

Cultural Notes on African Violets

by JAMES BROWN-FAUST and ROYAL HEINS

FOR the past 2 years at Michigan State University, we have been quantifying the growth and flowering responses of African violets in the greenhouse environment.

The following cultural notes summarize both old and new information on African violet crop production.

Propagation

For propagation, remove leaves greater than 1 inch in diameter from stock plants. Separate the entire petiole from leaves, and insert leaves

firmly into rooting media to anchor them. Approximately 60 leaf cuttings can be inserted into a 1.7-square-foot tray. Large leaves will develop plantlets faster than small leaves, so grade within a flat prior to sticking to ensure uniformity of plantlet development.

The rate at which roots and shoots develop from a cutting is dependent upon temperature; the optimum is 75°-79°F. Plantlets begin to emerge after about 7 weeks. Time to plantlet emergence increases rapidly as temperature decreases, averaging 12

weeks at 64°F after sticking.

When plantlets have unfolded three to four leaves, tear away the mother leaf at the soil line to allow more light and space for the plantlets to grow. Expect anywhere from one to seven plantlets per leaf cutting; two to three plantlets per leaf cutting are normal. The plantlets are ready to separate from the leaf cutting when the base of their stems is greater than 3 millimeters in diameter.

Discard small plantlets because of their low rate of survival. Remove the roots from the plantlets to allow all plantlets to start growth equally. This will increase the uniformity of growth and make the process of separating and transplanting the plantlets less difficult.

Stick individual plantlets into plug sheet cells. The 3-centimeter cells of an 84-cell plug sheet work very well. Plants which are grown on at 72°F will be ready for transplanting in

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says. "But because the minis have self-watering containers, some retailers will stick them on a shelf and treat them like greeting cards or ceramic vases. So we try to inform retailers who don't normally carry perishables about how to care for them."

Still, slow traffic patterns may exacerbate the problem.

"Retailers should have to fill the wells only one time — when the shipment arrives — so the product should be on the shelf only 7-10 days," Byland says. "If customers don't have that type of traffic, we advise them to wait for a busy period before ordering the minis."

Finally, there's the sticky problem of what exactly defines a true miniature plant. Holtkamp says it must be bred specifically for smaller pots — not forced into the pot through use of growth regulators.

"Unless we get more of a variety of actual miniatures, the plants that are forced to be smaller will continue growing, become root-bound, and die," he cautions. "Long-term con-

sumer satisfaction is not going to be there."

A Big Future

Holtkamp is confident, however, that more truly miniature cultivars will be forthcoming. "More and more researchers are going to spend more time on developing miniature products," he says.

Yoder Bros. has found that demand is definitely there. "We're inspired, if you will, by the needs of the marketplace," Higgins reports. "Growers have been asking, 'What's new? What's different?'"

Byland agrees. "I don't have any real numbers to back this up, but I would estimate we have only about 30%-40% market penetration."

And Carlson believes the opportunity for success in marketing minis is ripe for those willing to take on the logistics of growing, watering, packaging, and shipping minis.

"It's like anything else," he says. "If people work at it and make it happen, there's a market there — definitely." **GG**



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about 30 days, while those grown at 64°F will take about 40 days.

An alternative to producing your own plugs is to purchase them from a propagator.

Transplanting

Transplant plugs for finishing into 4-inch pots. Transplant so the top of the soil of the plugs is equal to or slightly above the growing media in the pots.

The crowns can easily be covered

with media during the first watering when the plugs are planted too deep. Be careful to avoid this as covering the crown causes the smallest leaves at the top of the stem to die or the entire plant to rot.

During transplanting remove any developing inflorescences greater than 1 inch long. The flowers on these early developing inflorescences will reduce early vegetative growth and will be dead before the plant is marketable.

The Greenhouse Environment

Temperature and Light. Temperature directly affects the rate at which leaves unfold and flowers develop. Light quantity strongly influences flower initiation and number of flowers to bloom. Through proper manipulation of greenhouse temperature and light, you can control the rate of growth and flowering for more accurate crop scheduling.

In our research, leaf unfolding rates increased as temperature was increased from 57°F to 79°F. Temperatures above 79°F slowed growth rate. The number of days to first open flower decreased as temperature was increased up to 79°F.

In the past it has been suggested that African violets flower most rapidly when day temperatures are lower than night temperatures. Our research, however, does not support this conclusion.

We have found that the fewest number of days to flower occurs when plants are grown under constant temperatures. There was no difference in time to flower between plants grown at 73°F during the day and 79°F at night and plants grown at 79° during the day and 73° at night.

Increasing the light level from 1 to 4 mol per square meter per day (or 115 to 450 footcandles for 12 hours) increased flower number in one experiment from five to 40 flowers per plant. However, increasing the light above 4 mol per square meter per day (or over 450 footcandles for 12 hours) only slightly increased flower number.

A general rule of thumb: Avoid exposing violets grown under low-light conditions to light intensities above 1000 footcandles. Plants acclimated to higher light levels can tolerate at least twice this level.

The potential for sun burn increases when plants are water stressed or exposed to high air (leaf) temperatures. We are currently performing experiments which will better determine the conditions under which violets are susceptible to sun burn.

Use supplemental light to increase the plant's flowering response, particularly when natural light conditions fall below 4 mol per square meter per day. This value is equivalent to the plant receiving 460 foot-

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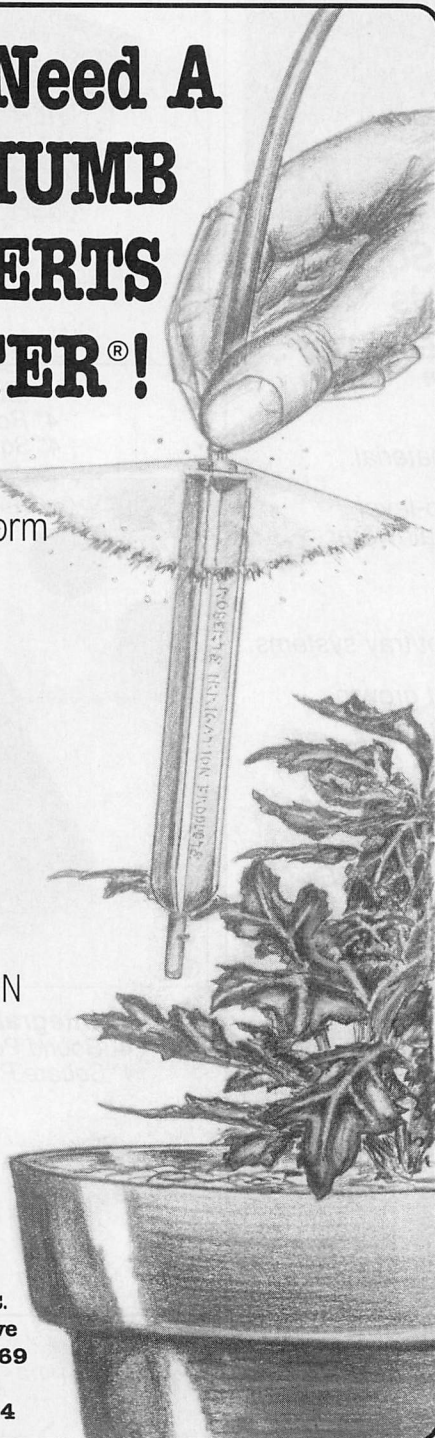
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candles of sunlight for 12 hours per day. High pressure sodium lamps are the lamps of choice for supplemental lighting. Six hours of lighting at 350 footcandles or 4½ hours at 500 footcandles delivers 1 mol per square meter of light per day to the crop.

Water and Nutrition. Water temperature 8°F cooler than the leaf temperature damages leaves. Therefore, always temper the water before overhead watering. If tempered water is not available, capillary mats and ebb and flow benches are both effective methods of watering without damaging foliage.

African violets have relatively low nutritional requirements. Fertilize with 50 ppm N and K on a constant liquid feed basis or 200 ppm N and K on a weekly basis. Monitor salts and pH weekly. The acceptable soluble salts range is from .5 to 1.0 mmhos using a 2:1 dilution; higher levels will stunt growth. Maintain pH between 5.5 and 6.2.

CO₂ and Relative Humidity. Enrich greenhouse air with 400-500 ppm CO₂ to improve growth and increase flower number. However, CO₂ concentration greater than 500 ppm causes undesirable leaf brittleness.

Increasing the relative humidity from 50% to 90% has been reported to accelerate violet growth and development. Watch out for two dangers of very high humidities — Botrytis and powdery mildew.

Storage

Occasionally, flowering plants are saleable before they can be marketed. If these plants are held under greenhouse conditions, the flowers continue to mature and die.

Cool temperatures slow the rate of growth and development. Place flowering plants in a section of the greenhouse where temperatures can be maintained at 55°-59°F. African violets will tolerate 55°F for up to 3 weeks, but do not expose them to temperatures below 50°F. **GG**

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