

The bottom-air-intake end vents of the greenhouse are blocked with air allowed into the houses only from the upper convection tube opening. A poly curtain is set up 6 ft into each house. This allows for even distribution of air flowing into the houses and also protects the main electricity areas.

Several hundred cuttings are prepared and stuck all at once. Cuttings are direct stuck into the plug trays on the floor. The cuttings are inserted 1 to 1-1/4 in. in depth into the medium and thoroughly watered in. The medium is checked on a regular basis for any drying that might occur. Depending on cultivar, rooting occurs in 6 to 10 weeks. On average 90+% rooting can be obtained.

Post Rooting. Once rooting has occurred, the cuttings can be hardened off and moved into another house for overwintering or left in the propagation house for overwintering. The house is set at 35F night temperature and the vent temperature is set on 42F.

The average speed for taking field cuttings, preparing the medium, filling plug trays by hand, preparing the cuttings, and sticking the cuttings is 130 cuttings per worker hour per person per day.

Control of Root Outgrowth by Copper Hydroxide in Capillary Mat Plug Production

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Capillary mat subirrigation offers several advantages over standard overhead watering. It provides a relatively constant supply of water reducing fluctuations in the water content of the medium caused by evaporation between overhead watering cycles. Also, it is a viable option to meet new or pending regulations for managing water and water effluent for greenhouse production. The drawback for plants grown on capillary mats is root outgrowth from the container into the capillary mat (Koranski and Kessler, 1991). Root outgrowth reduces the life of the mat, can make removal of plants from the mat difficult, and reduce the quality of the seedling for transplanting.

The objective of this study was to determine the efficacy of treating the outside, bottom of plug containers with Spin Out™ (a commercially available formulation of copper hydroxide in latex paint) to control root outgrowth into capillary mats during plug production of marigold seedlings.

Seeds of marigold (*Tagetes* Little Devil hybrids) were sown into plug flats and moved to capillary mats. Three square-plug flats—512, 406, and 288, and two octagonal-plug flats—384 and 288 (differing in volume and shape but with a constant height of 2.5 cm) were compared for seedling development. The outer, bottom surface of half the 16-celled flats were dipped in Spin Out™ (Griffin Corp, Valdosta, Georgia) containing 100 g Cu(OH)₂ liter⁻¹ (7%, w/w). Seedlings were evaluated for leaf area, shoot and root dry weights, and root length. Root length in 13-day-old seedlings was determined from 8-bit digital images obtained using a Coho video camera and analyzed using a Quadra 700 Macintosh computer.

The overall root outgrowth was reduced by 80% to 92% by the copper treatment regardless of cell shape or volume (Fig. 1). Seedlings grown in octagonal plugs showed less root outgrowth and produced 21% more roots compared to square plugs. Larson et al. (1987) observed larger tomato transplants produced in square compared to round containers. Seedlings transplanted to cell packs showed no effect of copper treatment on shoot and root growth. Seedlings grown in small square-shaped plugs showed reduced overall growth compared to large plug sizes. Improved growth following transplanting has been one of the benefits shown by plants grown in copper-treated containers (Struve and Rhodus, 1990).

Results from this study show the potential usefulness of using Spin Out™ on the outside bottom of plug containers to control root outgrowth onto capillary mats. The current study was limited to marigold seedlings and additional research will be required to show the general usefulness of this procedure with other species.

LITERATURE CITED

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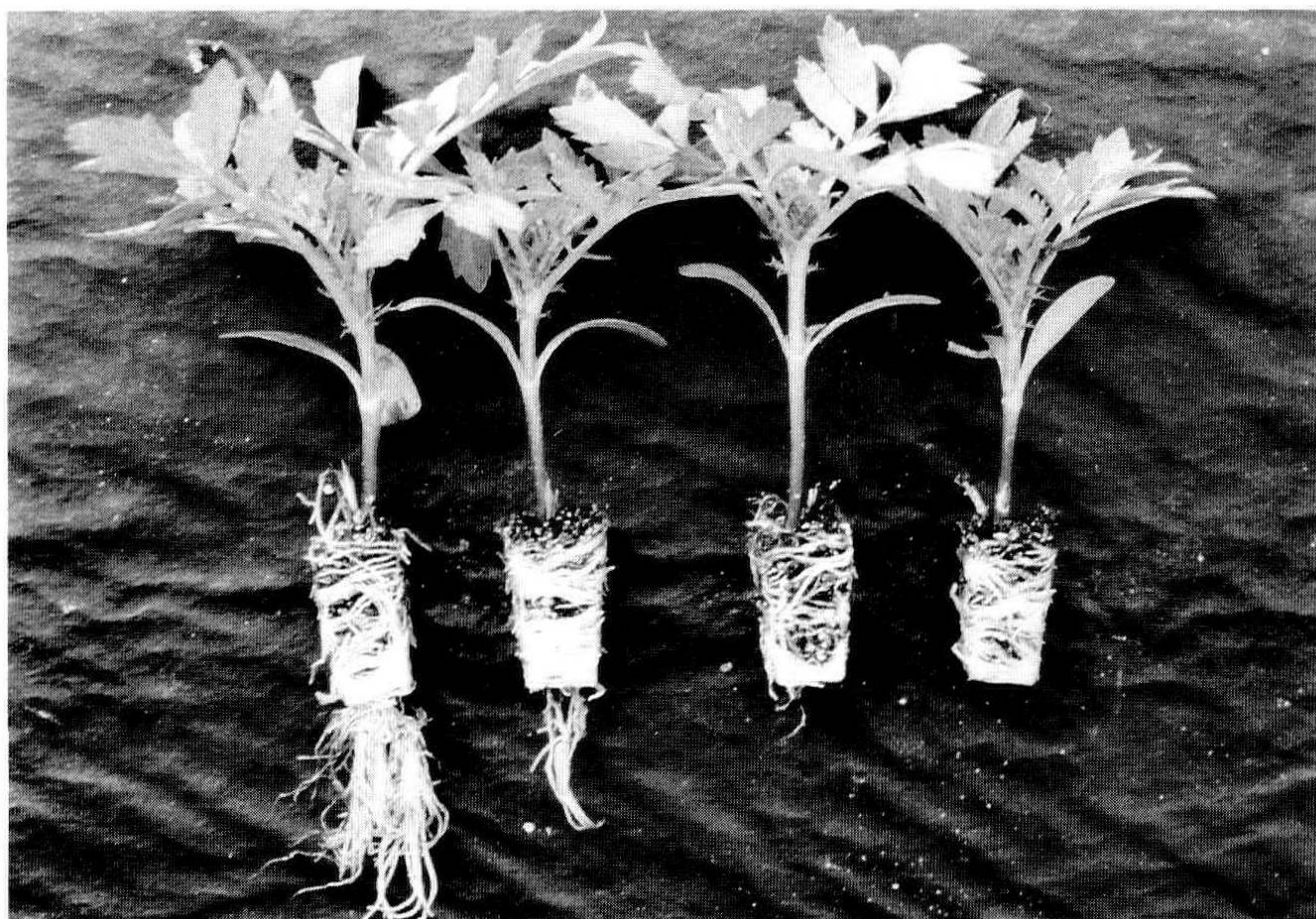


Figure 1. Marigold seedling growth after 16 days showing root outgrowth from the drainage hole in untreated plug (left) and copper-treated (right).