TECHNICAL NOTES

Small Alternating Temperature Germinator[1]

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Highlight

A low-cost germinator for special temperature conditions can be constructed from readily available commercial materials.

Knowledge of maximum and minimum temperature limits for germination, as well as light requirements for a given species, is a primary factor in the study of a plant's environmental requirements. This information is essential in studying the life cycle and ecological amplitude of a plant. The wide spectrum of temperatures under which seeds of different species germinate is often beyond the limits of equipment readily available for controlled germination tests. Furthermore, the chamber size of large germinators may contribute to undesirable temperature variations.

A special germinator (Fig. 1) to study the lower germination temperature limits of Dalmatian toadflax *(Linaria dalmatica* (L.) Mill.) was constructed for use in a laboratory cold room. The cold room temperature was adjusted to the minimum temperature desired (in this case, 10 C), and the temperature desired above the lower limit was controlled by means of an adjustable thermostat in the germination chamber. The time desired for each of the alternating temperature regimes was

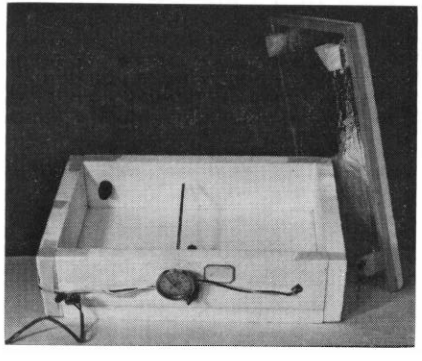

FIG. 1. Germination box built from plastic building insulation, illustrating thermometer and electrical component placement.

[1] Cooperative investigations of the Plant Science Research Division, Agricultural Research Service, U. S. Department of Agriculture, and the Washington Agricultural Experiment Station. Received February 5, 1971.

then regulated by plugging the unit into a single-pole, single-throw time clock in the cold room. In operation, the lower temperature attained was that of the cold room, and the higher was that to which the thermostat was adjusted. Because of the small size and relatively low cost, a number of such boxes with a range of maximum temperatures could be operated simultaneously in a single cold room.

The germination box was constructed of rigid, 1-inch-thick plastic foam building insulation. Inside dimensions were 9 by 13 by 3¾ inches. The plastic pieces were fastened together with a common brand of white glue. The cover was underlined with aluminum foil to serve as a heat reflector and to eliminate overhead light penetration. Triangular blocks in the corners of the under side of the cover prevented accidental removal. Heating was accomplished by installing two 7½ w, 120 v incandescent lamps, one in each of two diagonal corners. Lamps were spray-painted black since light was not necessary for germination of Dalmatian toadflax seed. An alternate possibility would be a heat tape fastened to the inside walls of the box. The thermostat was a commercial unit obtainable from a scientific supply house, and the dial thermometer was chosen for convenience in checking temperature without opening the chamber.

One side of the line cord was wired to one thermostat lead, the other side to one lead of each lamp. The remaining leads of each lamp were wired to the second lead of the thermostat. All wiring was done outside of the box and taped securely in position.

The box illustrated has a capacity of 16 9-cm petri dishes. Dishes were rotated daily both as to position in the box, and in order from top to bottom to compensate as much as possible for any differences in amount of heat received by each dish. The thermostat, thermometer, and time clock were available from laboratory stock. Other electrical components and the insulation board were purchased for about $5.