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BA Induces Lateral Branching of *Peperomia obtusifolia*

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Additional index words. N^6-Benzyladenine, growth regulators, foliage plants

Abstract. **Treatment of *Peperomia obtusifolia* plants with a single foliar spray of N^6-Benzyladenine (BA) at 250, 500, or 1000 mg/liter resulted in compact plants with an increased number of lateral branches.**

Peperomia obtusifolia (L.) A. Dietr. is a popular tropical foliage plant with an upright spreading growth habit and nearly oval leaves that are dark green and glossy. Ease of production and tolerance to low interior light levels are 2 additional reasons *Peperomia* is such an important foliage plant. Plants in production, however, sometimes become leggy and top heavy. Occasionally, the main stem weakens and bends during periods of rapid growth, especially under low production light levels. Such plants normally consist of a single main stem and 1 or 2 lateral branches originating from leaf axils near the soil level. To produce a full and compact plant, commercial growers routinely place 2 stem cuttings with 2–4 expanded leaves per 7.5 cm pot or 3–4 cuttings per 10 cm pot (4). Ability to increase lateral branching of *Peperomia obtusifolia* using growth regulators could eliminate the need for sticking multiple cuttings per pot.

Foliar sprays of N^6-Benzyladenine (BA) have been used previously to induce lateral branching in several foliage plants. Foliar applications of BA at 500, 1000, and 2000 mg/liter significantly increased lateral budbreak of *Dieffenbachia* 'Welkeri' (6). Eight weekly foliar sprays of 100, 250, and 500 mg/liter BA significantly increased the mean number of axillary shoots of *Cordyline terminalis* 'Celestine Queen' (5). Application of a 100 mg/liter BA spray increased phylloclade number up to 150% on *Schlumbergera truncata*, when applied under long day photoperiod (3). BA also has promoted branching of *Hedera helix* (1) and *Dracaena* (2). This paper presents results of an experiment designed to determine if the number of lateral branches of *Peperomia obtusifolia* could be increased by foliar sprays with BA.

Fifty-six plants of *Peperomia obtusifolia* 5–7 cm in height were planted one per 12.5 cm pot in a 2 Florida sedge peat: 1 pine bark: 1 cypress shavings medium by volume containing 4.2 kg dolomite and 5.9 kg Osmocote (19–6–12) per m^3. The 4 treatments consisted of a single foliar BA spray at 0,

Fig. 1. *Peperomia obtusifolia* plants in 12.5 cm pots 12 weeks after a single foliar BA spray. Plants pictured include (from left) untreated control, and BA spray at 250, 500, and 1000 mg/liter, respectively.

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Table 1. Effect of a single foliar spray of BA on number of lateral branches, internode length, and total growth of *Peperomia obtusifolia*.

Treatment (mg/liter)	Mean no. lateral branches[z]	Mean internode length (cm)				Increase in plant ht (cm)
		−1[y]	+1	+2	+3	
0	4.6	3.7	3.3	2.9	2.7	17.1
250	7.4	3.1	2.9	2.0	1.4	13.3
500	9.4	3.4	2.6	1.6	1.1	15.2
1000	10.4	3.3	2.5	1.8	0.8	13.4
		F test significances[x]				
Linear	**	NS	**	**	**	**
Quadratic	**	NS	NS	**	**	NS
Cubic	NS	NS	NS	NS	NS	**

[z]Fourteen replications per treatment.
[y]Position of internodes where (−1) = last node developed at time of treatment; (+1) = 1st node developed after treatment; (+2) = 2nd node and (+3) = 3rd node developed after treatment.
[x]NS,**Nonsignificant and significant at 1% level, respectively.

250, 500, and 1000 mg/liter. BA crystals were dissolved in a few drops of 1N KOH, followed by gradual addition of deionized water coupled with heating and constant stirring. Triton X-100 at 1 drop per liter was used as a wetting agent, and plants were sprayed once to runoff (about 10 ml per plant.) There were 14 plants per treatment arranged in a randomized block experimental design with each plant comprising a single experimental unit. At the time of treatment, plant height was measured from the top of the pot to the tip of the main growing point, and the last fully expanded leaf was marked. Plants were treated 12 Nov. 1983. Final data were taken 12 weeks after treatment. Data consisted of increases in plant height (cm), numbers of lateral breaks and length of the 1st internode below, and the 3 nodes above the leaf marked at the time of treatment. Position of internodes was indicated using the following notation: (−1) = last node developed at time of treatment; (+1) = 1st node developed after treatment; (+2) = 2nd node; and (+3) = 3rd node developed after treatment.

An increase in lateral budbreak in treated plants was noticeable within 4 weeks. After 12 weeks, there was a linear increase in number of lateral buds with increased concentration of BA. Untreated plants averaged 4.6 lateral branches compared to 7.4, 9.4, and 10.4 for the 250, 500 and 1000 mg/liter treatments, respectively (Table 1). The lateral breaks occurred all along the main shoot (Fig. 1). Several lateral branches were accompanied by secondary shoots beginning to emerge from the same leaf axil. No phytotoxicity or deformed growth was observed on treated plants.

The growth of main stems of BA treated plants was reduced significantly during the 1st 12 weeks after treatment (Table 1). Reduced height could be accounted for by a linear decrease in internode length of the 1st 3 internodes developed after the last fully expanded leaf marked at the time of treatment (Table 1). The most pronounced reduction of internode length occurred in the 3rd node, which would have been affected in previous stage of development by the BA application. After 12 weeks, subsequent internodes began to elongate normally, indicating that BA effects were lessening. We have no explanation for the BA effects on internode length of *Peperomia* at this time.

Significant quadratic effects were observed when analyzing number of breaks and internode length of nodes +2 and +3, indicating that response to BA declined as concentration increased. Such results could be depicted by a 2nd degree curve rather than a straight line and indicate that treatment concentration in the range of 250–500 mg/liter BA provide the optimum branching and dwarfing response per unit of active compound. In this study, BA effects resulted in more compact plants with a greater number of lateral branches and therefore may eliminate the need for sticking more than 1 cutting per pot.

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Duplicating Foliage Shade for Research on Plant Development

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Additional index words. phytochrome, shade film, light quality

Abstract. **A shade film is described which duplicates the spectral quality of light underneath foliage. The film should become an important tool for studying plant development, and it may have commercial applications.**

We are beginning to understand the ecological significance of phytochrome for plant development, beyond that of controlling flowering (17). Progress has been frustrated, however, by difficulties in experimental methodology. The quantity and spectral quality of radiation passing through foliage is altered by the optical properties of leaves. Leaves typically absorb 90% of incident light in the wavelengths 400–700 nm and less than 10% of radiation 750–1100 nm (7, 8, 20). Thus, natural light under foliage is deficient in radiation usable for photosynthesis, and is spectrally altered in the wavelengths (650–750 nm) affecting phytochrome equilibria (1, 10, 18). Although shade light may affect plant growth and development profoundly (3, 9, 13, 14, 17), it has been difficult to document its effects because of the heterogeneity of natural light environments (2, 15, 16), and the difficulty of producing artifical ones (17).

Research on the effect of spectral distribution of radiation on plant growth has been hampered by the necessity of including adequate levels of photosynthetic photon flux density (400–700 nm, or PPFD) along with altering the quantum ratios of red to far-red wavelengths [660/730 nm, or R:FR as defined by Smith (17)]. The high R:FR characteristic of sunlight is achieved easily through the use of fluorescent or mercury vapor lamps. However, only moderately low R:FR can be achieved by the use of low wattage tungsten incandescent lamps. This radiation can be altered further by filters (8, 9, 16), but the excess infra-red radiation from the high flux

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