigation after application is generally beneficial.

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June-August

Heavily-trafficked fields should be lightly aerified again in early June. Make two passes with $\frac{3}{4}$ -inch diameter tines. Drag the cores into the surface with a chain link fence or chain drag.

Schedule mowing regularly so no more than one-third of the existing grass blade is being removed with each mowing. Keep the mowers sharp, since dull mowers injure turf, increasing water use and wasting stored food reserves.

Irrigate the field as necessary. Water infrequently, but heavily when you do. Early morning irrigation (4 a.m. to 10 a.m.) is the most effective and beneficial. Time irrigation to avoid traffic on wet fields, if possible. In the summer it's important to watch for disease, particularly on tall fescue and perennial ryegrass fields. Rhizoctonia brown patch is the most prevalent and is effectively controlled with Bayleton 25WP, Chipco 26019, Daconil 2787 or Dyrene. Follow label

directions closely.

In late August, it's important to spot-seed or sod-patch thin areas. Light surface disruption with a three-pronged rake is desirable prior to establishment. Lightly foot-trample the seeded or sodded areas to assure seed and sod to soil contact.

September

Fertilize according to the soil sample recommendations. If phosphorus (P) and potassium (K) levels are high, use straight nitrogen. Apply the equivalent of 1.0 lb. of nitrogen per 1000 sq. ft. (40 to 50 lb. soluble nitrogen per acre). If P and K are not in the high soil test range, use a complete fertilizer following soil test recommendations.

Aerate the field lightly in early September using the $\frac{3}{4}$ -inch coring tines. Drag the cores into the turf.

At this time, consider repair needs. Overseeding of damaged areas can still be beneficial. Spot-sodding using tightly-butted, thick-cut sod is quickly playable.

October

Fertilize by following the September procedure.

Consider the need for broadleaf weed control. Winter annuals germinate in the fall and are most effectively controlled in this time frame. If herbicides are necessary, apply them in strict accordance with the label instructions.

November-December

In November, fertilize following the September procedure. In December, consider the repair needs.

After the last game, evaluate the damage to the field and decide on the reasonable methods of repair. If sodding is a possibility, it is best done with cool-season grasses at this time to allow maximum rooting. **LM**

Mention of specific products in this sample program does not imply exclusive endorsement of any one product. It was done to simplify the program for educational purposes.

COOL-SEASON ATHLETIC FIELD MANAGEMENT



	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
AERATE			Use coring aerifer. Make at least two passes.		Light aerification.	Light aerification in early June.			Aerate lightly			
DISEASE CONTROL						Watch for disease and treat as necessary.						
FERTILIZE					Fertilize lightly.				Fertilize: follow soil test recommendations.	Follow Sept. procedure	Follow Sept. procedure	
IRRIGATE						As needed. Infrequently, but heavy when you do.						
MOW			Begin mowing as soon as turf height exceeds mowing height by 1/3rd			Regularly.						
REPAIR	Fill in low spots to improve surface drainage.								Consider repair needs.			Consider repair needs.
RENOVATE	Determine need for renovation and order seed, sod, fertilizer pesticides.											
SEED/SOD						Spot seed or sod in late August.						
SOIL	Test soil as soon as the ground is not frozen.											
WEED CONTROL			Apply pre-emergence herbicides.		Control broadleaf weeds.					Consider broadleaf weed control.		

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On Design

THE ULTIMATE

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by Helde Aungst, managing editor

The course may have a strange name—Teeth of the Dog—but it's a classic in the world of golf. Teeth of the Dog is the only complete holes on an ocean. Built in 1970, the Pete Dye creation is the highlight of the Casa de Compo Resort in the Dominican Republic. "Golf" magazine rated it 29th in the world," Dye says. "It's one of the first courses built since 1960 to crack into that group." Other courses making the list include old-time clubs like Pine Valley.

Golfers enjoy a panoramic view of the Caribbean while playing at the Teeth of the Dog. The No. 7 hole on the South green, pictured here, is only four feet above sea level. A crew of 24 cares for the course year-round. The crew mows the 6500-square-foot Tidwarf Bermudagrass South green daily at $\frac{1}{8}$ of an inch. "Because of the proximity to the sea, management has to be continuous," Dye explains. "They syringe twice a day to keep the salt content down. Because of the syringing practices, the greens are fertilized every week to 10 days with a high sulfate fertilizer because of the salt intrusion."

The crew aerates the greens up to four times during the summer "off-season." Off-season play consists of about 80 rounds of golf. That number skyrockets to about 180 during the winter. The low humidity of the area keeps disease to a minimum.

The young course is already packed with history. In 1974, the Teeth of the Dog hosted the prestigious World Amateur Team Championships, with 40 participating countries. In 1978, Hurricane David damaged the No. 7 hole, closing it down. But after minor repairs, it opened three weeks later, matching the original design.

Dye says he has no plans to alter the design in the future. "I've always had a keen feeling about this course...a love affair," Dye says. "You'll never be able to have seven holes on the sea anywhere else."

