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# CHEMICAL CRABGRASS CONTROLS IN 1952

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Constantly the technology for the improvement of turf advances as industry and experiment stations join in testing many materials offered for weedy grass control. This report is a summary of cooperative efforts in testing materials and procedures available for the chemical control of smooth crabgrass (*Digitaria ischaemum*) and hairy crabgrass (*Digitaria sanginalis*).

A published article, "National Coordinated Crabgrass Trials," by A. M. Radko and F. V. Grau in the GOLF COURSE REPORTER, 1952 Conference Issue, gave the results of the 1951 studies. In those studies definite conditions of rates, numbers of applications and frequencies were specified. In some experiments the early germinating crabgrass was controlled, only to have reinfestations which became equally undesirable. In their conclusions the authors pointed out that there was a best time and a best set of conditions for each of the herbicides tested.

In 1952 reports were received from these cooperators: Chappell, W. E., Virginia Polytechnic Institute, Blackburg, Va.; Cornman, J. F., Cornell University, Ithaca, N. Y.; Davis, R. R., Department of Agronomy, Ohio Agricultural Experiment Station, Wooster, Ohio; Finnerty, D. W., Department of Agronomy, University of Nebraska, Lincoln, Neb.; Lee, O. C., Department of Botany and Plant Pathology, Purdue University, Lafayette, Ind.; Musser, H. B., and Gallagher, J. E., Department of Agronomy, Pennsylvania State College, State College, Pa.; Quinlan, L. R., Department of Horticulture, Kansas State College, Manhattan, Kans., and Robinson, B. P., Georgia Coastal Plain Experiment Station, Tifton, Ga.

Since crabgrass germinates after the nights become warm in late spring, preemergence treatments at that time to inhibit germination in turf areas were investigated. Mr. Davis, in Ohio, began treatments (shown in Table I) on May 15. However, the most crabgrass germinated after a rain on July 3, and only in some replications was the dichloral urea treatment better than no treatment.

**TABLE I**

**Effect of pre-emergence sprays on subsequent crabgrass infestations in bluegrass turf. Average of 4 reps. by R. R. Davis, Ohio, 1952.**

| *Material* | *Rate* | *Number of Applications* | *Percent Crabgrass in Area, Sept. 29* |
|---|---|---|---|
| No Treatment | ——— | — | 28 |
| Dichloral Urea | 5 lbs./A | 3 | 16 |
| PMA | 5 pts./A | 3 | 22 |
| Chlordane Emulsion | 10 lbs./A | 1 | 23 |

Also pre-emergence treatments by Messrs. Lee and Daniel, of Purdue, using Dinitros, Chloro-IPC and an emulsion formulation of Chlordane, showed no reduction in seedling crabgrass plant counts. (However, this phase of crabgrass control is recommended for further study.)

To date the most common type of chemical crabgrass control has been the repeated use of selective sprays. Treatments started after the crabgrass had germinated well (three-leaf stage) but before it had developed competition for the bluegrass would be called early-summer control. Under those conditions, tests indicated that one should use the rates recommended on the container, or lighter, and treat weekly until every crabgrass plant is dead; otherwise new growth from surviving plants will be as obvious as before.

Tables II, III and IV show the relative cost of materials for midsummer treatments and the amount of crabgrass compared to non-treated areas. Data submitted by Mr. Davis (Table II) show that his August herbicidal spraying for crabgrass control was more effective than the July spraying. However, rainfall and favorable weather for bluegrass growth were of greater importance than the difference in the type of spraying, according to Mr. Davis.

**TABLE II**

**Results and cost of crabgrass control per 1,000 sq. ft. for three treatments 12 days apart. R. R. Davis, Ohio, 1952.**

| *Material* | *per 1,000 sq. ft. Total Used* | *Cost** | *Crabgrass in Area, September 29 First spray July 17* | *First spray Aug. 12* |
|---|---|---|---|---|
| PMA, 10% | 3 fl. oz. | .65 | 4 | 0 |
| PMA, 0.74% | 9.6 lbs. | 3.11 | 9 | 4 |
| KOCN, 91% | 8 oz. | .85 | 2 | 0 |
| $NaAsO_3$, 91% | 1 oz. | .02 | 4 | 0 |
| No Treatment | —— | —— | 36 | 47 |

* Average of 4 distributors' prices in 1952.

In Table III data are given on larger plots where a very heavy crabgrass population was treated until it was killed. Not three, but five, applications were required, which made the cost per 1,000 square feet more than that shown in Table II. However, on September 15 bluegrass recovery was 85 per cent or more of the turf on treated areas and only 30 per cent on the untreated areas. All plots were watered and fertilized adequately.

## TABLE III

**Percent of crabgrass in bluegrass turf* on August 19, 1952. Treated July 16, 21, 25, and Aug. 1, 5. W. H. Daniel, O. C. Lee, Purdue.**

| Material | Per 1,000 sq. ft. Total Used | Cost** | Per cent of Area August 19 Crabgrass | August 19 Bluegrass | September 15 Crabgrass | September 15 Bluegrass |
|---|---|---|---|---|---|---|
| PMA, 10% | .7 pt. | 1.30 | 1 | 83 | 1 | 91 |
| PMA, 0.74% | 13 lbs. | 4.29 | 6 | 79 | 2 | 85 |
| KOCN, 91% | 1 lb. | 1.70 | 1 | 57 | 1 | 86 |
| No Treatment | ----- | ---- | 91 | 6 | 61 | 30 |

* Very heavy early crabgrass growth.
** Average of 4 distributors' prices in 1952.

Data from Messrs. Finnerty, Chappell and Quinlan show close agreement with Tables II and III. Only when the interval between treatments was greater than ten days or the treatments less than three days have the chemicals listed failed to show positive results as spray applications.

## TABLE IV

**The number of crabgrass plants per sq. ft. on July 15 following treatments on June 23 and July 1 and 8 on watered bluegrass turf. L. R. Quinlan, Kansas.**

| Material | No. of Crabgrass Plants per Sq. Ft. |
|---|---|
| PMA, 10% | 6 |
| KOCN, spray | 2 |
| KOCN & MCP | 2 |
| Chlordane in Oil | 2 |
| No Treatment | 30 |

Much of the homeowner demand for crabgrass killers comes only after the plants have produced seed and are growing profusely. Then the need is to burn back the crabgrass and uncover the bluegrass so that it may have a chance for fall recovery. Five stations reported tests using Milcyanate (a 3 per cent potassium cyanate dust mixed with 97 per cent Milorganite fines). Table V shows from 20 to 100 per cent of the existing crabgrass killed by two applications made when the turf was damp. Further, very little leaftip burn on bluegrass has been observed. Since late season (after Labor Day) crabgrass competition may be reduced greatly without killing the entire plant, a complete kill on seedlings in fall treatment is not nearly so important as in early summer treatments.

## TABLE V

**Per cent of existing crabgrass killed by 3 per cent mixture of KOCN in activated sludge as fall applications.**

| Station | Lbs. of Mixture per 1,000 sq. ft. | Number of Applications and Days Interval | Percent Crabgrass Reduction |
|---|---|---|---|
| Purdue | 15 | 2—7 | 100 |
| Kansas | 10 | 3—7 | 70 |
| Georgia | 10 | 2—7 | 20 |
| " | 10 | 2—2 | 43 |
| " | 15 | 2—7 | 30 |
| " | 15 | 2—2 | 83 |
| Cornell | 10 | 3—10 | 82 |
| " | 15 | 3—10 | 78 |
| Pa. State | 10 | 3—10 | 43 |
| " " | 15 July | 3—14 | 92 |
| " " | 10 " | 3—7 | 66 |
| " " | 15 August | 3—10 | 80 |

In summary:

Selective killing of crabgrass, as shown in 1951 tests, was most efficient when chemicals were applied in liquid form as sprays.

Rates heavier than recommended caused excessive injury to desired turf grasses.

Retreatment planned for from five to seven day intervals to prevent the weakened crabgrass from recovering gave best and quickest control.

As each chemical usually acts within three days after having been sprayed, early summer applications require treatments on schedule until all crabgrass plants are dead.

KOCN appeared more adapted to use on bluegrass than on fescue or bentgrass, as less leaf burn of bluegrass was experienced.

Sodium arsenite was by far the cheapest compound tested. However, the greater turf burn and necessary safety precaution tend to limit its use to special areas (such as fairways).

The 3 per cent KOCN dust proved to be excellent for use by home owners for fall renovation and fertilization.

The use of pre-emergence applications toward a preventive program needs further investigation.

# GROUND PEARL DAMAGING SOUTHERN TURF GRASSES

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Lawn owners in the Southeast during the last two years have been puzzled over the loss of turf grasses. Irregular areas of turf often showed signs of wilting, becoming thin, turning brown and eventually dying. Visual observations by most home owners and other turf producers did not reveal the cause. The casual organism was discovered to be a soil-inhabiting insect called ground pearl, which has a peculiar feeding stage.

Even though one species (*Margarodes meridionalis Morr.*), presumably native to the United States, was described more than twenty years ago, extensive damage was not observed until the Southeast experienced two of its most severe droughts in 1951 and 1952. As the insects appear to disturb the water relations of grasses, damage was very noticeable during the last two seasons. This was true especially in infested turf areas which were not irrigated or fertilized well.

Ground pearls belong to a group of insects known as coccids. This group contains some of the most destructive plant insects known. During the last two years ground pearls belonging to two genera (*Margarodes* and *Eumargarodes*) have been reported as damaging turf grasses in the coastal area of the Southeast. Distribution of ground pearls, however, is not confined to the southeastern United States. They are found in areas throughout the temperate zone.

Although grasses are the only types of plants known to have been damaged, reports from the United States and other countries suggest that the insect has potentialities beyond that of injury to lawns or other turfed areas. It may become a serious pest on other grass crops in the temperate zone.

Differing from the life cycle of grubs, army worms and so forth in which the destructive stage is easy to control, the life cycle of the ground pearl includes a specialized, protected pre-adult feeding stage. In that stage the insect loses all means of mobility and becomes enclosed in a lustrous shell or cyst, commonly called ground pearl. A single hair-like

Cooperative investigation at Tifton, Georgia, of the Georgia Coastal Plain Experiment Station and a number of southern golf associations.