A METHOD OF TRANSPLANTING AND SUPPORTING SEEDLINGS FOR SHORT TIME RESEARCH STUDIES

G. M. Aubertin and L. T. Kardos

THE difficulties involved in obtaining initially uniform corn, sorghum, and sudangrass seedlings for a soil moisture-bulk density-root penetration study prompted a search for a method which would allow seedlings of uniform growth to be successfully transplanted to the experimental soil. The work of DeRoo and Wiersum, involving root training by plastic tubes, provided the impetus to develop the method being reported.

The method consists of germinating the seeds between thick layers of moistened cheese cloth. After emergence and growth of the primary root to approximately 1/2 to 2 centimeters, the germinated seeds are transferred to glass tubes containing about 2 1/2 inches of loosely packed vermiculite (screened to pass a 2-mm. screen). The glass tubes are 3 inches long, with a nominal 9/16-inch O.D., 7/16-inch I.D., and are held in a wooden rack which has several layers of cheese cloth fastened around its bottom to serve as a wick (Figure 1). The germinated seeds are placed with care on top of this vermiculite in such a manner that the primary root is immersed in the vermiculite. The tube is then filled with additional vermiculite and the sides of the tubes are gently tapped to obtain a uniform settling of the germinated seed and vermiculite. The tubes in the rack are then saturated with water by slowly lowering the rack into a container of water deep enough to allow the water level to almost reach the top of the tubes. In this manner the vermiculite in the tubes is completely wetted from the bottom up. The rack is then placed in a tray containing water to a depth of about one-half inch. The vermiculite in the tubes is in this way constantly kept at a proper moisture level due to the capillary action through the cheese cloth. In about 24 to 36 hours the tip of the primary root usually reaches the bottom of the glass tube and the shoot usually has emerged through the top of the vermiculite. At this stage of growth, the seedlings in their glass tubes are "transplanted" to the experimental setup.

When "transplanting" to soils, a hole is bored in the soil to a depth of 1 inch with a No. 9 cork borer and the tube containing the seedling is inserted into the hole to make firm contact with the bottom (Figure 2). The outside diameter of the cork borer should be slightly less than that of the glass tube. This method has proven very satisfactory in providing firm support of the tube in tests involving different moisture levels and different bulk densities.

The size and length of the glass tubes can be varied to meet experimental conditions, but the tubes described above have proven most satisfactory for root penetration studies involving a 3- to 4-week test period.

In the greenhouse evaluation study, maize "grown" in glass tubes placed in soil in a 5-gallon crock for periods of time up to 45 days did not differ from "normally grown" maize in any observable aspects.

---

1 Authorized for publication on March 20, 1964, as paper number 2882 in the journal series of the Pennsylvania Agricultural Experiment Station. Received Mar. 30, 1964.

2 Graduate Research Assistant and Professor of Soil Technology, Department of Agronomy, The Pennsylvania State University, University Park, Pa.


---

Figure 1. Seedling transplant tubes resting on cheesecloth wick just prior to "transplanting".

Figure 2. Transplant system used with soil compacted in 3-inch aluminum cylinders in soil moisture-bulk density-root penetration study, showing No. 9 cork borer for cutting 1-inch deep central cavity and transplant tube in place in cylinder No. 3.

UNIFORMITY of the final seedlings selected for "transplanting" is obtained by eliminating non- or slow-germinating seeds and by selection of uniform root growth and seed sizes at the time of putting the germinated seeds into the glass tubes. An additional aid in obtaining uniformity is provided in the final selection of tubes for "transplanting" by selecting tubes containing seedlings with uniform root lengths protruding from the bottom of the tubes and uniform shoot growth.

EFFECT OF TEMPERATURE ON COLEOPTILE ELONGATION IN EIGHT WHEAT VARIETIES AND SELECTIONS

J. R. Burleigh, R. E. Allan, and O. A. Vogel

FIELD and laboratory studies at Pullman, Washington, showed that there is a positive correlation between coleoptile length and seedling emergence rate of fall-sown wheat (Triticum aestivum L.). Furthermore, selections with long coleoptiles emerge faster than selections of short coleoptile length. Poor seedling emergence has been encountered frequently when seeding is performed in warm weather. The object of the study described herein was to...