NATIONAL COORDINATED CRABGRASS TRIALS

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The year 1951 was marked by another stride forward in the national coordinated turf program. Turf workers and manufacturers of herbicides unanimously agreed that the time was ripe to conduct national coordinated crabgrass trials. The herbicides selected for these trials were 10 per cent phenyl mercuric acetate, potassium cyanate and sodium arsenite. Igepon AP Extra Concentrate (wetting agent) was used at the rate of one pound to the acre. Each herbicide was applied in 100 gallons of water to the acre.

Crabgrass long has been considered the number one problem of those interested in better turf. Today, however, due to the extensive amount of study on chemical control measures, crabgrass has assumed a place of lesser importance. Nevertheless, in some regions it will continue to be a troublesome pest.

At the Purdue Conference in March, Dr. Fred V. Grau, Director of the USGA Green Section, and other turf leaders laid the groundwork for the national coordinated crabgrass trials. The keynote of these trials was uniformity of herbicidal application and technique. It was felt that many factors which perhaps might have been the cause of the conflicting results in the past could be brought into harmony under the uniform plan.

Materials and Methods

The national coordinated crabgrass trials included these three individual series of trials:

THE EARLY SERIES: The first herbicidal application was applied when the crabgrass seedling was in the two- to three-leaf stage. Then two additional applications, for a total of three, were applied at intervals of seven to ten days.

TABLE I

Per cent crabgrass survival, mean values, 7 locations, 3 applications:

Chemical	*Rate/Acre*	*Per cent survival after third appl.*	*Per cent survival final reading*	*Permanent injury to grass*
PMA	5 pints	11.88**	19.26**	None
KCNO	8 pounds	23.32**	48.35**	None
$NaAsO_3$	1 pound	85.85**	103.06	Slight
Check		164.73	121.61	

**Indicates significant reduction from check at 1% level

THE LATE SERIES: The first herbicidal application was applied when the seedhead emerged approximately one inch out of the boot. Two additional applications were made at intervals of seven to ten days.

TABLE II

Per cent crabgrass survival, mean values, 7 locations, 3 applications:

Chemical	*Rate/Acre*	*Per cent survival after third appl.*	*Per cent survival final reading*	*Permanent injury to grass*
PMA	5 pints	55.55**	30.25**	Slight
KCNO	8 pounds	41.96**	19.45**	Slight
$NaAsO_3$	1 pound	46.37**	27.20**	Moderate
Check		95.33	97.90	

**Indicates significant reduction from check at 1% level

THE EARLY-LATE SERIES: The first three applications were made at the same time as the early series. Three additional applications were made at the same time as the late series, thus combining the above two series.

TABLE III

Per cent crabgrass survival, mean values, 7 locations, 6 applications:

Chemical	*Rate/Acre*	*Per cent survival after sixth appl.*	*Per cent survival final reading*	*Permanent injury to grass*
PMA	5 pints	26.41**	6.85**	Slight
KCNO	8 pounds	34.26**	11.05**	Slight
$NaAsO_3$	1 pound	58.40*	45.60**	Slight
Check		88.11	89.50	

**Indicates significant reduction from check at 1% level
*Indicates significant reduction from check at 5% level

Discussion of Results

A study of the data which were analyzed and presented in Tables I, II and III clearly indicates that there is a best time and a best set of conditions for each of the herbicides tested. Combined analyses for each series indicate that PMA is the most effective on seedling crabgrass and that three applications, under most conditions this year, appear to be sufficient for lasting effect for one particular season. Six applications of PMA reduced the amount of crabgrass slightly more (as compared with three applications) but apparently not enough to warrant the expense of three additional applications. PMA in the late-series performed the least efficiently, as compared with PMA treatments in the other series. Results reported by some cooperators indicated that PMA can be used safely at the rate applied in these trials when soil moisture conditions are below optimum. The high cost of PMA formulations may continue to limit their use to small areas and to highly specialized turf, such as bent putting greens.

Applications of potassium cyanate at the rates used in these trials indicate that this herbicide is the most efficient when it is applied on mature crabgrass. In early season on crabgrass seedlings, three applications of KCNO also produced good results. However, as KCNO hydrolyzes quite rapidly, reinfestation did occur. Three applications of KCNO in early season appear beneficial despite the non-residual qualities of KCNO. At the end of the season there remained only 48 per cent crabgrass in the KCNO treated areas as compared with 121 per cent crabgrass in the check plots. Six treatments with KCNO provided more perfect control. Potassium cyanate has been and may continue to be used mainly by home owners due to the safety factors (non-toxicity to man or animal). Soil moisture appears not to be so critical a factor with KCNO as it is with sodium arsenite.

Sodium arsenite results indicate that this herbicide can be used to best advantage on mature crabgrass. Under some conditions, sodium arsenite can also be used efficiently on seedling crabgrass. Cooperators who conducted trials on bermudagrass turf reported excellent results on seedling crabgrass with sodium arsenite, KCNO and PMA. Under such conditions, the cost of application would then become the primary factor for consideration (and sodium arsenite is the most economical by far). The one-pound rate of sodium arsenite to the acre has come into rather widespread usage, mainly with the golf-course superintendent, whose eye is ever on the budget. Three applications in early season on seedling crabgrass in turf other than bermudagrass appear to be of little value.

Reinfestation of crabgrass one month after the third application was sufficient to bring the mean figure to 103 per cent. Since bermuda treated plots, which afforded nearly perfect control, were included in this average, it is safe to assume that plots of other types of permanent turf had considerably more than the 103 per cent crabgrass survival shown on Table I.

Summary and Conclusion

1. There is a best time and a best set of conditions for the use of each of the herbicides tested.

2. Under most conditions, PMA affords the best control of seedling crabgrass. On bermudagrass turf, any of the three chemicals effectively control seedling crabgrass with three applications. Residual properties appear to be of less importance in bermudagrass turf, as bermudagrass, if given a slight edge, will fight its own battle against crabgrass reinfestation.

3. PMA appears to be the safest herbicide of the three tested (at these rates) when soil moisture conditions are below optimum.

4. Where more than three herbicidal applications are made, all chemicals materially reduce the crabgrass population. Other factors, such as cost of herbicide, effect on permanent turf grasses, ease of handling and toxicity to man and animal, should be weighed carefully before a choice of a herbicide is made.

5. Potassium cyanate and sodium arsenite appear to be the most efficient on mature crabgrass.

6. Soil moisture is an extremely critical factor when considering the use of sodium arsenite.

7. Each herbicide applied at the rates used in these trials can be used effectively in thinning-out the crabgrass population. Proper management practices can then enter into the picture to help the permanent grasses to fight their own battle against crabgrass.

8. Chemical control of crabgrass should be considered in its proper perspective, as a tool which can be utilized along with good management practices on the proper types of permanent grasses to provide better and lasting turf.

Grateful acknowledgement is made to: The American Cyanamid Company, whose financial support contributed largely to the success of this program; to O. E. Linck Co., Inc., Clifton, N. J., manufacturers of phenyl mercuric acetate formulations, The American Cyanamid Co., New York, N. Y., manufacturers of potassium cyanate and The Chipman Chemical Co., Bound Brook, N. J., manufacturers of sodium arsenite, for contributing the chemicals used in these trials; to The Antara Products Division of the General Dyestuff Corp., New York, N. Y., for contributing the wetting agent; to D. D. Mason and J. Koch of the U. S. Dept. of Agriculture, Division of Biometrical Services, who supervised presentation of the statistical data; and to Spraying Systems Co., Bellwood, Ill., for contributing Tee-jet nozzles.

COMING EVENTS

June 9: Field Day, Central Plains Turf Foundation, Boys Town, Neb. L. E. Lambert and Harold W. Glissmann.

June 16: Field Day, Oklahoma Turf Association, Oklahoma A. & M. College, Stillwater, Okla. Roy A. Chessmore.

August 17-23: Sixth International Grassland Congress, State College, Pa. W. M. Myers, General Chairman, Plant Industry Station, Beltsville, Md.

August 5: Field Day, Rutgers University, New Brunswick, N. J. Ralph E. Engel. Tour starts at 1:30 P. M. from Turf Plots.

August 20-21: Field Day, University of Rhode Island, Kingston, R. I. J. A. DeFrance.

September 3-4: Pennsylvania Field Day, Pennsylvania State College, State College, Pa. H. B. Musser.

September: Field Day. Greater Cincinnati Golfers League and Cincinnati Golf Course Superintendents. (Date during week of September 22 and place to be announced).

October 22-24: Third Turf Conference, Central Plains Turf Foundation and Kansas State College, Manhattan, Kans. William F. Pickett and L. E. Lambert.

November 17-21: American Society of Agronomy Meetings, Netherland Plaza Hotel, Cincinnati, Ohio. L. G. Monthey.

December 1-3: Texas Turf Conference, Texas A. & M. College, College Station, Texas. James R. Watson.