keep them afloat. A small anchor of some sort keeps the can in a inverted position. Holes are punched in the submerged part of the can and dissolved fertilizer may diffuse into the surrounding water. Broadcast fertilizer applications were found to encourage aquatic weeds in some cases but the fertilizer distributed by the specially made floats showed some herbicidal effects. This effect was due partially to a large increase in plankton bloom with consequent shading but there also appeared to be some direct toxicity in the case of 16-20-0 fertilizer.

Walker also found that pelleted simazin and a dalapon—2,4-D mixture did not injure fish or fish food species. He found that simazin controlled most submerged weeds. Pelleted herbicides have been longer lasting and more effective than liquid materials.

Weed control is one of the difficult phases of pond management and consequently, a great deal of attention has been given to the matter. Table 1 is taken from Texas Agricultural Extension Service Bulletin B-213 (1).

Algae is a troublesome plant in many ponds. Copper sulfate at a rate of 0.5 to 2 parts per million is a standard treatment. Dichlone has come to be used to a considerable extent, though its use is not as common as that of copper sulfate. To treat at the rate of 0.5 p.p.m., 4.15 lbs. of copper sulfate should be dissolved in each million gallons. The 2 p.p.m. rate requires 16.6 lbs. of copper sulfate for each million gallons.

It is recommended that only about ¼ of a pond be treated at one time. Fish may then move to an untreated area. In a few weeks the other sections may be treated.

Because of the widespread use of insecticides and the toxicity of these materials to fish, care must be taken to prevent the introduction of insecticides into stocked lakes. Rudd and Genelly (2) have published data to indicate the relative toxicity of insecticides to fish species. Their findings are shown in Table 2.

Most state agricultural experiment stations or extension agencies have literature relating to pond management. This information is usually prepared from the standpoint of farm ponds, but it will be adaptable to some extent to ponds on golf courses. Making use of available information will help to make your pond a source of greater pleasure with less trouble.

References

1. Cooper, Edwin H., Improve Your Farm Fish Pond. Texas Agricultural Extension Service Bulletin B-213
2. Rudd, Robert L. and Genelly, Richard E., Pesticides, their use and toxicity in relation to wildlife. California Fish and Game Department. 1956.
3. Walker, Charles R., Control of Certain Aquatic Weeds in Missouri Farm Ponds. Weeds 7:3 July 1959.

New Laboratory Facility At UCLA Aids Research

The U.S.G.A. Green Section Research and Education Fund, Inc. makes numerous grants for the purpose of supporting research in turfgrasses. These funds become much more useful when the institution to which they are granted is equipped with adequate facilities for carrying out fundamental studies. The Department of Ornamental Horticulture at the University of California at Los Angeles has recently built and put into use six "phytotrons" which are a part of a rather elaborate greenhouse and laboratory facility.

The following release by the Department of Ornamental Horticulture describes this facility:

"A new laboratory facility has been added to the UCLA campus at 300 Veteran Avenue. This building is dedicated to the quest for knowledge in plant science with particular reference to the ornamental plants. Within this building are facilities which will allow the conduct of studies in plant genetics and in the physiology and biochemistry of ornamental plants.

"The heart of the installation is six controlled environment rooms for plant growing. Each of these rooms will be supplied with dirt-filtered, smog-filtered, washed air at a controlled temperature and humidity. All air from the room will be circulated through an air-conditioning

unit every two minutes and 10 per cent new air will constantly be introduced. This means that every twenty minutes the air will be completely renewed. Temperatures will be controllable to plus or minus 1°F. Each room then operates at an automatically controlled temperature and humidity.

"Each room is divided by light-tight partitions into four chambers. The ceil-

Light tight partitions divide this controlled environment room at U.C.L.A. into four rooms of differing light intensity. Plants are wheeled into the innermost chamber on a specially designed tall cart, made to bring plants near fluorescent lights. In use, outer door and inner partitions are closed.

ing of two of the chambers will be a solid bank of fluorescent light (with a few incandescent lights) which is planned for an output of 2000 foot candles. In these chambers it will be possible to grow plants through their entire life cycle. The other two chambers are equipped with low intensity fluorescent and incandescent lights which will be useful for photoperiod studies. All lights are automatically turned off and on by time clocks. The envelope temperature of the fluorescent tubes in the high light intensity chambers will be kept constant at most efficient operating temperature regardless of room temperature. To accomplish this the lights are separated from the chamber by a glass ceiling and the temperature is controlled above this ceiling by an automatic damper and blower system which allows cooling air to pass over the lights when necessary.

"Attached to these controlled environment chambers are two 36' x 95' free span greenhouses of steel frame and aluminum bar construction. One of these is divided into three chambers which will allow for 3 temperatures. All chambers will be ventilated with smog-filtered, evaporative-cooled, forced air. The greenhouse has a concrete floor which will facilitate moving plants on carts to and from the controlled environment rooms and between chambers. With the three greenhouse chambers and the controlled environment rooms, it will be possible to subject plants to numerous combinations of well controlled environments. Experience at the Earhart Plant Research Laboratory of the California Institute of Technology has proven the worth of such controlled environments for plant research.

"Laboratories are located on the floor above the controlled environment rooms. There are five office-laboratories for individual staff members. There is a general biochemistry laboratory, a small "hot" lab for preparation of radioactive plant materials, a counting room for radioactive counting, a general cytology-anatomy laboratory, and a sterile culture laboratory with a transfer chamber.

"A small secretary-receptionist office, a conference room, and a plant and soil handling area complete the facility except for the machinery rooms and service area. The total floor area, including the greenhouses is 11,692 sq. ft."

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The Role Of Water In Plant Growth

BY DR. MARVIN H. FERGUSON
Mid-Continent Director, National Research Coordinator, USGA Green Section

Water is the most abundant material in a growing plant. The weight of water contained in a plant is usually four or five times the total weight of dry matter. Water is one of the constituents of many of the complex substances found in plants but it is interesting to note that liquid water is never found in a pure state in the environment of living organisms.

The essentiality of water is readily apparent. It has many functions in the plant.

It is a solvent for mineral nutrients and the complex substances manufactured within the plant.

It is a transportation agent and the means whereby the equilibrium of salts and other dissolved products is maintained between the various plant parts.

It is a raw material for the process of photosynthesis—the basic process underlying all life.

It acts as a temperture regulator in that water vapor given off by