Introduction to the Symposium

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The influence of the stock plant (mother plant, donor plant) has long been known to exert a profound effect on subsequent propagation capability of its propagules. Both treatments applied to the stock plant and the environment under which the stock plant is grown have a strong influence on subsequent propagation. These effects may include an increase in size or number of cuttings and improved root regeneration by cuttings taken from such stock plants. Nutrition, light, temperature, genotype, plant growth regulator applications, physical manipulations, and season of the year have all been reported to influence macropropagation efforts. Similarly, the influence of these same factors often has been reported to have a strong effect on the performance of propagated explants taken from stock plants so treated. From the early work of Kraus and Kraybill (18) in 1918, we can see that the carbohydrate : nitrogen ratio was shown to be an important factor in the rooting of tomato cuttings. Micronutrition of stock plants also has been given some attention, as exemplified by the work of Weiser and Blaney (25). Dhillon (5) also has pointed out that nutrient effects often are modified by light. Reduced light intensity has been reported to enhance the rooting of dahlia, forsythia, and weigelia (3, 19). Etiolation, or extreme light reduction, frequently has been reported to also improve rooting (9, 17). Other authors have reported that reduced stock plant light intensities can lead to better rooting of the cuttings of several species (1, 11, 21). Increases in endogenous auxin level generally are believed to occur under reduced light, thus enhancing rooting (20). Whally (26) has reviewed literature on photoperiod effects on rooting of numerous ornamental species. Keeping stock plants in a vegetative condition by the use of night interruption or day extension has enabled researchers to provide a continuous supply of cuttings (14, 15, 24). Bachelard and Stowe (2) and von Hentig (16) have reported direct effects of stock plant photoperiod on the rooting of cuttings. The influence of the stock plant on micropropagation has been demonstrated by several researchers. An increased yield of haploid plants resulted from in vitro-cultured anthers of tobacco (Nicotiana tabacum L.) when the anthers were taken from stock plants grown under short days and high light intensities (6). Earlier, Heide (12, 13) reported that in vitro culture of Begonia leaves was positively influenced by high temperatures and long days applied to the stock plants. Significant differences among genotypes was reported by Cheng and Smith (4) for autonomous growth of Nicotiana pith culture. Read et al. (22) also demonstrated dramatic differences in shoot regeneration among a large number of petunia cultivars. In some of our other early work (23), the influence of light quality on the stock plant was demonstrated (Fig. 1). Petunia stock plants grown under end-of-day red light treatments branched profusely, and those plants receiving far-red light at the end of the day grew in an unbranched vertical manner. Furthermore, leaf segment cultures taken from stock plants treated with red light produced up to three times as many shoots per explant as did explants taken from nontreated plants. Other reports indicate interesting stock plant effects, e.g., effect of stock plant propagation method on subsequent tissue culture and cutting propagation of blueberries (10), light duration and irradiance level effects on azalea micropropagation rate (8), and the profound effect that the number of passages or recul-
and irradiance level effects on azalea micropropagation rate (8), and the profound effect that the number of passages or recultures has on shoot regeneration from azalea explants cultured in vitro (7). This evidence suggests that endogenous hormonal changes also occur during the culture period, just as they probably do in intact stock plants.

This symposium therefore addresses the essential question, “How can propagators increase reproducibility of results from location to location, nursery to nursery, and laboratory to laboratory?” The stock plant condition is clearly a key variable that has too often been given insufficient attention. The influence of the stock plant on both macropropagation and micropropagation is examined in the following papers.

Literature Cited

11. Hanson, J. 1976. Adventitious root formation induced by gibberellic acid and regulated by the irradiance to the stock plants. Physiol. Plant. 36:77-81.