Grub Identification Important Factor in Control with DDT

By O. J. NOER

Because of the publicity accorded DDT, one may be inclined to believe it will control white grubs of all kinds. Apparently this is a misconception and should be corrected.

At the Cornell Turf Conference in mid-March, the entomologist of that state recommended DDT, Chlordane, etc., for white grubs of the Japanese, the Asiatic, and other annual life cycle species of white grubs, including the annual type June beetle grub. They supported the contention that 25 lbs. per acre of actual DDT would give control for three years at least, and possibly longer. They stated that these materials were less effective, and possibly not the answer for the May or June beetle grub, two or three year cycle, genus Phyllophaga. This is the grub frequently encountered in the Midwest and in many other parts of the country.

In view of the statements made at Cornell, it was believed advisable to obtain the views of other entomologists. Letters were sent to various federal and state workers. In their replies they supported the stand taken by New York investigators. Their comments are interesting and worthy of repetition to help clarify a confusing situation.

Professor Ray Hutson of Michigan states, "I agree with the Entomology department at Cornell that DDT is not effective against the June beetle grub. I think the confusion in this connection has arisen because of the fact that DDT is effective against Japanese which has a similar grub. However, the information is clear that DDT cannot with the present information be recommended for the control of white grub."

Dr. George C. Decker of the Natural History Survey Division at Urbana, Ill., advised that they did not have first-hand information and suggested contacting Dr. Ritcher of Kentucky and Dr. Packard of the U. S. Department of Agriculture.

Dr. Paul Ritcher of the Department of Entomology and Botany at the University of Kentucky made the following statement: "I have your letter of April 16 in regard to the control of white grubs of the genus Phyllophaga. Last year I compared Chlordane and benzene hexachloride emulsions for the control of grubs in bluegrass sod. Against small grubs (second stage) I got 80 per cent kill with BHC at the rate of 2 lbs. of gamma isomer per acre and chlordane at the rate of 5 lbs. per acre. The materials at these rates were not nearly so effective against large grubs (third stage) giving about 55 per cent kill with BHC and 37 per cent kill with Chlordane. No injurious effects were observed on the bluegrass.

"Such tests as I have made so far are on a very small scale and I should hesitate to go all out in recommending these materials until they are further tested. This season I am planning some large scale tests with larger amounts than those used last year, namely up to 4 lbs. of the gamma isomer of BHC and 10 lbs. of Chlordane. For the present we are still recommending lead arsenate for grub control."

Dr. C. M. Packard, in charge of Cereal and Forage Insect Investigations for the Bureau of Entomology and Plant Quarantine, U.S.D.A., made this statement: "In reply to your letter of April 12 concerning the use of DDT for control of the June beetle grubs in turf, I regret to say that we have very little information on the subject. The results of our very limited small-scale laboratory experiments with DDT for this purpose have been rather unfavorable, but we have not been in a position to conduct any trials under field conditions."

Dr. C. H. Hadley in charge Japanese beetle investigations for the U.S.D.A. at Moorestown, N.J., wrote as follows: "I have your inquiry of the 12th regarding the effectiveness of DDT for controlling white grubs of three-year life cycle species. We have not had any opportunity to work with this type of grub. Our work is primarily with the Japanese beetle, a one-year species, and several other native white grubs available locally as we have opportunity. Those that we have tested among the native species are also one-year species.

"I would be inclined to accept the opinion of Professor Hutson of Michigan and the Cornell people. I know that the Cornell people have worked with native species having two and three-year life

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(though it was an exclusive millionaires' club, and at one time the membership was said to represent 75% of the total capitalistic wealth of the country) these "haydoodles" were never changed and year after year they remained, not only to mar the natural beauty of the course but to be laboriously maintained in some fashion by hand. Fortunately, golf architecture has come a long way since that time and such mistakes are not likely to be repeated, but many of the old mistakes still remain uncorrected to harass the greenkeeper.

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cycles, and I presume that Professor Hutson has also. It would be my opinion that the main reason why DDT might not be sufficiently effective in controlling these three-year cycle species is that the larvae of these species probably feed deeper in the soil than, for example, the Japanese beetle grubs, and thus escape the effect of the poison which is usually concentrated in the upper two to three inches. However, I may not be correct in this surmise, and it may be that these native species just are not susceptible to this particular poison. We do know, of course, that DDT is not a 'cure-all', and that there are a number of species of insects which are apparently not susceptible to it.

"I would not want to make a guess about Chlordane. In our preliminary tests with Japenese beetle grubs, this material has appeared to be fully as effective as DDT and more rapid in its toxic action. However, we have not had an opportunity to get results from our large-scale tests, which are in progress, nor have we had opportunity to try this material against native white grub species."

Professor John C. Schread of the Connecticut station made a number of tests with several of the newer materials and used them on fairway areas. He made the following comment about his tests: "Turf areas treated with Chlordane in 1947 at Wepauwaug Country club, Orange, Connecticut, contained in one instance both grubs of Japanese beetles and white grubs. The insecticide was used at various dosage levels, and it was seen that where the toxicant was employed at a technical level of 24 pounds to the acre complete destruction of white grubs as well as Japanese beetles ensued. A longer period of time was required for the reduction of the Phyllophaga population owing to the fact that the grubs are larger than Japanese beetle third instar grubs and also slightly deeper

in turf than the latter. No accurate check was kept on the rapidity of kill of the white grub. In any case, however, when the insecticide was applied to turf before the middle of May they were all destroyed by early July.

"We are undertaking more reliable experiments this season on the use of Chlordane for this purpose. When the results of this investigation are available, I will be glad to release them for publication. At this time, however, I believe that if Chlordane is used at the rate of 500 pounds of 5 per cent dust to the acre, or 50 pounds of 50 per cent wettable powder, good control of Phyllophaga may be expected. Due to the fact there are quite a large number of species of Phyllophaga in the United States, those most commonly found in western states may or may not be the same species as occur in Connecticut. This may have no bearing on suppression of western species by the toxicant in question."

The customary recommendation for lead arsenate ranges from 400 pounds per acre, maximum, to 200 pounds minimum. At present prices this is approximately $100.00 per acre for material alone at the 400-pound rate, as compared with $12.00 to $15.00 for DDT, and $25.00 to $30.00 or more for Chlordane at the rate suggested by Professor Schread.

Identification of the grub species causing damage would seem important. Where injury is due to grubs of Japanese, Asiatic, annual June beetle and other animal species, the use of DDT at 25 pounds actual DDT per acre, or Chlordane at 4 to 10 pounds actual toxicant should give effective control at moderate cost per acre.

When white grubs of Phyllophaga are responsible, DDT is not the thing to use until more evidence is at hand. It may be necessary to use lead arsenate for effective control. Treatment is justified even at present high prices in regions where broods A and B are both bad, because severe damage to turf is likely two years out of three. The other alternative is to use Chlordane at the higher rate suggested by Professor Schread, namely 25 pounds per acre of actual Chlordane.

CADDYMASTER IS MAINSPRING

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By doing this, he always knows if the ball he finds is his player's and avoids argument with other players on the course."

At the end of each instruction period given over to a set of lessons, the kids are quizzed. They must maintain a high grade average or take the lesson they fail over again.