this type of cover. Two physical limitations are size and transportation. Since they cannot be transported easily, construction on site is necessary. They are also expensive. Therefore, this type of cover would be suitable only for permanent, longtime experiments.—LEON LYLES WOODRUFF, Agricultural Engineers, Western Soil and Water Management Research Branch, SWCRD, USDA, Manhattan, Kansas.

RESISTANCE IN POPCORN TO EUROPEAN CORN BORER LEAF FEEDING

DAMAGE to stalks and ear shanks by the European corn borer (Pyrausta nubilalis (Hbn.)) generally is more serious in popcorn than in dent corn hybrids. Smaller stalks and shanks of popcorn than of dent corn cause relatively greater number of broken stalks and dropped ears. Feeding which causes only slight damage to the grain is very serious in popcorn because of its affect on popping volume. Knowledge of the borer resistance of inbred lines and their hybrids is necessary for an effective popcorn breeding program.

In a cooperative study by the Iowa Agricultural Experiment Station and the U. S. Department of Agriculture, established inbred lines, single crosses, top-crosses of new lines and some 3-way and double-cross popcorn hybrids have been artificially infested with corn borer egg masses to measure their resistance to borer leaf feeding. Four corn borer egg masses in 2 lots of 2 masses each were applied about 4 days apart to 8 plants of each line or cross. A 9-class rating scale as described by Penny and Dicke was used, with a rating of 1 being most resistant and 9 most susceptible.

Eighty single-cross hybrids were grown in replicated plots at Ames and were artificially infested in 1958. The data indicated that some single-cross combinations have a greater degree of resistance than others.

The mean rating of 6 inbred lines tested in 1957 and 1958 at Ankeny and the mean ratings of all possible single crosses among them grown in 1958 at Ames are given in table 1. While these data are rather limited, it appeared that the resistance of a hybrid could be estimated by using the mean resistance of the parent inbred lines as a criterion.

Three experimental and 2 commercially released hybrids were evaluated for resistance to borer leaf feeding. It again appeared that there was considerable relationship between the mean resistance of the inbreds involved in the hybrids and the resistance of the hybrids to borer leaf feeding.

While no estimate of the genetic background determining the expression of borer resistance in popcorn has been made, it appears that wide differences occur among inbreds and hybrids. Further studies are necessary to establish the inheritance of borer resistance and to determine the most efficient breeding program for using this resistance.—W. I. THOMAS, Assistant Professor of Farm Crops; F. F. DICKE, Entomologist, Entomology Research Branch, ARS, USDA; and J. C. ELDREDGE, Associate Professor of Farm Crops.

A BATH FOR SOIL TEMPERATURE CONTROL IN POT CULTURE WORK

The water bath presented in figure 1 is designed to provide a relatively inexpensive method of maintaining a uniform soil temperature during crop growth in the greenhouse. The bath consists of a plywood box 8 feet by 4 feet by 10 inches or dimensions as desired, lined with clear polyethylene plastic sheeting. A uniform temperature within the bath is obtained by circulating the water with 2 inexpensive impeller-type circulating pumps, having a capacity of approximately 8 gallons per minute.

![Figure 1—A uniform-temperature water bath with control unit, circulating pumps, and temperature recorders.](image)

The bath is cooled by turning on the line water (having an 18° C. temperature in this case), using a thermostat in the bath connected to a hydraulic action solenoid switch, whenever the temperature goes above a predetermined level.

A continuously recording thermograph used during an experiment showed that the temperature of the water bath was maintained at 21° C. ± 0.5° except on a few cool evenings when the over-all temperature of the bath dropped to 18° C. During this period the average air temperature fluctuated between 20° and 36° C. A drop in temperature of the bath could be prevented by inserting a heating element and a suitable thermostat-relay system.—ALEX R. MACK, former graduate student, (now Research Officer, Canada Department of Agriculture, Ottawa, Canada) and STANLEY A. BARBER, Professor of Agronomy, Purdue University, Agricultural Experiment Station. Contribution from the Department of Agronomy.