

# Effective Turfgrass Weed Control

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Advancing technology has touched all fields of endeavor. The science of turfgrass management is no exception.

One obvious example is in the area of weed control. The increasing number of herbicides now available to turfgrass managers has resulted in their unconscious addition of one word to the topic of weed control. That one word is "chemical."

In some respects this can be viewed as an unfortunate development, based on the fact that many people use chemicals as a panacea for weed problems. They fail to place herbicides in their proper perspective.

Herbicides are just one of the many useful tools that can be incorporated into an overall management program based on the application of sound agronomic practices designed to pro-

vide the best possible conditions for growing turfgrasses. With these thoughts serving as a guideline, a review of today's weed problems and some of the more useful herbicides is in order.

If documented proof of the importance of weed control problems were needed, the 1966 Pennsylvania Turfgrass Survey has provided more than enough. A review of the weed related sections in that report shows that weeds are the No. 1 turfgrass problem when all turfgrass areas (home lawns, parks, cemeteries, golf courses, etc.) are combined. Weeds rank as the second most troublesome problem on golf courses, the most intensively maintained turfgrass areas. Narrowing the field of possible weed pests down, the survey reports that golf course superinten-

*30 lbs. ai/A of bensulide — 6 ft. wide darker green strip across 16 strains of bentgrass — color difference due to absence of Poa.*





Closeup of control plot of crabgrass (left) and 9 lbs. siduron ai/A (right) treated and seeded May 27 — picture June 15.

dents ranked their weed problems as follows:

1. Poa annua	24.3%
2. Knotweed	22.1%
3. Crab grass	21.0%
4. Broadleaved Weeds	18.4%
5. Goosegrass	8.1%
6. Miscellaneous Pests	6.1%

This list provides an excellent basis for a discussion of turfgrass herbicides, since the majority of weed control research has been devoted to one or another of these species.

### CRABGRASS

This annual pest has received the greatest attention from researchers because of its widespread and continual occurrence.

Crabgrass control has evolved to the predominant use of highly selective pre-emergent chemicals. These chemicals must be of such a nature that when applied to an area they stay in place to afford maximum levels of control over an extended period of crabgrass germination. This same characteristic has also eliminated many promising chemicals from common use, because their excessive immobility in the soil has resulted in residual toxicity to some desirable turfgrass species. Additionally, the trend today is towards dry formulations of these materials. These dry products offer not only ease of application but also a generally higher level of control than their sprayable counterparts.

If crabgrass control were the only criterion for recommending a particular chemical, an almost endless list of materials could be presented. Certainly this isn't the case, and the safety of these chemicals on the various turfgrass species weighs heavily on their final selection. Not all recommended chemicals are safe on all turfgrasses but at least one material is suitable for every situation. An examination of the recommendations of the experiment stations in the Northeast would yield a combined list such as follows:

1. H-9573
2. Benefin
3. Bensulide
4. DCPA
5. Siduron

A more detailed discussion of these materials is necessary to understand their best usage potential.

H-9573 (Azak) should be limited to infrequent use on bluegrass turf. It has shown definite injury to both the fine leaved fescues and to the bentgrasses. In a continued program of crabgrass control, H-9573 has shown residual toxicity even to bluegrass. Crabgrass control in general is good to excellent. (90% or better).

Benefin (Balan) is a relatively new material on the crabgrass market and still requires more examination. Its performance to date, particularly with regards to injury, has been inconsistent. Injury to bentgrass and fescue has



occurred and a few reports of bluegrass injury have appeared. Nonetheless, crabgrass control is good to excellent and final conclusions have yet to be drawn.

Bensulide (Betasan or Presan) finds its primary use on bentgrass turf due to its high level of safety on most of these sensitive species. Control results have been good to excellent.

DCPA (Dacthal) has consistently given the best performance on bluegrass turf over a period of about ten years. It can be injurious to bentgrass and usually does cause injury to red fescue turf. In addition to its excellent control of crabgrass, DCPA is the only herbicide which shows an acceptable consistency in controlling goosegrass. Although goosegrass is not as widespread as crabgrass, it usually requires a more concentrated program to achieve satisfactory control.

Siduron (Tupersan) is a rather elite member of the crabgrass herbicide group. This chemical can be applied at the time of establishment and provide an excellent level of crabgrass control while not affecting the germination of the desirable grass species. It is equally effec-

tive on mature turf stands and is considered safe on most turfgrass species with the exception of several vegetative bentgrasses.

With safety as an overriding criterion and the average user in mind, the Pennsylvania State University now recommends three of the above materials for crabgrass control. They are as follows:

**Bensulide**

**DCPA**

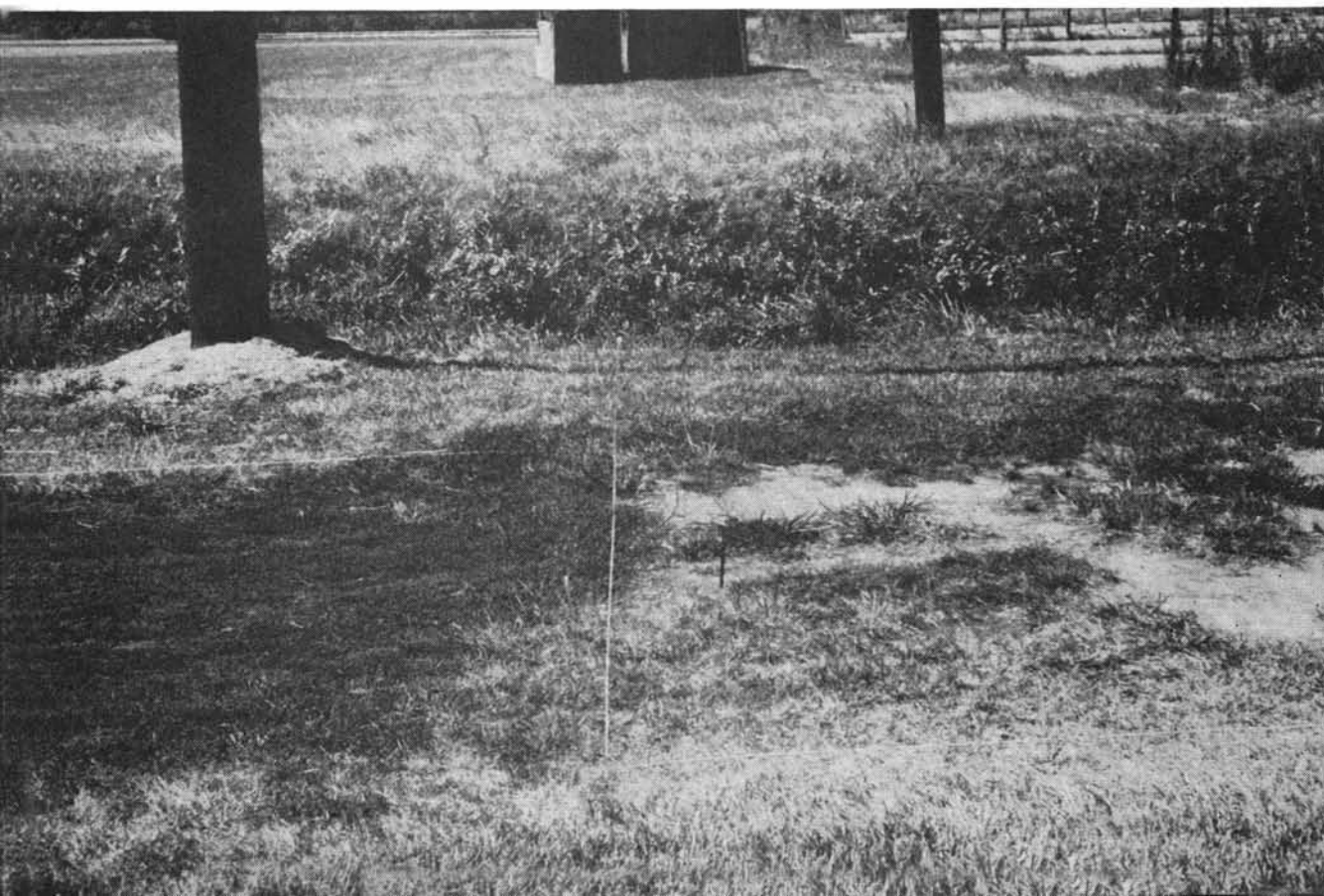
**Siduron**

#### **ANNUAL BLUEGRASS**

Annual bluegrass or *Poa annua* has long been a weed problem on highly maintained, well irrigated areas. Selective control measures have been attempted for years but little success achieved. Chemical control of *Poa annua* involves two areas of major concern, (1) injury to permanent grasses and, (2) residual toxicity as it affects subsequent reseeding operations. Two of the chemicals currently being tested for pre-emergence control of *Poa annua* are calcium arsenate and bensulide.

Calcium arsenate has been somewhat erratic in its performance. Control results have ranged

*Knotweed control with dicamba. Near solid stand of knotweed. Plot on left not treated. Plot on right treated pre-emergence spray.*



from poor to excellent with unpredictable degrees of bentgrass injury. The ever present phobia of handling arsenicals plus this inconsistency have resulted in increased effort to find other chemicals for this problem. The most promising material is bensulide. Research to date has shown that pre-emergence control levels are good to excellent while no permanent surface injury has appeared. Temporary discoloration during periods of spring moisture stress followed by differential patterns of summer wilting have been observed. These factors would suggest a possible root pruning effect, but more detailed study is needed before positive statements can be made.

Successful reseeding following herbicide application may also cause some difficulty. On areas containing a fairly uniform distribution of *Poa annua* where its density isn't excessive, reseeding shouldn't be necessary. For areas requiring reseeding, success depends on being able to place the seed in contact with the soil below the surface herbicide layer. Greatest success in this respect has been obtained using mechanical grooving equipment.

With difficulties such as these still to be solved, the annual bluegrass problem may be with us for some time to come. Nevertheless, the performance of bensulide to date offers considerable hope that it may soon be recommended for incorporation into an overall *Poa annua* control program.

### **BROADLEAF WEEDS**

This rather large grouping of weeds contains the remainder of our major weed problems. Chemical control within this group involves two stages of turfgrass maturity.

#### ***Mature Turf***

For many years, broadleaf weed control on mature turf meant 2,4-D or one of its closely related derivatives. The addition of several new herbicides to this market have eliminated many of our most troublesome broadleaf weeds as serious problems.

Dicamba provides a reliable control for mature knotweed, white clover, and many of the weeds which were formerly classified as difficult to kill with 2,4-D. Mecoprop allows treatment of the close cut bents without fear of temporary discoloration or permanent injury. Beyond its safety benefits it offers excellent control of



*Loxynil at 1/2 lb. ai/A sprayed across 4 seeded strips in early post emergence condition. Bare area was seeded to mixture of broadleaf annual weeds, shows complete control. Three grass species were able to develop into acceptable stands. Seeded August 30, treated September 17. Picture October 1.*

white clover and chickweed.

With this trio of chemicals to work with, the major emphasis in the past several years has been to develop a combination product which offers a much broadened spectrum of control. This has been achieved by combining 2,4-D and dicamba in ratios of approximately 4:1. The results from such combinations have been excellent and we can now eliminate most, if not all, of our broadleaf weed problems with a single preparation.

One important factor should be understood about 2,4-D-dicamba mixes. When these mixes are being formulated as dry materials, the 2,4-D rate of application must be adjusted accordingly. To be on a level with liquid treatments, dry 2,4-D must be applied at two to three times the rate of the normal liquid application. This factor is essential in determining the effectiveness of dry combinations of 2,4-D and dicamba.

Despite manufacture emphasis on dry materials, it remains a fact that liquid preparations of these same two chemicals offer the most effective control over the widest range of broadleaf weeds. A noteworthy aspect of such combinations is that increasing their wetting properties offers definite control advantages.

### Seedling Turf

Short of fumigation, seedbed control of broadleaf weeds has been nonexistent. With 2,4-D as the major herbicide a minimum treatment delay of six weeks was required. Even at this stage the risk of considerable stand reduction was present.

Two experimental materials, bromoxynil and ioxynil, now under test show promise for this troublesome area of weed control. Results at Pennsylvania State University show successful stands of red fescue, bluegrass, and bentgrass can be achieved following early post-emergence treatment with these two materials. As expected, red fescue and bentgrass are more susceptible to injury than bluegrass. A wide range of common seedbed weeds such as pigweed, lambs-quarter, mustard, ragweed, chickweed, and yellow rocket were effectively controlled with both herbicides.

Additional study with these materials is in progress, but results to date would indicate that either or both of these chemicals may alleviate some of our present difficulties with weed

control in seedling turf.

It should be apparent from the preceding discussion that sufficient management tools, in the form of herbicides, now exist to enable any competent turfgrass manager to control most if not all of his weed problems. The fact that weeds still remain the problem they are today points once again to the view that herbicides are considered by too many people to be cure-alls and not as one management tool in a well-conceived and well-executed management program. Professor H. Burton Musser has expressed this sentiment adequately: "Weed encroachment is the result and not the cause of poor turf."

### Generic and trade names of common turfgrass herbicides:

Generic Name	Trade Name
Benefin	Balan
Bensulide	Betasan or Presan
Bromoxynil	Brominal
Calcium arsenate	Various names
DCPA	Dacthal
Dicamba	Banvel-D
H-9573	Azak
Ioxynil	None (Experimental)
Mecoprop	MCP, Mecopex
Siduron	Tupersan
2, 4-D	Various names

*Establishment control of crabgrass with siduron — 22 days after treatment. Six strips of grass seeded the same day siduron was applied. Strip left to right — Merion, Col. Bent, Crabgrass, Kentucky Bluegrass, Red Top, Creeping Red Fescue. Crabgrass completely controlled with all treatment rates 4½ lbs. ai/A — 9 lbs. — 13½ lbs. — 18 lbs. Occasional blocks of crabgrass are control plots.*

