

Southern California Turf Culture

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CONTROL OF SOD WEBWORMS OR LAWN MOTHS IN SOUTHERN CALIFORNIA

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Sod webworms, also called lawn moths, are the most common insect pests of lawns in Southern California. The injurious species are *Crambus sperryellus* (Klots) and *Crambus bonifatellus* (Hulst). The following information on their life history and habits is taken from Bohart (1947) who made an intensive study of sod webworms and other lawn pests from 1938 through 1941.

Life History and Habits - The adult insects (Figs. 1 and 2) are small, whitish or buff colored moths with a wing spread of slightly less than one inch. *Crambus sperryellus*, is distinguished from *C. bonifatellus* by its silver-striped forewings (Fig. 2). When at rest, the wings are folded close to the body which gives them a characteristic slender appearance (Fig. 2). The moths begin flying in April or May and breed continuously through October. There are 4 or 5 generations a year. During the day the moths hide in shrubbery or other sheltered places, but may be observed flying over lawns at dusk.

The damage to lawns is done by the larvae (Fig. 3) which are slender, grayish, black-spotted worms which may be 3/4 of an inch long when full grown. The larvae feed on the grass blades, the growing tips and the greener portions of the crown but not on the roots. Damage is most frequent during July, August and September, although often control measures must be applied earlier. Bentgrass and young bluegrass lawns are most susceptible to injury. Sod Webworm infestation is indicated by a dying-back of the new grass shoots

followed by the appearance of irregular brown areas. Most feeding is done at night, the larvae hiding during the day in silken shelters camouflaged with bits of grass and excrement.

Testing the Lawn for Sod Webworms - Since many other troubles are often confused with sod webworm injury, the presence of the larvae should be confirmed before applying insecticides. The most reliable test is to use a water-miscible pyrethrum extract diluted 1-400 with water (2 teaspoons per gallon of water). With a sprinkling can, apply to damaged portions of the lawn, using one gallon per square yard. The pyrethrum irritates the larvae and brings them to the surface. If no larvae are found, the trouble may be due to disease, insufficient water, improper fertilization, other insect pests, etc.

Results of Insecticide Tests - Acid or standard lead arsenate, pyrethrum, and dichloretyhl ether preparations have been used to control sod webworms in lawns. In recent years certain commercial pest control operators have reported that lead arsenate has not given satisfactory control. Pyrethrum and dichloroethyl ether preparations will kill the larvae in the lawn at the time of application but have little or no residual action for later infestations.

Experiments by R. H. Smith (1945) and Ebeling, Pence and Kimball (1947) showed that DDT was promising for the control of sod webworms. Further tests by the writers since 1947 indicate that DDT, cholordan and toxaphene all give very



Fig. 1. *Crambus bonifatellus* (Hulst)

Fig. 2. *Crambus sperryellus* Klots showing position of wings when at rest and the silver strip on forewing.

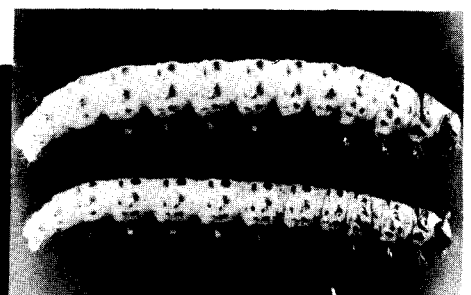


Fig. 3. Sod webworm larvae. *Crambus sperryellus* above, *C. bonifatellus* below.

(Photos by R. J. Pence)

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effective control. Aldrin and dieldrin were also effective the one season they were tested. With all these materials, repeat applications may be necessary every 6 to 8 weeks. The number of applications required during the season apparently depends on the number of factors such as the kind and age of the grass, cultural conditions and the prevalence of the moths in the area. In one instance, a bentgrass lawn in its second year required three treatments, while an adjacent bluegrass lawn of the same age required none. The previous year both lawns had to be treated.

Control of Sod Webworms in Large Turf Areas - For application to large turf areas with power sprayers, use chlordan, toxaphene or DDT according to the manufacturer's directions. Where specific directions are not given on the label, they may be applied at the rate of 5 to 6 pounds of the active ingredient per acre. With the wettable powders commonly available, this would amount to 5 pounds of a 40%, or 4 pounds of a 50% wettable powder per 100 gallons when used at the rate of 6 or 7 gallons per 1000 square feet. If more gallons per acre are used, reduce the concentration of the spray proportionately in order to keep the amount applied per acre the same. Water the lawn thoroughly before treatment, and do not water again for several days unless necessary. Emulsi-

fiable concentrates of chlordan, toxaphene or DDT may be used as well as wettable powders, but the amount of active ingredient in the spray should be the same.

Control of Sod Webworms in Home Lawns - Use chlordan or DDT according to the manufacturer's directions. Where specific directions for the control of lawn moths or sod webworms are not given on the label, chlordan or DDT may be applied as follows.

Use 4 level tablespoons of 40% chlordan wettable powder, or 3 level tablespoons of 50% wettable DDT powder, to one gallon of water. In preparing the spray, add a small amount of water to the required amount of powder. Make a paste and work out all lumps before adding to the sprayer. Apply to lawn with a compressed air type hand sprayer. One gallon of spray will cover approximately 150 square feet. It is essential that the spray be applied evenly to the lawn. Dividing the lawn into small areas and spraying these separately, and the use of a special disc in the nozzle which throws a flat, fan-shaped spray, will help in obtaining more even coverage. Shake the sprayer frequently to prevent settling of the insecticide. The lawn should be thoroughly watered before treatment but the grass should be dry when the spray is applied. Do not water again for several days unless necessary.

Emulsifiable concentrates or 5% or 10% dusts may also be used when applied according to the manufacturer's directions. Toxaphene is not suggested since at this time it is not readily available in small quantities.

CAUTION - Insecticides such as DDT and chlordan are known to last a long time in the soil. If excessive amounts are applied repeatedly, it is possible that injurious residues may accumulate in the soil. Apply the spray lightly but evenly. It is not necessary to soak the insecticide into the soil to control sod webworms. Apply only enough to control the infestation and do not repeat until reinfestation occurs.

The same care should be used with toxaphene.? However, under certain conditions, toxaphene does break down in the soil (Cullinan, 1949). While there may be less possibility of building up injurious residues of toxaphene in the soil, it also may remain for a considerable period as Schread (1949) has reported that it was effective against Japanese beetle grubs for 18 months.

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CRABGRASS TRIALS AT THE BEL-AIR COUNTRY CLUB

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On July 28, 1950, plots were established in the center of #15 fairway at the Bel-Air Country Club, and the first application of the herbicides was made. The plots were 10' x 40' - 400 sq. ft. We used three basic materials: Lead Arsenate, 10 lbs. per 1,000 sq. ft.; PMAS - 10% 2.5 oz. per 1,000; and Aero-Cyanate - 91% Potassium Cyanate, at 15 lbs. per acre. All three materials were replicated 4 times. At the same time we added two plots, one each of Crab-Not (65% Potassium Cyanate) and Nott's Crabgrass Killer + 2, 4-D.

Readings were taken before the first application, and 10 days following each successive application, to determine the percentage of crabgrass in each plot. With each, except the Nott material, we used 10 gallons of water to spread the chemical. With the Nott material, we followed the directions on the cans, 5 teaspoons to 1 gallon water to 135 sq. ft., and used a Hudson 2 1/2-gal. sprayer in applicator. The three other materials were applied with a Hardie 200-gal. sprayer at 200 lbs. pressure.

Ten days following the first application, readings were taken. In all instances except the lead arsenate and the control plots, there was a definite checking of the development of crabgrass.

A second application was made on August 28. At the time we added two plots to permit us to use Scutl. Again the results of the readings indicated a check on crabgrass, but Nott's material and Scutl were superior to the other three.

We were getting results, but they were not good enough. A second application of Scutl, and a third application of other materials was necessary. At this time we cut the amount of water used in spreading the lead arsenate, PMAS and Aero-Cyanate, in half. Scutl and the Nott materials went on again according to manufacturer's directions. Results were good, but proportionate to the results was the discoloration of the desired turf grasses - a discoloration that was temporary.

The check plots showed an average increase of 5 1/2 times the amount of crabgrass present at the start. The mean readings of the treatment plots are shown in the following table, using the original amount of crabgrass at the time of the first application as 100 per cent:

Material	Per Cent of Original Crabgrass Remaining
Nott's Crabgrass Killer ----- (KCN) +2, 4-D	20
Crab-Not (65% KCN) -----	20
Scutl -----	33
PMAS -----	40
Aero-Cyanate (91% KCN)-----	50
Lead Arsenate -----	85

These figures are by no means conclusive. We started too late to get truly economical. The two lead arsenate plots may show the effect next spring. We plan to treat the other two lead arsenate plots next February. Because we feel that fertilization of the fairway is part of the answer

in the control of crabgrass, we are at the same time fertilizing this area to encourage the desired grasses to fill in the area where crabgrass has been removed. This will be carried out next spring, and if possible, similar plots will be laid out at several locations to get a more conclusive answer.

VALUABLE NEW BOOK ON TURF CULTURE

The recent appearance of the new book, "Turf Management," edited by a board of experts under the direction of Professor H. B. Musser of Pennsylvania State College, was an important event in the field of turf culture. There has been nothing of a comprehensive and authoritative nature since the books of Piper and Oakley, and of Mrs. Farley, which appeared 20 years or more ago. This volume of 354 pages was sponsored by the U. S. Golf Association, and published at a price of six dollars by the McGraw-Hill Company of New York.

The members of the editorial board included Dr. Fred V. Grau of the U. S. Golf Association Green Section; Mr. Herb Graffis, Editor of "Golf-dom"; Dr. O. J. Noer of the Milwaukee Sewerage Commission; and Mr. Marshall E. Farnham, former president of the National Greenkeeping Superintendents Association. Among the others who assisted is Mr. E. W. Van Gorder, in charge of the Leland Stanford University golf course and athletic fields, who is well known among Californians in the field of turf culture.

Progress in some phases of turf culture is so rapid that periodic revisions of this work will doubtless be necessary.

This is perhaps the first comprehensive review of the field of turf culture based on the findings of scientific research. The fields of pomology, vegetable crops, agronomy, and floriculture all have had standard works of this type. The appearance of this book thus emphasizes the important fact that the field of turf culture has come of age and is now recognized as worthy of the serious attention of agricultural scientists.

The book is well illustrated and is arranged for quick reference. We believe that it should be at the hand of every person interested in turf culture.

The book is written in a condensed style which presents much information in a small space. The inclusion of many tables also helps to make this book a complete reference book on turf culture, without rendering it unduly bulky. Much valuable information on irrigation and drainage systems is included. There is an excellent key for the identification of turf grasses. The use of modern machinery for turf maintenance, including deep mechanical cultivation of turf is treated, along with the newest methods for weed, disease, and insect control. Chapters are included which present the basic principles of golf course design and operation.

U-3 bermuda is a fine-bladed strain of bermudagrass which was selected in Savannah, Georgia. It has been in the nursery of the U. S. Golf Association Green Section at Beltsville, Maryland, for a number of years, and has been in the turf nursery at the University of California, Los Angeles Campus, since the summer of 1949. It is now growing at many points between Washington, D. C. and St. Louis, and north to Canada.

Its ability to produce a dense turf rapidly makes it practical for use on tees and fairways at golf courses, athletic fields, playgrounds, park areas, and on sunny lawns where crabgrass and weeds are a problem. The following information is adapted from material prepared and distributed by the U. S. Golf Association Green Section.

Growing Habits - U-3 is a rapid grower, even under adverse water and high temperature conditions, and requires fertilizer and enough water to establish the initial covering. Once established, the turf, under low mowing, will withstand long drought periods and in the fall of the year will remain green long after other strains of bermuda have gone dormant.

U-3 will not thrive in shade and does poorly when neglected. Continued heavy frost will cause it to go off color, but in early spring it is the first of the bermudagrasses to green up.

No seed is available, and it has not been known to set seed in the East.

Planting U-3 - The ideal method is to develop a nursery similar to a bent stolon nursery. Sprigs, plugs, or strip sods may be started also in freshly-prepared soil. A nursery will often quickly re-establish itself after the removal of sods. It is important to have good soil in the nursery.

After a sod is developed in the nursery, 2-inch plugs or larger may be moved to where it is desired to grow U-3 permanently. Plugs may be placed on 6-inch centers. The planting is done at the season when growing conditions are ideal for bermudagrass. It is important that the soil where the U-3 is to be planted is loosened prior to planting. On tee areas numerous operations of a tool such as the Aerifier prepare the soil properly.

Watering is important for a short period after the transplanting of the stolons, and fertilizing with nitrogen hastens the growth if applied when the sprigs start new runners.

If facilities are available, U-3 can be propagated rapidly in flats under glass. Several nurseries are now propagating this grass, and commercial supplies of stolons should be available shortly.

A report is desired from all who have obtained U-3 bermuda from the UCLA turf garden for trial. Send information about results to the Division of Floriculture and Ornamental Horticulture, University of California, Los Angeles 24, California. Information is desired particularly on retention of color during cold winter weather, and also on the quality of the turf produced in comparison with that of the ordinary bermuda from seed.

One of the chief highlights of the past year was the two-day conference on Turf Culture on May 8 and 9 in Los Angeles, at which 270 visitors were registered.

A similar event is planned during 1951 on April 30 and May 1. The meetings will likewise be held at the turf plots at the UCLA campus at 300 Veteran Avenue in West Los Angeles, and also at the nearby Riviera Country Club.

Full details of the program have not been worked out, but Dr. Fred V. Grau will be with us again. Probably Dr. O. J. Noer of the Milwaukee Sewerage Commission, one of the top authorities on turf culture in the country, will be on the program also.

Numerous changes have recently been made on the turf plots on the UCLA campus, and visitors to the conference will see results of some entirely new lines of work. Be sure to mark these dates on your calendar now, and plan to attend these meetings!

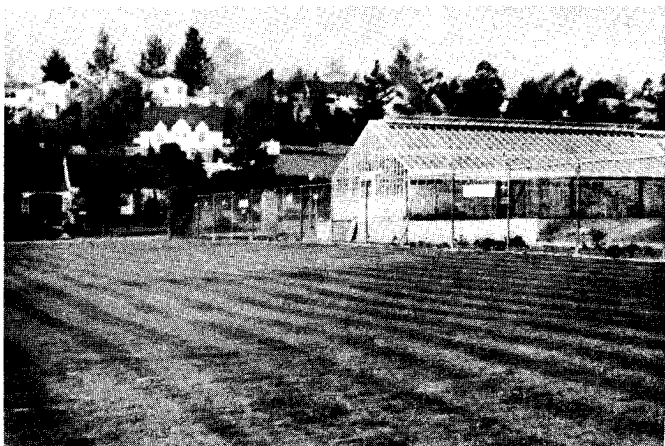
Last year the first Northern California Turf Conference was held in Berkeley and was a success from the standpoints of both attendance and interest. Plans are being made for a similar conference this year. The dates have not been announced, but will probably precede those of the Southern California Turf Conference.

SOUTHERN CALIFORNIA TURF CULTURE

This issue of "Southern California Turf Culture" is the first of a series to be issued quarterly and distributed through the various organizations contributing to the support of the Experimental Program in Turf Culture on the UCLA Campus.

This publication is sponsored and financed by the Research Advisory Committee for this program. This committee includes representatives of all of the various fields of interest in turf culture,

This publication should help to meet the urgent need for the dissemination of information on turf culture. We hope that it will contribute to the development of better turf in Southern California. Communications regarding this publication may be sent to the Division of Floriculture and Ornamental Horticulture, University of California, Los Angeles 24, California.



Portion of area devoted to experimental plots of bent-grasses and bermudagrasses mowed at putting green height