COMMERCIAL BOUGANVILLEA CULTURE*
Anders Wisnewski, Student and
Jay S. Koths, Professor of Floriculture

Bougainvillea has the potential to become a popular greenhouse pot plant. Strikingly colorful and numerous flowers make this a very attractive plant. In the greenhouse, Bougainvillea glabra requires less time to produce than many other crops, tolerates high light intensities, and has no cold requirement for forcing. The control of flowering in B. glabra is by certain specific cultural procedures. It is now possible to induce flowering on plants only 8-12 inches tall in 4-5 inch pots.

Rooting succulent tip cuttings is the most effective method of propagation but shoot apex culture is also effective. Most propagators of this plant take 3-4 inch cuttings but cuttings 6 inches long are effective with removal of the lower leaves (retain only the top 2 leaves). The larger cuttings contain more carbohydrate reserves and this may promote flowering.

Cuttings may be taken any time of the year and should be dipped in a 1000-3000 ppm rooting powder (Hormodin nos. 1 or 3). A coarse-grade vermiculite or other well-drained and aerated rooting medium such as sand should be used. The cuttings root in approximately 4 weeks under mist with bottom heat of 75°F. The new roots are brittle and care must be taken in potting operations.

When potting, multiple cuttings per pot may be used; 1 to 3 cuttings in a 4 inch and 3 to 5 in a 5 inch pot. After potting, place them under long-interval intermittent mist for several days (5 seconds every 15 minutes) to harden them off.

Bougainvillea is photoperiodic, setting buds when the night length exceeds perhaps 12 hours. Low temperatures have been suggested as enhancing bud set but 65°F may be a low temperature for this plant. Excessive heat at night may delay flowering. However, some cultivars will flower during the summer in a warm greenhouse. Some cultivars appear to flower more when slight wilting is permitted between waterings. This is tricky since severe wilting may cause complete bud drop.

Severe bud drop may also occur during shipping when the plants are enclosed in boxes for a couple of days or even placed in a dark room. Silver thiosulfate sprays will help avert this (Cameron et al. 1983).

For rapid and prolific flower promotion high light is also necessary (4000-5000 f.c.). Full sunlight should be provided; more flowers are produced on more compact plants and the flower bracts gain more intense color.

The plants must be soft-pinched to promote branching when new growth starts to occur (about 10 days). Flowering seems to originate on new growth. From March 15 to October 15 use a black cloth from 7:00 PM to 8:00 AM to lengthen nights for bud initiation. The black cloth is started 1 to 2 weeks after the pinch.

Growth regulators have proven to be effective in keeping plants compact and promoting flowering, but cultivars vary in response. Growth regulators may not be needed, given the

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proper culture and daylength controls. In the cultivar 'San Diego Red', cycocel treatments promote early flowers and compact growth. It should be applied as a soil drench when the axillary buds on pinched plants start to swell (5 to 7 days after pinching). A-Rest may also work with this cultivar.

Flower drop is a problem with the cultivar 'San Diego Red' and many other cultivars as well. In the greenhouse, flowers are retained for 2 to 3 weeks but when moved indoors the flowers abscise very rapidly. NAA applied to plants as a 30 ppm spray results in 50% retention after 2 to 3 weeks. It must be applied when 50-75% of the flowers have opened and are mature bracts because the spray promotes drop of immature flowers. Silver thiosulfate effectively inhibits bract abscission. Some double-flowering clones might be more suitable for greenhouse crop production because the bracts do not abscise.

During active growth, Bougainvilleas respond to high nutrient levels such as continual fertilization with 200 ppm nitrogen. For New England, the potassium level should be a bit higher than the nitrogen. If the root medium contains a bit of soil and if superphosphate has been incorporated, the fertilizer should contain little or no phosphorus. The pH might be anywhere between 5.5 and 7.5 with 6.0-6.5 preferred.

Leaf spot (Cercospora bougainvilleae) is the most important disease of Bougainvillea. It may be controlled with Maneb or copper sprays applied several times at 10 to 14 day intervals. Insects such as scale and mealybug can be problems; these can be controlled with malathion sprays.

with no hanging pots and a low growing crop the air velocity will approach 100 fpm.

Let us look at this another way. The cross sectional area of a 30 x 100' greenhouse with an average height of 10' is about 300 sq.ft. Half of this is 150 sq.ft. Air moving past any point at 100 fpm would give a volume flow of 15,000 cu.ft./min. With a free air fan rating of 1274 cfm, the air is moving past the fan with a volume nearly 12 times the free air movement rating of the fan (15000/1274 = 11.8).

Why does this happen? Moving air in a container (greenhouse) utilizes mass flow principles wherein the air is simply "kicked along" by the action of the fans. This is a principle advantage of the HAF system.

Compare this with a system wherein a fan is blowing air into a plastic distribution tube. The fan is working against pressure with minimal air flow principles. The air delivery of a quarter horsepower fan is about half of the free air delivery of the small HAF fans described above. If the air mass flow is half the HAF fan air rating and the HAF efficiency is 12 times the fan air flow rating, one might deduce that HAF is 24 times as efficient as a fan blowing into a distribution tube. This is not really true. We don't know if HAF is 2 or 5 or 24 times as efficient as a fan and distribution tube. But it is most certainly more efficient.

Similar calculations were made for a very large house, 81 x 600' x 16' average height. The fans were 30", 1/6 HP, PSC, 230 V., 1040 RPM. Air moving at only 50 fpm would total 12 times the free air rating. At 100 fpm the figure would be 24 times. Actual air flow was measured at about 50 fpm. Mass flow of air in greenhouses is efficient.
HORIZONTAL AIR FLOW FAN EFFICIENCY

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Horizontal Air Flow (HAF) fans are more efficient than their book ratings would indicate. We are often asked what capacity of fans should be installed in relation to the volume of the greenhouse. A figure for free air capacity of one-quarter of the greenhouse volume per minute has been used as a guideline.

Using this guideline, the air should circulate in the greenhouse every four minutes if the fans are installed using a conventional HAF method. For example, a 30' x 100' foot greenhouse would therefore have an air velocity of 50 feet per minute (fpm) if the air travels down one side and back the other, a total of 200 feet.

In a typical installation, four (1/15 HP, PSC, 1625 rpm, 16" blade) fans having a calculated free air rating of 1274 cubic feet per minute (cfm) each at 1625 rpm are used in a 30' x 100' greenhouse. The four fans will deliver 5096 cfm. With a 10' average height the volume is 30,000 cubic feet. The fan free air volume is only 17% (1/6) of the greenhouse volume, not 25% (one quarter) as suggested in the guideline, therefore air should circulate every 6 minutes, or 33 fpm.

The air has actually been measured moving faster than 50 fpm in such a house. In a house

LITERATURE CITED


