CONSTRUCTION AND OPERATION OF A SIMPLE GROWTH CHAMBER

A controlled growth chamber has been improvised at Mississippi State College for use in barley and wheat breeding. Its construction and operation were aided by information in a report by Goulden. This note presents additional observations and details of possible interest to other cereal breeders.

A room 12 feet by 8 feet with a 9 foot ceiling was used. The outside wall of this chamber is 8-inch brick and contains a window covered on the inside with paper. The inner walls of the room consist of two layers of wood with a layer of building paper between them. Walls, ceiling and floor are white for light reflection. The floor is covered with tar paper to prevent rotting. A 21-tube battery of 8-foot slim-line, white-light, fluorescent tubes hangs on each side of the room. Standard parts were used to construct these batteries in this manner: Commercial 2-tube fluorescent units were purchased and converted to 3-tube units. Seven of these units were secured together with two pieces of 2-by-4-inch lumber. Two large eye screws were set in the tops of the 2 by 4's and connected to the ceiling with blocks and tackle for raising or lowering one battery of lights. The other battery is hung from a shelf, 5½ feet from the floor. A string of five 40-watt incandescent bulbs is suspended in permanent position down each battery. The distance between the floor can be varied but usually is about 36 inches.

Two one-ton capacity air conditioners are in the window and the other over the door on the hottest summer days will maintain a temperature of about 65°F. Except in the summer, one unit alone will maintain a minimum temperature of 65°F. With night temperatures of about 65°F, daytime temperatures must be about 75°F or fertility will be low. Manual adjustment of the thermostat morning and evening provides a daily temperature range of 62° to 78°F. A time clock could be installed to alternate control of the temperature between two thermostats set to provide a desirable range of temperatures. A continuous record of temperature and humidity is kept by a hygrothermograph.

The fluorescent lights on a time clock provide for an 18-hour day. Red light is supplied by incandescent bulbs which burn continuously. Foot candles of 1700, 1500, 1030, 1020, 920, and 780, respectively, and at the edge of the fluorescent unit, 1000, 900, 780, 760, 700, and 640, respectively.

All plants are grown in 6-inch clay pots. The potting mixture is used only once and is one-half sand and one-half field soil. The plants are watered with a Shives R5S2 nutrient solution (Miller) made as needed from stock solutions of magnesium sulfate, calcium nitrate, and dibasic potassium phosphate.

1 Mississippi Agr. Exp. Sta. Journal article 662. Received April 19, 1957.