

# Southern California Turf Culture

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## THE USE OF 2,4, 5-T FOR CLOVER CONTROL IN TURF

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Many of the current turf management practices of today tend to encourage the growth of clover in turf. The close cutting, excess watering, weed removal, low nitrogen feeding, disease attacks, turf cultivation, crabgrass control and compaction all may indirectly favor clover infestations. Under lawn conditions, particularly with bluegrass, it is hardly possible to fertilize heavily enough with nitrogen to prevent clover infestation.

Considerable success in clover control has been obtained by using one to three pounds per acre of sodium arsenite as a weekly spray to repeatedly defoliate and weaken the clover, particularly as winter approaches. By the same treatment, chickweed and *Poa annua* may be greatly reduced. Research by Nutter and Cornman of Cornell University showed good results with Endothal, a product now on the market. Both Endothal and the sodium arsenite give temporary leaf burning to the turf.

In 1951, several turf superintendents in the Chicago area began using a mixture of 2,4,5-T (2,4,5 Trichlorophenylacetic acid) and 2,4-D (2,4 Dichlorophenylacetic acid) for clover control. This report is a summary of various tests conducted at Purdue University using 2,4,5-T for clover control. Fairway plots, located on the Purdue Golf Course, sprayed with 2,4,5-T in June, 1951, at the same time as various rates of Endothal were used, have shown definitely lesser clover percentages than those treated with Endothal during the following year. Where one pound of 2,4,5-T acid equivalent was used, there was less than 2% clover one year after treatment compared to 25% for untreated areas.

We have tried fall and summer clover control on a practice putting green through cooperation with the Elks Country Club of West Lafayette, Indiana. The presentation of these results is not to be considered a general recommendation for its use but to suggest it as a possibility when management has allowed clover infestations. One quart of 2,4,5-T solution, or one pound of acid equivalent, applied on October 10, 1951, gave an estimated 95% control of existing clover within one month,

while a mixture of one quart 2,4,5-T and one pint of 2,4-D, one-half pound acid equivalent, gave 98% control. On April 23, 1952 or later that year no clover could be found on either treated area. Lesser rates were only partially effective.

On June 16, 1952, applications of .75 pound, .5 pound and .25 pound per acre of 2,4,5-T and .5 pound 2,4,5-T plus .25 pound 2,4-D were used on the north half of the Elks Country Club practice green. Temperatures for the following two weeks were high, up to 100° F., with very high humidity. There was considerable reduction in the vigor of the bentgrass, but no extended injury, and it responded to nitrogen applications made five days after spraying. The summer applications gave only 90% control of the clover and regrowth began before fall.

On June 18, 1952, three grasses maintained as lawn areas—Merion bluegrass, F-74 fescue and Astoria bentgrass—were treated with 2,4,5-T alone and in combination with 2,4-D. Table 1 shows that clover in bentgrass was reduced from 18% of the turf to 2% by a summer treatment. This table also shows that the vigorous Merion bluegrass was restricting the invasion of clover. Considerable regrowth has taken place on these plots during the fall of 1952.

TABLE 1  
PERCENT OF CLOVER IN TURF ON JULY 18, 1952  
WHICH WAS SPRAYED JUNE 18

| Gasses            | 1.5 Pts.*<br>2,4,5-T/A | 1 Pt. 2,4,5-T&*<br>.5 Pt. 2,4-D/A | None |
|-------------------|------------------------|-----------------------------------|------|
| Marion bluegrass  | 0.5                    | 1.5                               | 10   |
| F-74 fescue       | 2                      | 4                                 | 17   |
| Astoria bentgrass | 2                      | 2.5                               | 18   |
| Unseeded          | 3                      | 3                                 | 36   |

\* 1 qt. of both materials is equal to 1 pound of acid.

In the fall of 1952 a series of three applications 10 days apart were made on a lawn area containing approxi-

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## TURF WEED EXHIBIT

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Those who attended the last turf conference will remember that a living exhibit of the common turf weeds attracted considerable attention. A similar exhibit was assembled by Dr. Jesse Skoss and displayed in the Educational Section of the California International Flower Show held at Hollywood Park, Inglewood, March 14 to 22. Living plants of the chief turf weeds were displayed in attractive containers together with a card listing the common and scientific names, and recommendations for the most practicable method of control.

One organization had planned to make an educational exhibit of the various turf grasses, but circumstances prevented the execution of this plan. This was most unfortunate, for we believe that such a presentation of the modern ideas in turf maintenance would attract an unusual amount of attention. Such an exhibit could not be sponsored by the University, since it would result in an avalanche of telephone calls and letters on turf subjects which could not be handled.

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It has been necessary to increase the printing of Southern California Turf Culture to 4500 copies. This publication is distributed almost entirely through the various organizations represented on the Advisory Committee. This publication is becoming known throughout the whole world of turf culture. From the beginning, our aim has been to supply useful information, preferably original, in each issue rather than mere chit-chat. Your suggestions for improving this publication will be appreciated.

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### TURF AREA SURVEY OF LOS ANGELES COUNTY

Information on the area of turf in the various categories of usage is not available for California but is urgently needed. The Advisory Committee has succeeded in initiating a turf area survey of Los Angeles County which will indicate the amount of turf which is currently in use. If this project is successful, it is hoped that something similar can be done for the other counties of the state. However, information of this type for the several counties of the state having large metropolitan areas would be very useful. It is hoped that the results of the survey can be announced later in the present year.

In a recent book, "Marching With the Grasses" by Raymond Pool, he stated that the total acreage of turf in the county is enormous and estimated that there were over twenty million home lawns in the county Los Angeles is a horizontal, spacious city, and it is our belief that the amount of home lawn turf will equal and possibly exceed the national average.

THE USE OF 2,4, 5-T  
FOR CLOVER CONTROL IN TURF

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mately 25% clover in the turf. Clover control of applications made at all three times, as shown in Table 2, were satisfactory for the higher rates, while no rates of less than one-half pound of 2,4,5-T acid equivalent per acre gave complete control.

TABLE 2

PERCENT OF CLOVER IN LAWN TURF AT PURDUE UNIVERSITY  
AVERAGE OF 3 DATES OF APPLICATION  
AUGUST 29, SEPTEMBER 10 AND SEPTEMBER 19

| Treatment, lbs. Acid Equivalent | Time After Spraying |          |
|---------------------------------|---------------------|----------|
|                                 | 1 Month             | 2 Months |
| None                            | 28                  | 23       |
| ..... 1, 2,4-D                  | 4r                  | fr       |
| 1# 2,4,5-T                      | 0.3                 | 0.3      |
| 1# 2,4,5-T & 12# 2,4-D          | 0.3                 | 0.1      |
| 12# 2,4,5-T                     | 2                   | 1.5r     |
| 12# 2,4,5-T & 14# 2,4-D         | 2                   | 2r       |

- New Leaves on old stolons

Observations on golf courses where these materials have been used lead to one precaution. If applied on dense matted areas of creeping bent which have dry soil below, these can be injured by 2,4,5-T.

Based on these observations, the current recommendation for clover control in fairways and lawns is a fall application of one pound of the amine form of 2,4,5-T acid equivalent. In most formulations this is equal to one quart of 2,4,5-T solution. If broadleaf weeds need to be controlled, then add one-half pound of 2,4-D acid equivalent, one pint solution, to the 2,4,5-T solution. Late fall applications, (October in the Midwest) have given the cleanest turf areas as treatments made at that time will also kill the fall growth of new weeds, including some *Poa annua* and chickweed. Clover control is only one step in turf improvement. Adequate nitrogen fertilization and soil cultivation should be included in the program.

**EDITORIAL NOTE:** Apparently only an ester form of 2,4,5-T is currently licensed for sale in California. Care should be exercised to avoid drift to susceptible plants until experience indicates the necessary precautions.

TURFCONFERENCEINFALL

Tentative dates of October 12 and 13 have been selected for the annual Southern California Conference on Turf Culture. Plans are being made to bring several nationally prominent authorities on turf culture for this event. Full details will be given in the next issue of this publication.

RECENT GIFTS

Vaughan's Seed Company  
Chicago, Illinois  
1 lb. Grass seed mixture

Wilbur-Ellis Company  
Los Angeles, California  
Transportation costs on  
fertilizer

Pacific Toro Company  
Los Angeles, California  
Servicing of equipment

FIRST DOCTORATE IN TURF CULTURE

Another milestone has been passed in the development of investigational work in turf culture on the Los Angeles Campus, with the production of the first doctoral dissertation in this field. This was produced by Dr. M. Zaki Mahdi and is entitled "The Influence of Management on Botanical Composition and Quality of Turf." This included a number of very important discoveries which will be reported to out readers later.

Dr. Mahdi was a graduate of Fouad I University in Giza and afterward was a teaching assistant there. Later he spent six years in the Park Department of Cairo, Egypt. He was awarded a scholarship in 1946 and came to U.C. L.A., where he obtained his MS. in 1948. He returned to Egypt as an instructor at his University, but left the following year to come back and complete his work. He will return to the staff of the Agricultural College of the University.



DR. M. ZAKI MAHDI

# CHEMICAL CONTROL OF BROAD-LEAVED WEEDS IN LAWNS AND TURF

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Weeds have long been a problem in lawn and turf area. Only in recent years have good chemical control methods been developed. Various chemicals gave some control in the past, but hand pulling or digging of weeds remained most effective. This method still is cheaper and easier in home lawns, where scattered individual weeds occur. In large turf areas, however, general weed infestations are best controlled by chemical weed killers.

**CONTROL IN NEW LAWNS.** Chemical control of weeds usually is not advisable in a newly planted lawn. The chemicals act through the soil to some extent and affect the susceptible germinating seeds or young seedlings of most grasses. After an established lawn has been clipped two or three times it may safely be sprayed. Many common field weeds in young lawns can be controlled by the competition of grass and subsequent mowing.

**CONTROL IN ESTABLISHED LAWNS.** Control of most broad-leaved weeds in established lawns and turf is relatively simple. Dandelion, plantain, dock, bur clover, pennywort, spotted spurge, and heal-all can be killed by spraying with 2,4-D. More than one treatment will be required for complete elimination of these weeds. Chickweed is usually stunted by 2,4-D and may be controlled by a combination of repeated spraying, mowing, and lawn management. Oxalis was best controlled in experimental tests with 2,4,5-T, a relative of 2,4-D. This perennial weed often invades starved or shaded lawns, where it almost completely eliminates the grass. Repeated sprayings will probably be necessary to eliminate oxalis, but results with 2,4,5-T are much more promising than earlier attempts with 2,4-D.

**APPLICATION.** 2,4-D and 2,4,5-T are obtained from most garden supply stores and agricultural chemical dealers. Each is mixed with water and applied as a spray. A small knapsack or garden sprayer is suitable for the home lawn. A power sprayer is more efficient for large areas, such as parks or golf courses. High pressures are not necessary when applying these chemicals. A pressure of 20 to 50 pounds per square inch is ample. Uniform distribution and the actual amount of 2,4-D or 2,4,5-T applied to the turf are more important than the total volume applied. With a garden sprayer, 4 to 5 gallons per 1,000 feet of lawn can easily be applied, though less also will be effective. When a power spray is used on large areas, the usual application is 1 to 1½ pounds of 2,4-D per acre. The amount of active ingredient contained in commercial formulas varies, so directions on the package should be followed.

Mowing of the sprayed lawn should be delayed several days or a week, if possible, after spraying. Sprinkling should be held off for at least 12 hours after the spray

is applied.

**TIMING.** One of the important factors in the successful use of 2,4-D or 2,4,5-T is in the timing of the spray. Annual weeds are more effectively treated when young and actively growing. Perennial weeds, such as dandelions, are more easily killed when in good leaf growth. Actually, it is well to wait until the first dandelion flowers are showing in the spring. Old, mature weeds often show little response to 2,4-D, and weeds growing in deep shade are likewise more difficult to control.

**SUSCEPTIBILITY.** Grasses vary in their susceptibility to damage from 2,4-D. Established bentgrasses and red top turf are easily damaged by 2,4-D. It therefore may be necessary to reduce the strength of the spray solution to about one half that recommended on the label for lawn. Bluegrass and ryegrass are relatively resistant. Bermudagrass is highly resistant. The more susceptible grasses should not be treated when young, nor with a heavy dose of chemicals. Clover may be damaged by 2,4-D, but usually not killed. If more clover is desired in the lawn it can be reseeded in the bare spots. With adequate irrigation, the old plants usually recover or new plants come from the freshly planted seed.

**MANAGEMENT.** Chemicals alone will not solve all the weed problems in a turf. Reinfestation of sprayed areas occurs unless the grass is encouraged. A thin starved stand of grass invites invasion. Bare areas will be taken over by weeds unless the grass is encouraged through re-seeding, fertilizing, and proper irrigation. New weed seeds are constantly carried into lawn areas. In fact, the soil of most lawn areas has a high population of viable weed seed. Proper management of lawn and turf areas to help keep weeds controlled cannot be overemphasized.

**PRECAUTIONS.** These chemicals are highly effective plant killers and must be used carefully to avoid undesirable effects.

1. Do not spray a newly seeded lawn with 2,4-D.
2. Use care in spraying bentgrass and red top. These grasses are more easily damaged by 2,4-D and 2,4,5-T than are bluegrass, ryegrass, or Bermudagrass.
3. Do not allow the spray to reach other ornamental or crop plants. Even small amounts of drift may injure these plants some of which are highly sensitive.
4. Keep one sprayer exclusively for 2,4-D. Do not use it for insecticides or fungicides. If the sprayer must be used for other purposes it should be thoroughly washed with several changes of warm water and baking soda or sal soda. Rinse thoroughly several times. Rubber spray hose is particularly difficult to clean satisfactorily. Even small amounts of 2,4-D remaining in a sprayer may be enough to distort and damage sensitive plants treated with insecticides or fungicides from the sprayer.