A DEVICE FOR GREENHOUSE AND FIELD EMASSCULATION OF SWEET SORGHUM FLOWERS

In the variety improvement work with sweet sorghum in California it has been necessary to make numerous crosses. Individual floret emasculation is slow and tedious. Killing pollen without harm to the other essential floral parts by means of hot water has been successful where the temperature of the water is maintained at an effective and safe level. In the past, emasculation by the hot water treatment of sweet sorghum plants grown in the greenhouse has consisted of removing the plants to the laboratory and dipping the heads in a container of water maintained at the desired temperature. The moving of the plants back and forth between greenhouse and laboratory is time-consuming and otherwise unsatisfactory. Furthermore, it is impracticable to tip the plants over the container of hot water in such a position that the heads are submerged in the water.

In the field there was no satisfactory equipment available to use in the emasculation of the sorghum flowers. To fill this need, equipment was designed for use in both field and greenhouse emasculation (figure 1). This consists of a cylindrical cup 3 inches in diameter and 12 inches long, with a 3/4-inch hole in the base, cut longitudinally into 2 equal halves. A layer of sponge rubber, attached in grooves around the edges of each half of the cup, forms a tight seal when the halves are closed. The two halves are joined with small hinges on the back and metal straps in front. Arms, about 3 inches long, are welded to opposite sides of the cup. Each arm has a clamp at the end which can be attached to a metal rod. These clamps permit the cup to be adjusted to the desired height on ringstands, for greenhouse use, or on metal rods driven into the soil adjacent to the plant in the field. A rubber tube is used to siphon the water from the cup. The water may be emptied from the cup by releasing the metal straps, but this may wet the operator.

This equipment is used by placing the head of the sorghum plant between the two halves of the cup and closing the halves around the panicle with the stem extending through the hole in the base of the cup. It is usually necessary to wrap a piece of cotton around the part of the peduncle that passes through the hole to adjust for differences in the diameter of stems of individual plants. The quantity of cotton necessary for a tight seal is readily determined by observation. A thermometer is attached to the inside of the emasculator in a position in which it can be easily read from the top of the cylinder. Hot water is added to cover the panicle. In practice it is necessary to check the temperature at frequent intervals and to add hot water to keep the water up to the desired temperature. The temperature found most satisfactory for emasculation of sorghum by a 10-minute hot water treatment is in the range of 42 to 44°C.

This emasculator has been used for two seasons and has proved to be very satisfactory. It seems probable that it can be used with other plants where the thermal inactivation of pollen is practicable.—Charles Price, Research Agronomist, U.S. Agricultural Research Station, Salinas, Calif.

INHERITANCE OF WHITE FLOWER COLOR IN COMMON VETCH,

Vicia sativa

The use of a genetic marker is important for identifying hybrids in a highly self-pollinated species such as Vicia sativa. Flower color is useful for this purpose, as an aid in varietal identity, in seed certification, in rogueing off-type plants resulting from chance crossing or mechanical mixing, and in genetic studies of other characteristics. The present study was undertaken to determine the inheritance of white flower color in this species.

Data are from a cross between a white-flowered and a purple-flowered selection. The white-flowered female parent was emasculated by the suction method and 4 pods with 20 seed were obtained from 4 flowers cross-pollinated in the greenhouse in 1952. Of the 20 seed, 18 produced white-flowered plants and 2 produced purple-flowered plants, indicating that only the 2 purple-flowered plants were F1 hybrids. Seed of these two plants was harvested and the resulting progenies segregated for flower color. With the exception of 16 F2 plants, all plants of the F2 and subsequent generations were grown in the field and were permitted to set seed without bagging or artificial tripping. All families were composed of approximately 20 progeny, with the exception of 14 F4 families, each of which had approximately 40 progeny.

Segregation in the F2 suggested a 3:1 phenotypic ratio for purple to white flower color. Nonsignificant Chi-square

3 The author gladly acknowledges the advice and assistance of E. F. Schultz, Jr., biometrician (resigned), Agr. Exp. Sta. of the Alabama Poly. Inst., in the statistical analysis of the data.