

## FUCHSIA STANDARDS IN FIVE MONTHS WITH GIBBERELIC ACID

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Fuchsia, geranium, poinsettia, coleus and lantana are sometimes grown as standards, or in a tree-like form, as a novelty. Growing a standard often takes 12 to 18 months, considerable labor and greenhouse space. Consequently, they are not widely grown and they are expensive when sold.

An excellent history and guide to the propagation and the culture of fuchsia has been written by Wilson (3). He described three types of standards: a table standard, having a bare stem less than 12 inches (30 cm); a half standard, having a bare stem of 18 to 30 inches (46 to 76 cm); and a full standard, having a bare stem greater than 30 inches (76 cm). A quality fuchsia standard should have a strong straight stem and a dense, well-balanced head. Wilson described the half standard fuchsia as being ideal for greenhouses and for planting with summer bedding plants.

A rapid production method for standard geranium using gibberellic acid ( $GA_3$ ) was reported by Pudlo et. al. (1). Gibberellic acid has been shown to promote stem elongation, but it also inhibits flower initiation in fuchsia (2). Research was conducted with  $GA_3$  to develop a production schedule, whereby fuchsia standards could be produced more rapidly for spring sales. Two upright fuchsia cultivars 'Winston Churchill' and 'Black Prince' were studied. 'Winston Chur-

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chill' is a double-flowered, small-leaved cultivar. 'Black Prince' is a single-flowered, large-leaved cultivar.

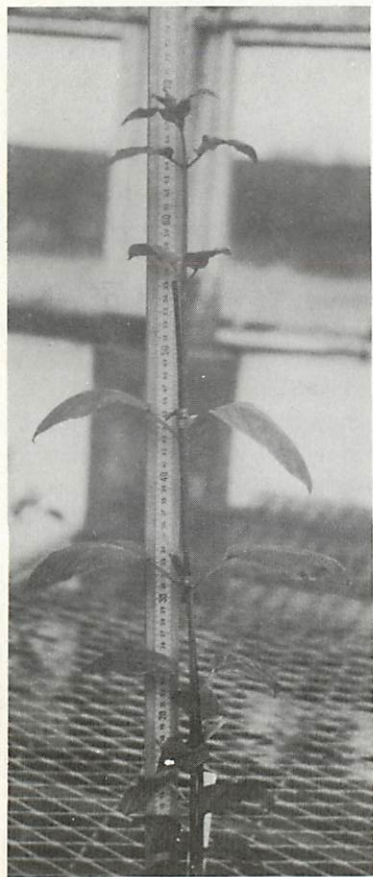
#### MATERIALS AND METHODS

Rooted cuttings were purchased from a commercial propagator, planted in 10 cm (4 inch) pots and spaced 65 plants/m<sup>2</sup> (6 plants/ft<sup>2</sup>) on January 21, 1981. Plants were grown in a soil-peat-perlite (1:1:1 by volume) medium amended with 7.1 g/l (12 lbs/yd<sup>3</sup>) of dolomitic limestone and 1.7 g/l (3 lbs/yd<sup>3</sup>) of 0-20-0. The fuchsia were fertilized with each irrigation throughout the study with a complete fertilizer (Peters 20-20-20, Allentown, PA) at 200 ppm N. Plants were irrigated through capillary mats and were grown at 16°C (60°F) nights with day temperatures 5 to 8°C (10 to 15°F) higher.

Table 1. Mean number of weeks from planting until fuchsia were 70 cm (28 inches) tall and could be pinched.

Treatment Number	Concentration of GA <sub>3</sub> (ppm)	Number of Applications	Number of Weeks	
			'Winston Churchill'	'Black Prince'
1	Control	Control	>15	13
2	50	1	>15	13
3	100	1	14	14
4	200	1	13	12
5	400	1	14	12
6	50	2	14	13
7	100	2	14	12
8	200	2	13	12
9	400	2	12	9
10	50	3	13	13
11	100	3	10	11
12	200	3	9	8
13	400	3	10	7

On February 13 the plants were graded; only cuttings that were 8 to 11 cm (3 to 4 inches) and had five to six pairs of fully expanded leaves were selected. There were 13 treatments of both cultivars with five plants/treatment randomized on the bench (Table 1). In addition to a control, plants were treated with a 50, 100, 200 or 400 ppm  $GA_3$  solution. The foliar applications were made to run-off to the upper 5 to 10 cm (2 to 4 inches) of each plant one, two or three times on February 13, February 20 and February 27. A wetting agent (1% solution, Tween 20) was added to the  $GA_3$  solutions at the rate of 33 ml/l.



*Figure 1. 'Black Prince' sprayed with 400 ppm  $GA_3$  at weeks three, four and five after the rooted cutting was planted. Photograph taken at week seven when the plant was 70 cm (28 inches) tall.*

Stakes were placed in each pot one week after the first  $GA_3$  application and the plants were tied as needed. Lateral branches were removed as they developed, but the foliage at each node was not removed until the end of the study.

When the fuchsia were 70 cm (28 inches) tall (Figure 1) the terminals were pinched, the plants were transplanted to 17 cm (6 1/2 inch) azalea pots and they were spaced 11 plants/m<sup>2</sup> (1 plant/ft<sup>2</sup>). Plants were then grown on expanded metal benches and irrigated overhead. Three weeks later they were moved to their final spacing of 3 plants/m<sup>2</sup> (1 plant/4 ft<sup>2</sup>); the lateral branches, which were developing into a head, were pinched a second time.

## RESULTS AND DISCUSSION

Plants generally reached the transplanting and pinching stage (70 cm tall) faster when the  $GA_3$  concentration and the number of applications was increased (Table 1). There were some cultivar differences. 'Black Prince' grew fastest when treated three times with 400 ppm  $GA_3$ . A concentration of 400 ppm caused some necrosis on 'Winston Churchill' and slightly checked growth; the meristem was damaged visibly on at least four plants. 'Winston Churchill' plants grew faster and were not damaged when treated three times with 200 ppm  $GA_3$ . A fourth application might have increased growth further, but this was not tried.

Foliage of both cultivars became chlorotic when  $GA_3$  was applied two or three times at concentrations of 200 or 400 ppm. The leaves returned to their normal color within two to three weeks after the last  $GA_3$  application. These leaves were also removed from the main stem at the end of the study to make the stem more visible.

On May 8 'Winston Churchill' standards, which had received three applications of 200 ppm GA<sub>3</sub>, averaged 95 cm (37 inches) tall and had an average head diameter of 50 cm (20 inches). 'Black Prince' standards (Figure 2) which had received three applications of 400 ppm GA<sub>3</sub> averaged 104 cm (41 inches) tall and had an average head diameter of 69 cm (27 inches).

The production time for fuchsia standards can be reduced considerably. Standards can be



*Figure 2. 'Black Prince' on May 8 (week 15) which had been sprayed three times with 400 ppm GA<sub>3</sub> at weeks three, four and five.*

grown from rooted cuttings for spring sales in less than five months. All plants had formed bark, giving them the appearance of a small tree. Internodes were longer in GA<sub>3</sub> treated plants and stems were straighter than most standards which are grown for 12 to 18 months. To produce a large well-branched head, at least two pinches are needed. In this study, the second pinch was made 21 days after the first pinch until April 1. After April 1, branches were pinched only once; they were too weak and they broke when they were about 30 cm (12 inches) long. The plants from the best treatments for both cultivars began flowering approximately May 15.

To grow salable standards for Mother's Day, standards should be started about January 1 and the second pinch should be given no later than March 15. If a larger or more dense head is desired, it seems that plants should be started in December and given a third pinch before March 15. However, this was not done in this study.

Plants were finished in 17 cm (6 1/2 inch) azalea pots. The medium frequently dried and plants wilted. Occasionally plants fell because they were top-heavy, even though they were well staked. A 20 cm (8 inch) or larger pot size would be better for fuchsia standards.

The time required to produce fuchsia standards can be greatly reduced by using GA<sub>3</sub> without sacrificing quality. It appears the labor required to train and stake standards also can be reduced considerably. Standards grown with GA<sub>3</sub> also have a straighter stem than is usually found on fuchsia standards grown over longer periods of time. Further research is needed to determine cultivar differences, which appear to be considerable, and to develop more precise production schedules. However, treating fuchsia with GA<sub>3</sub> appears to be an excellent way of reducing the production time and lowering the cost of growing fuchsia standards.

1. Pudlo, M., W.H. Carlson and L.H. Aung. 1967. A rapid method for standard geranium production with gibberellic acid. Flor. Rev. 141 (3647):32-33, 54-56.
2. Sachs, R.M. and C.F. Bretz. 1962. The effect of daylength temperature and gibberellic acid upon flowering in Fuchsia hybrida. Proc. Am. Soc. Hort. Sci. 80:581-588.
3. Wilson, S.J. 1965. Fuchsia a complete guide to their propagation and cultivars for house and garden. St. Martin's Press, New York.

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