Dr. G. C. Decker

How to Control Rodent and Insect *Turf Destroyers*

By DR. G. C. DECKER
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FORTUNATELY the number of insect and rodent pests that destroy or damage valuable turf are not large; however, the insidious nature of their attack, their subtle methods and evasive habits make these pests formidable if not dangerous enemies.

The greenkeeper is fortunate in that he is not unduly required to pinch pennies when it comes to selecting and using effective control measures. Furthermore, he is fortunate in having available reasonably satisfactory control measures for most of the insect and rodent pests that are likely to infest or seriously damage turf grasses. Unfortunately, however, prophylactic or preventive measures are frequently more effective than remedial measures and if these preventive treatments are not applied as a matter of policy or insurance, the greenkeeper frequently finds himself face to face with an emergency problem for which there is no immediate answer. Furthermore, since injured turf cannot be immediately restored, it is extremely important that all insect outbreaks be discovered in their incipient stages and control measures, either prophylactic or remedial, must be applied before noticeable or conspicuous damage has occurred. This, of course, means that the greenkeeper must at all times be on the alert and detect insect activity or damage in the early stages.

In the practical consideration of insect control, it is frequently customary to divide insect pests into two groups. Chewing insects, which actually devour portions of the plant, are usually, though not always, most easily controlled by insecticides collectively referred to as stomach poisons; and sucking insects, which insert stylet-like mouth parts into the plant and extract the plant's juices, are usually controlled by so-called contact insecticides. The chewing insects which infest turf grasses can be further divided into those which feed upon the foliage and those which feed on the roots of the plant. Then, of course, we have a fourth group of so-called nuisance pests, such as ants and earthworms, which do not feed upon the plants but are objectionable because of the mounds or casts that they leave on the green. While it is always desirable to determine the specific identity of the insect you are attempting to control, this is not always essential. Very often the proper placing of an insect in one of the four categories just mentioned will automatically suggest an appropriate control measure. For example, most leaf-eating forms will respond to applications of lead arsenate or other suitable stomach poisons and most sucking insects will be destroyed by the same general types of contact insecticides.

Sod Webworm Control

Sod webworms are the caterpillars or larvae of a group of rather small, so-called close winged moths. Upwards of 100 species of these moths are known in the United States, and the larvae of at least a dozen or more species are known to feed upon a wide variety of grass plants. Some species have but one generation a year, whereas others may develop two or more broods a year, depending upon the species and the length of the summer season.

In general, the control measures are the same for all species. From time to time various insecticides, including oil emulsions, pyrethrum extracts, derris extracts, and dichloroethyl ether have been recommended and you can find recommendations for the use of these materials in the back numbers of your official publication and in a number of entomological journals. The writer, however, after years of experimental testing, has eliminated all of these materials in favor of lead arsenate sprays or dusts. Two pounds of lead arsenate in 20 gallons of water per 1,000 square feet of green, applied with a sprayer developing a pressure of 150 to 300 pounds when properly applied invariably gives ex-

cellent control of sod webworms. This spray should be applied when the first evidence of an infestation is noted and, of course, the greens should not be sprinkled or watered for 48 hours after treatment. In addition to giving good control of sod webworms, the use of lead arsenate has several advantages over other suggested treatments. For example, lead arsenate has a stimulating effect on most turf grasses and tends to retard the development of several common weeds, particularly poa annua and chickweed. Several species of cutworms and other grass-feeding caterpillars are readily controlled by this spray and the lead arsenate when washed into the green tends to accumulate in the soil where it aids in the control of earthworms, white grubs, Japanese beetles and other soil infesting species.

Cutworm Control

Several species of cutworms frequently do more or less damage particularly on close cut bent grass greens. For the most part the caterpillars remain hidden in the mat just above the surface of the soil where they feed upon all portions of the plant within their reach. As food is needed, they move forward slowly and thus produce narrow, linear brown patches from 2 to 6 inches in length.

All of the infestations encountered in Iowa were readily controlled by the lead arsenate spray recommended for the control of sod webworms. Species which will not respond to this treatment might be controlled through the use of the poison bran bait normally recommended for the control of cutworms, armyworms and grasshoppers.

White Grub Control

White grubs, which are the larvae of the common May beetle or June beetle often observed at lights around the doors and windows of clubhouses, frequently occur in sufficient numbers to completely destroy the roots of grasses in greens and fairways.

For the time being, I know of no better control measure than the oft-repeated grub-proofing of the soil by the addition of lead arsenate. Application of 5 to 20 pounds of lead arsenate per 1,000 square feet have been recommended, the amount of lead arsenate to be used depending somewhat on the severity of the infestation, the speed of action desired and the texture of the soil. In general, heavy clay soils require heavier applications than light sandy soils. Where lead arsenate is applied for sod webworm control once or twice each year, additional applications for grub control are not required.

For practical purposes the Japanese beetle may be regarded as a white grub. This species, however, has a one-year life cycle and therefore frequently presents an annual problem rather than a tri-annual problem as is the case with most grubs which normally have a three-year life cycle.

Grub proofing of the soil with lead arsenate as recommended for the control of white grubs is a common practice. The introduction of the milky white disease has been very successful in many sections of the East and persons interested in this phase of control should contact their state entomologist or the federal Japanese beetle laboratory at Moorestown, New Jersey.

The hairy chinch bug is generally distributed throughout most of the eastern states and westward to include at least part of Ohio, Michigan, Wisconsin and Minnesota. It is a typical example of the sucking type of plant bug and therefore cannot be controlled by the use of lead arsenate or other stomach poisons.

Several species of ants can usually be found nesting on or around the greens of most courses. A number of effective ant baits have been developed, several of which are on the market in prepared form and others can be prepared by the greenkeeper if he so desires. Most of the baits are effective if properly used and in most cases ants can be held under control through the use of baits alone, although at times it may seem desirable to supplement their use with injections of carbon disulphide into the nests of stubborn colonies.

DDT Control Still Experimental

The use of DDT for the control of insect pests is still in the experimental stage. While we might, on the basis of preliminary research, make a great many suggestions on where and how this new insecticide might be used, I am inclined to suggest that for the present you should rely on those insecticides you have used in the past until such time as definite recommendations for the use of DDT can be made. The extensive and promiscuous use of DDT should by all means be discouraged. At the same time, there is no reason why greenkeepers who are inclined towards experimentation should not use DDT experimentally. A few tips to the experimentors would be in order.

1. A pinch of 10% DDT dust placed on the apex or scattered around an ant hill frequently results in the extermination of the colony.

2. DDT sprays containing ¾ to 1 pound of actual DDT (in the form of a wettable powder) per 100 gallons of water and properly prepared dusts containing from 1% to 3% DDT in prophyllite or other suitable diluents have proven very effective for the control of practically all lepidopterous larvae on which they have been tested. Preliminary laboratory tests seem to show that sod webworms and cutworms that consume considerable quantities of foliage are no exception. DDT, therefore,

(*Continued on Page* 65)

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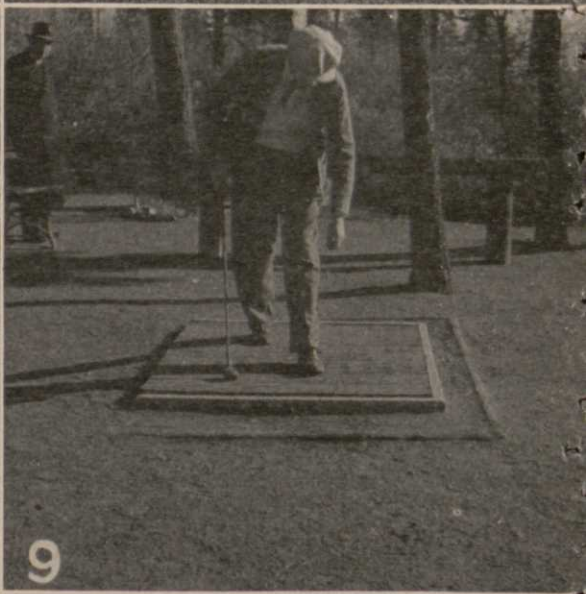

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HOW OTHERS DO IT

6. Applying sodium arsenite by the dry method with a Gandy spreader. . . . 7. A three-gang spiker which can be used for preparing a seedbed on weed treated tees. . . . 8. A simple method of introducing bent stolons into tees at Canterbury CC, Cleveland. Workman is planting stolons in spot where a small piece of soil was removed with the trowel. Soil will be replaced and firmed by pressing underfoot. . . . 9. Turf on the tees has been abandoned at this heavily played municipal course in Spokane, Wash. Rubber door mats, made from old tires, are used instead. The openings are filled with a clayey sand containing just enough calcium chloride to keep it damp. . . . 10. A zoysia matrella tee at Audubon CC, Louisville. The turf is outstanding and resists crab grass invasion. The club never had good turf on tees until zoysia was used.

Photos by O. J. Noer

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No Natural Rubber Golf Balls Before June 1

It is the best combined belief of the members of the Golf Ball Manufacturers Association that it will be at least June 1, before golf balls made with natural rubber will be available.

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HOT WEATHER
Creeping Red Fescue

Recently isolated strains of creeping red fescue which retain live green coloring despite drought and heat are being marketed by F. H. Woodruff & Sons, Inc., Milford, Conn.

For years considerable work has been done with fescue for warm, dry summers because this variety is hardy, particularly in northern latitudes. A solution for southern and semi-southern regions, in locations where ample water is available for the planting year, has been found in Flawn, also introduced by Woodruff. But Flawn is not suitable for latitudes with extremely severe winters. In such regions fescue has proved the most enduring variety. Fescue not only is a northern grass, but it grows on relatively poor soils, requires little moisture, stands up under traffic and withstands considerable heat.

The chief drawback to the strains of fescue hitherto available, however, has been their characteristic of turning a dull grey-green during hot, dry weather. The grass survives but loses its beauty. Although Chewings fescue is recognized as one of the mainstays of northern lawns, the work of isolating superior strains has continued steadily. Considerable progress has been made with the numerous strains of creeping red fescue.

Many of the so-called creeping reds are not truly creeping, but grow similar to Chewings. One of these is the Old strain, which originated in Canada. The isolation of this strain is a good illustration of the painstaking labor required in isolating grasses. After plants are selected and their seed propagated, and the new plants re-selected season after season, until permanent characteristics can finally be depended upon, the new strain will be found to have gained advantages at the cost of sacrificing desirable characteristics of the older strains. Olds is typical of such a strain, having received certification as an independent strain, but its attainments have been at the expense of putting up with a coarse, flat leaf, and of losing the runners.

Harvesting a stand of Illahee. Note: the size to which the base of the rows has grown because Illahee is a true creeping type of red fescue.

So the search started anew for a creeping red with rhizomes, and with typical narrow, round fescue leaf, yet a plant that would stay green in hot, dry weather. Such a true creeping red has now been isolated by the Northwest District of the U. S. Department of Agriculture. It is called Illahee, the Indian name for Paradise. It is the only creeping red certified as to strain.

The seed of Illahee, the true certified color-holding creeping red fescue with round leaves, is being offered commercially by Woodruff. This seed is obtained from plants grown in rows two feet apart, with the space between the rows cultivated to keep out weeds. By this method it is possible to offer seed certified a minimum of 99 percent pure, and 95 percent germination.

Notwithstanding the advantages attained with Illahee, the task of isolating other fine strains continues. Among the newer types not available commercially, but showing promise, are Ranier and an unnamed strain now simply designated as .0675. More information will be available about these strains next year, when F. H. Woodruff & Sons, Inc., put them on display in their several trial grounds.

Young plants of Illahee, the Creeping Red Fescue Grass. Note: the land is cultivated between the rows.

The same stand of Illahee grown to maturity. Note: That there is no other vegetation between the rows.

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Regional Cooperative Research Programs

By DR. O. S. AAMODT

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THE BOUNDARIES of a particular problem or branch of biological research do not as a rule coincide with municipal, county, or state boundaries, but with the limits of the region to which the problem applies. When research on very similar problems with little coordination is conducted by several agencies, private or governmental, in the same geographical or environmental region, the economy and efficiency of the work done may be greatly reduced. When research is developed as a cooperative enterprise between the interested agencies, it can, through coordination and integration of work within a problem area, increase economy and efficiency to the point where basic research is made possible along certain lines for which previous provision was inadequate. Duplication of work between the cooperating agencies is avoided in regional organization, and fundamental research for which specialized staff or special equipment and laboratories are essential is greatly enhanced.

The need for a scientific cooperative approach to turf problems was recognized early by Frank M. Hardt, Chairman, Green Section Committee, U. S. Golf Association. In the first issue of TURF CULTURE, he writes as follows:

"As the interest in golf became more general, and as golfers demanded better playing conditions, the men who were in charge of some of our principal golf courses were far-sighted enough to realize that ultimate improvements in turf could best be obtained by a scientific study of the various problems encountered in raising turf on golf courses under widely different soil and climatic conditions.

"As a result, a cooperative agreement was drawn up between the United States Department of Agriculture and the United States Golf Association for a program for the study of turf grasses. This work was begun in 1920 under the direction of the late C. V. Piper, of the Bureau of Plant Industry, and has continued to date. During that interval extensive experimental work has been conducted in various parts of the country to determine the best grasses, the most effective fertilizers, disease and insect remedies, and to develop cultural practices which will lead to the improvement of turf."

During the "depression years" the joint policy of conducting regional investigations "under widely different soil and climatic conditions was greatly restricted." Early in the present emergency representatives of the Bureau of Plant Industry met with representatives of the U. S. Golf Association to consider war-time needs of the turf interests. In addition to plans for war-time needs, plans for cooperative regional programs were tentatively formulated. Fielding Wallace, Chairman, Green Section Committee, U. S. Golf Association, sent a statement to that effect in a general letter to District and State Golf Associations and Greenkeeping Superintendents' organizations as follows:

"Postwar plans are being developed now for a turf program more national in scope than has been the case in the past. The program will be based on regional investigations in diverse sections of the country which will be carried out cooperatively between the golf clubs and their greenkeepers on the one hand, various state experiment stations or agricultural colleges on the other, with the Green Section acting as a focal point to which the results from regional investigations may converge for correlation and from which suggestions may radiate in connection with proposed investigations in various sections of the country. Thus, in this program the function of the Green Section would be to act as a clearing house or a coordinating agency to prevent duplication of effort and to keep each investigating group informed as to what other groups are doing which should be of interest to them. Moreover, the Green Section staff would thus be able to fit together the results from various sec-

Talk made at the GSA annual meeting.

tions of the country into one over-all picture which will be more significant to all concerned than numerous isolated findings in as many individual sections of the country."

In this same letter Mr. Wallace clearly states the advantages of cooperating with the U. S. Department of Agriculture:

"As has been in the past, the Green Section is in a position to identify or have identified disease, weed, insect or other turf pests from specimens sent to the Beltsville office. Because of its location in the vicinity of Washington and our close collaboration there with the Department of Agriculture, it is possible for the Green Section staff to confer with specialists in any and all of these fields and to obtain the most recent recommendations for their control where it has been impossible to date for the Green Section itself to study control methods in turf. Facilities are also available for the testing of soil samples and recommendations can be made on the basis of the results of such tests. For all of these recommendations as well as recommendations on various other aspects of turf maintenance the present Green Section staff has at its command a wealth of information which has accumulated as a result of the investigational work conducted by the Green Section during the last quarter of a century."

The policy of cooperation by the U. S. Golf Association with other agencies having an interest in and contributing to turf development has been more firmly entrenched and greatly facilitated by the appointment of Dr. Fred Grau as Director of the Green Section. His scientific training, practical knowledge, and complete understanding of the Greenkeeper's problems augers well for the future. He fully appreciates the need to coordinate the research activities of all national, state, and local groups.

The inter-regional coordination can be carried on most effectively and efficiently by such national research organizations as the Green Section, U. S. Golf Association, and the Bureau of Plant Industry, Soils, and Agricultural Engineering of the U. S. Department of Agriculture. The work of the regional groups should be organized to take the fullest possible advantage of expert scientific men from all Federal, State, and educational institutions. It is very desirable that its membership be developed from a broad base, including Federal, State, municipal, highway, park, and recreational interests, golf clubs, cemeteries, estates, airports, industrial grounds, etc. The Bureau of Plant Industry, Soils, and Agricultural Engineering will do everything it can to further the activities and success of the regional research program within the bounds of the Appropriation Acts. The U. S. Department of Agriculture has had in effect for several years a policy of regional development of research as is evidenced by the four Regional Research Laboratories and the nine Bankhead - Jones Research Laboratories. The programs of these laboratories are determined to a large extent by advisory committees made up of Federal and State agencies, industry, producers, or local institutions.

Several informal regional conference groups are also operating in different sections of the country, such as the alfalfa improvement conference, the corn breeders' conference, the spring wheat improvement conference, etc. These goups, having a common interest and purpose, gather around the table as their activities require to consider objectives and methods for attaining them. Their procedure is somewhat as follows: Collect and review the available information concerning the past, current, and proposed research work relating to the problem under consideration; study and correlate the information by means of individual and group conferences or special committees; prepare reports and make recommendations to the cooperating agencies; plan a coordinated program of research; arrange for essential materials, equipment, and personnel; avoid undesirable and unnecessary duplication of effort; and secure greater economy and efficiency in the expenditure of funds. Independent research by the regional group is not advocated if arrangements for the work can be made with one or more of the cooperating institutions or agencies. The chief responsibility of the conference group to the regional program should be advisory, coordinating, promotional, and financing.

It is important to recognize that no one plan for organization can be final in all details. The nine U. S. Department of Agriculture Bankhead-Jones laboratories are not organized and operated on the same lines. Neither are the many informal conference groups operating in all sections of the country. Each one has adapted its organization and activities to its dominating requirements, facilities, and personnel at hand.

It is also important to recognize that no one research plan can or will be final. To be useful a regional research program must be dynamic, changing with every new need or advance. It must permit the investigator to make adjustments from old or less promising fields to newer and more fertile opportunities or possibilities. The important thing is to arrange all activities so that they may be quickly responsive to the needs of the future. It is unlikely that the research and educational patterns of today will fit the needs of tomorrow.