

mixtures of sawdust, soil and fertilizer mixtures have been studied. Preliminary reports indicate that sawdust is an excellent material in proper mixtures.

Pest Control

Much effort has been expended in weed control research in the period since 1945. 2,4-D has been an excellent tool for controlling broadleaf weeds. However, like many other management tools, it must be used properly. The use of 2,4-D has now become fairly well standardized.

The crabgrass control materials are presently receiving the major emphasis in weed control studies. An article in the USGA Journal, February 1951 issue, summarized the present information with respect to crabgrass control.

Chickweed is one of the broadleaf weeds which is not controlled easily by 2,4-D. Potassium cyanate has shown promise in some tests as an agent in chickweed control. Sodium arsenite has been used for this purpose for many years. Preliminary tests have indicated that a mixture of one pound of sodium arsenite and 8 pounds of potassium cyanate per acre will provide excellent control for chickweed and even lighter rates may be used effectively.

Most insects of turf may be controlled by either DDT or Chlordane. Both of these materials are relatively non-toxic to warm-blooded animals. DDT is an excellent material for the control of Japanese beetle grubs (25 pounds of actual DDT to the acre) and many of the surface-feeding insects, such as sod webworms, army worms, and cut worms (5 pounds of DDT to the acre). Chlordane is considered to be a more reliable and a quicker-acting material for the control of most of the surface feeding insects than is DDT. It is considered to be a more effective agent in the control of white grubs in the soil (10 pounds of technical Chlordane to the acre is standard).

The two stations which have conducted the major part of the research on insects of turf are the Connecticut Agricultural Experiment Station and the Florida Agricultural Experiment Station.

While earthworms are not insects, they may be controlled by using the insecticide Chlordane at the rate of about 10 pounds to the acre. While this amount of Chlordane may not actually kill all the worms, it appears to be effective in reducing the worm population so that worm casts on greens are not a serious nuisance.

The early research on turf diseases was done almost exclusively by the USGA Green Section. This phase of turf research probably has been pursued more avidly and with a more scientific approach than any other. Mercury treatments for brownpatch and dollarspot and Tersan treatments for brownpatch were developed by the Green Section.

More recently, agricultural experiment stations have begun to investigate disease control methods. The Pennsylvania Agricultural Experiment Station and the Rhode Island Agricultural Experiment Station have been the leaders in this work. The cadmium materials have come into use for the control of dollarspot as

a result of the experimental work conducted at these two stations.

At the present time the National Coordinated Fungicide Trials on Turf are being conducted. These trials provide a means of testing fungicides at a number of locations under various conditions. At the end of the year each cooperating agency furnishes the coordinator with the results of his tests, and the results are then summarized and distributed to the cooperators. This appears to be an excellent method of screening new fungicides.

Miscellaneous pests include moles and other burrowing animals. Experience has shown that moles are rarely a problem if good control of grubs is effected. Other burrowing animals are generally controlled by trapping or by baiting with poisoned grain.

Outlook

The accelerated pace of turf research is highly encouraging. As more people are trained to do turf research work through research fellowships and research grants, more effort will be expended in attempting to solve the problems which confront turf users. As these trained workers, on the completion of their training, go into various state experiment stations and other work, they will encourage the investigation of turf problems by experiment stations that previously have not done any such research.

As interest in turf research grows, the demand for near-perfection in turf will grow. The resulting pressure on experiment stations will enable them to assign men to detailed phases of major problems and also to the solution of many relatively minor problems. The prospects for advancing the cause of better turf appear to be excellent. Of great significance is the fact that the original idea of "Better Turf for Better Golf," which started when the Green Section was organized, February 10, 1921, now has spread to all fields of turf and the slogan has broadened to "Better Turf for Everyone." At the present writing we see that athletic field turf is receiving the lion's share of attention, next to golf, and that home lawns rapidly are coming into focus. It is still unrefuted that "There are more taxpayers directly interested in Better Turf than in any other single agricultural enterprise."