

Residual Control Of Annual Bluegrass With Preemergence Herbicides

By F. V. JUSKA and J. J. MURRAY*

ANNUAL BLUEGRASS *Poa annua* L., is a very serious weed which infests putting greens and other turfgrass areas. *Poa annua* is a prolific seed producer during both fall and spring. Seed is produced under low cutting heights such as those required for bent- and bermudagrass putting greens and in low density turf. A good stand of *Poa annua*, obtained in the field and seeded in the greenhouse on the same day, showed that seed does not require the after-ripening process that is necessary for the germination of many other grasses.⁵

A study was initiated in 1965 to determine the phytotoxicity to bentgrass *Agrostis palustris* varieties from preemergence herbicides. The herbicide plots were 2½ feet by 55 feet and variety subplots within herbicide treatments were 2½ feet by 5 feet. Herbicides and rates used during a five-year period are given in Table 1.

This study was continued for three years after the last application of herbicides in 1969 to determine the residual control of *Poa annua* plants following the application of herbicides.

Except for Betasan bensulide herbicide (Table 2), some injury from all preemergence herbicides was noted in August of 1965-67². Little or no injury was noted in 1968 through 1969. The greater injury from calcium arsenate was due to severe injury to C-52 (Old Orchard), and high rates applied at one time.

Griffin¹ reported that research results from Virginia Polytechnic Institute and State University showed a reduction of roots with an application of DCPA at five pounds (active ingredient) per acre and a greater

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TABLE 1. Average percent of *Poa annua* present after treatment with preemergence herbicides on eleven bentgrass varieties*.

Herbicides** and rates	Aug. 1965	July 1966	Aug. 1967	Aug. 1968	April 1972
Betasan bensulide 15 lb. ai/A	10.0	14.1	21.0	13.4	15.0
Zytron DMPA 15 lb. ai/A	12.7	17.1	31.5	21.6	30.0
Calcium arsenate 69% ai 5 lb./1,000 ft. ²	2.3	7.3	1.5	2.7	2.0
Control plot	13.2	10.9	22.5	27.0	30.0
Tupersan siduron 12 lb. ai/A	19.5	13.5	24.5	20.7	35.0
Lead arsenate 96% ai 5 lb./1,000 ft. ²	6.8	7.0	2.0	8.6	5.0
Dacthal DCPA 10 lb. ai/A	9.5	12.3	19.0	16.6	20.0
Control plot	9.1	8.8	15.0	19.3	15.0

*The bentgrass plots were aerified and topdressed with sterilized soil in the spring and fall of each year.

**Herbicides were applied in May of each year (1965 through 1969).

reduction with Betasan at 15 pounds (active ingredient) per acre.

The percentage of *Poa annua* present for each preemergence herbicide treatment was averaged for 11 bentgrass varieties (Table 1) for 1965 through 1968 and 1972. Percentage of annual bluegrass was not recorded in 1969. Poor control was obtained (Table 1) for each treatment except for calcium arsenate and lead arsenate. Sprague and Burton⁵ reported that lead arsenate applied to turf to control grubs greatly reduced, but did not elimi-

nate annual bluegrass in bentgrass turf.

Two applications of two pounds of calcium arsenate per thousand square feet, two to three weeks apart in the spring and two to three applications at the same rate in the fall, will gradually remove annual bluegrass. It was the observation of Holman Griffin, mid-Atlantic director, USGA Green Section, Charlottesville, Va., that two or three years of this treatment in the Mid-Atlantic regions does not injure
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TABLE 2. Injury of preemergence herbicides on bentgrass selections: average for 1965-1967.

Varieties	HERBICIDES AND RATES (a.i.)					
	Betasan Bensulide 15 lb./A	Zytron DMPA 15 lb./A	Tupersan Siduron 12 lb./A	Dacthal DCPA 10 lb./A	Calcium arsenate 5 lb./1,000 sq. ft.	Lead arsenate 5 lb./1,000 sq. ft.
Arlington	0	.8	.7	1.0	1.0	.17
Arlington Congressional C-52 (Old Orchard)	0	.3	.8	1.2	.3	0
Cohansey	0	.7	.17	1.8	.7	0
Collins	0	.8	1.3	1.2	.17	.3
Congressional	0	.3	.3	.8	.7	0
Metropolitan	0	1.0	.8	1.0	1.7	0
Pennlu	0	1.3	.7	1.2	1.0	.17
Penncross	0	1.2	0	1.2	.8	.3
Seaside	0	1.3	1.7	1.5	1.2	.3
Washington	0	1.3	3.3	1.7	.3	0

Scores: 0 = (no apparent injury) to 10 = (severe injury).

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POA ANNUA CONTROL

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bentgrasses or leave bare areas.

Perkins⁴ obtained good control of *Poa annua* with Betasan applied at 30 pounds (active ingredient) per acre. However, at 15 pounds active ingredient per acre this herbicide was not effective at five yearly applications. Because annual bluegrass seed does not require the after-ripening process for germination, it is likely that spring and fall applications of preemergence herbicides to coincide with germination are necessary.

Preemergence herbicides which

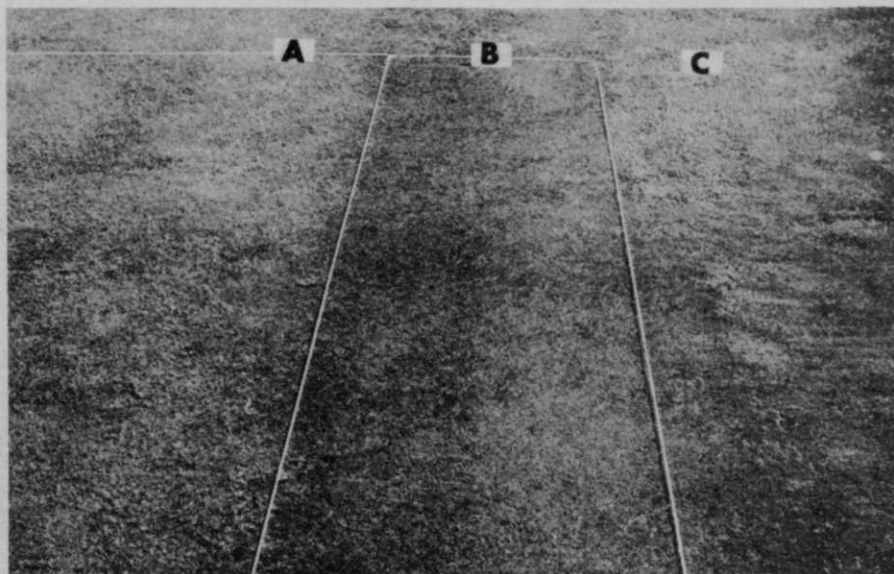
will prevent germination of *Poa annua* seed but will not kill the mature plant did not control annual bluegrass.

Younger⁶ found that *Poa annua* is not truly annual in many areas. This is especially true on putting greens where highly perennial types are segregated out by cultural practices. After application of some pre-emergence herbicides, there are problems of getting seed germination and stands of grass. However, applications of either calcium arsenate or lead arsenate³ result in germination and growth of grasses.

The last application of herbicides was made in May of 1969. Notes

taken in April of 1972 disregarding bentgrass varieties showed that only calcium arsenate and lead arsenate were effective. Only two to five percent annual bluegrass encroachment three years after the last application in 1969 was reported (Table 1). Lower percentage of *Poa annua* in the control may be the result of injury from herbicide treatments to other plots.

In greenhouse studies, Juska and Hanson³ obtained much poorer control of annual bluegrass with calcium arsenate — ten pounds per thousand square feet—when rates of phosphorus were increased. They concluded that soil phosphorus should be maintained at low levels for best results. Phosphorus levels were very high in field soil. However, excellent control of *Poa annua* was obtained with both calcium arsenate and lead arsenate because of the high buildup of arsenates. □



Absence of *Poa annua* in plot "B" three years after the final application of calcium arsenate in 1969. Plot "A" was treated with Zytron DMPA and plot "C" is the control.

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