GCSA Convention

What They Said at Houston

Present Day Research.. A Study in Productivity

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Research in the field of turf became more widespread and intensified in the late 40's and is continuing to grow. This period has been very productive with reference to the development of better strains. Some of these are Pennlu and Penncross creeping bent; Pennlawn red fescue; Meyer and Emerald zoysia; and Tifgreen, Tiffine and Sunturf Bermudas.

Most state experiment stations now involved in turf research have turfgrass breeding or selection programs with varying degrees of intensity in conjunction with other turf studies. We can expect a number of new turfgrass strains in the near future.

Despite the release of the existing new

strains, we still find without exception, that there are some areas and some management conditions where these grasses still leave something to be desired. So there is a continuing need for tailor-made strains, for special conditions of management and areas of adaptation.

Fungicide Development

In the realm of fungicides, Bordeaux mixture was the standard material to use for any "blight" on turf prior to the mid 20's. Then, as a result of research work by Dr. John Monteith of the USGA green section, the use of mercurials in the late 20's became standard. Mercurial fungicides remained as standard controls for turf diseases until the start of World War II when mercury became scarce for non-military uses. Attention was then directed to other materials which could be used as substitutes. As a result of these investigations an organic fungicide called Thiram was found to be effective in the control of brownpatch. This material is still widely used today. About 1946, cadmium materials were developed for the control of dollarspot and other less common diseases. The antibiotic type fungicides came into use about 1953. At the present the most promising development in this field is the "broad-spectrum" materials. They are formulated to control a wide range of disease organisms.

In 1874 a German scientist named Zeidler discovered DDT, but it was not until 1939 that its insecticidal value was determined. It was first manufactured in the United States in 1943 and was used on a limited scale for mosquito control. By 1946 it had attained widespread use.

Go to Organic Insecticides

Prior to the discovery of the insecticidal properties of DDT, such materials as lead arsenate, bichloride of mercury and sodium fluosilicate were used almost exclusively for the control of turf insects. Soil fumigation was achieved by the use of sodium bisulfide. The pyrethrins, cube roots and ground tobacco stems were products used for the control of surface feeding insects. Most of these materials except lead arsenate, some of the pyrethrins and synthetic pyrethrin products which are still being used, have been largely replaced by the highly effective organic insecticides.

With the discovery of the insecticidal properties of chlorinated hydrocarbons such as DDT, chemists were provided a basis for formulation of many useful insecticides. Chlordane, toxaphene, dieldrin and aldrin are examples of the many chlorinated hydrocarbons which have been useful in the control of turf insects.

We have reduced the amount of insecticide required for effective insect control from the old standard of 400 lbs. or more of lead arsenate per acre to three lbs. or less of aldrin or dieldrin. Bacterial cultures, possessing no mammalian toxicity, will perhaps be the insecticide of the future for the control of many insects.

Development of Herbicides

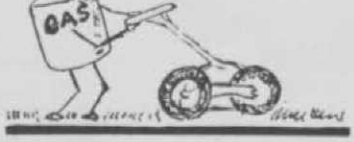
There was very little use of herbicides in turf prior to 1930. One of the first materials used for weed control was sodium arsenite. It is still in use today. Next in the line of herbicides to be used rather widely was sodium chlorate and the dinitro compounds.

The greatest revolution in the use of herbicides came with the development of a highly selective material called 2,4-D. The effectiveness and selectivity of this material was so great that broad-leafed weeds in most cases were no longer considered a serious problem. The development of 2,4-D enabled plant scientists to better understand the chemical mechanisms of selectivity and brought about extensive research in this field. With an insight into the mechanism of selectivity in broad-leafed weeds, attention was then turned to crabgrass, which was the next most serious weedy pest.

Some materials in use at the present time for crabgrass control are potassium cyanate, phenyl mercuric acetate, disodium methyl arsonate and amine methyl arsonate.

The application of herbicides to turf during the dormant season of growth, as pre-emerge controls of crabgrass, is receiving attention in this field. Several materials appear to have promise for this use. In the near future we will probably have herbicid s that are specific for a given plant.

Prior to World War I very little turf was fertilized. Manures and waste products of other industries were used to some extent



but most grass went unfertilized. During World War I factories were built in Germany for the synthesis of atmospheric nitrogen into stable compounds for war purposes because their original source of nitrogen was no longer available. After the war these factories produced fertilizer materials. Improvements have been made in this field especially in the physical condition of fertilizers with the development of granules. Granular material is easier to handle and spread and can be stored more satisfactorily. At the present time the use of high analysis materials and synthetic organic fertilizers that permit an orderly release of nutrients at a controlled rate are the trends in turf fertilization.

Power Broadened Scope

We cannot discuss turf research without pointing out the progress which has been made in the equipment line. Research in this field does not necessarily mean the development of new and different kinds of machines, as the principles of turf equipment have remained rather unchanged, but rather refinements in design or construction for longer wear, greater efficiency and safety to the operator are involved.

The change in the source of power for turf equipment was one of the great accomplishments in this field. Prior to the time of power equipment, good turf management was restricted to a very small area. With the advent of power driven cultivation equipment, which came around 1946, the cultivation of turf became a standard management practice. Other developments which have advanced the field of turf have been planters for vegetative materials and machines for seeding steep slopes, improved mowers, seeders, sprayers and fertilizer distributors.

A 3-Phase Contract to Protect the Club

By GEORGE W. COBB
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I am afraid that many architects feel that the design of a course is the only thing that concerns them. Consequently, there are many cases in which the entire construction phase is tossed in the lap of an assistant, a construction supt., contractor or even an individual club member or a group of members.

We break our course building contracts into three phases. The first is the preliminary layout of holes; the second is setting

up of specifications for building; the third is personal inspections while the course is being built.

I think that the second and third phases are so important that it is clearly stated in the contract that the client is not obliged to proceed with either until he is satisfied with what has been done before. He has immediate call upon my services to straighten out any detail which is not to his liking. I know of quite a number of courses where a designer's name has been attached to the layout although he has done nothing more than route the holes. Architecture, to my way of thinking, is not as simple as that.

It can't be divorced from construction. The overseeing of the building of tees, greens, fairways, and particularly the installation of the course drainage system are far more important functions of the architect than the mere drawing of the design. If he doesn't take the trouble to frequently visit the building site and see that everything is going according to his plans, he has no right whatever after the damage is done to utter those famous last words: "They didn't build it according to my layout or directions."

Nutrition — A Disease Control Factor

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Fungus produces disease symptoms in grass plants by feeding on contents of the cell. When a fungus pathogen (organism) infects turf it does so in two stages — through entry into the interior or tissue, and by establishing itself so that it can feed on substances produced by the plant. Resistance to the disease may occur at either or both stages.

Structural characteristics of the leaf or root surface may favor or repress invasion of the fungus. Waxy coating of the leaf for example, may make it more difficult for a fungus spore to work its way in. Presence of hair on the leaf surface has been known to have a similar effect. The number, size and positioning of stomata (a tiny breathing pore) on the surface of the leaf may also favor or discourage penetration. Another factor is structure of the cell walls on the leaf surface.

Fungus may enter a plant as the result of various mechanical, chemical or insect injuries. Root damage, such as from nematode infestation, invites invasion.

Inner Workings

Production of certain organic acids, sugar, tannin, etc. within cells protects the grass plant against fungus. These materials counteract enzymes produced by the organisms. It is believed that high carbohydrate content in relation to nitrogen and presence of compounds such as magnesium sulphate and potassium phosphate within the cell modify the efffect of enzymes generated by fungus. If these en-