

Floriculture Research

Success with Vegetative *Osteospermum*



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Introduction

Vegetative *osteospermum* cultivars have great potential for the Southeastern grower. The genus *Osteospermum* belongs to the plant family *Asteraceae*, because of their daisy-type flower heads. The plant originates from South Africa and its common name is African Daisy. In the genus *Osteospermum* there are two perennial-type plants, which vary by hardiness and an annual-type. Both perennial types of *osteospermum* are sometimes confused with plants in the genus *Dimorphotheca* (the annual-type *osteospermums* formerly listed under this genus). The hardier perennial-type *osteospermum* is more prostrate or low growing in habit and can withstand temperatures below freezing. The half-hardy type will not withstand more than 28 to 32°F in protected areas and 32 to 36°F in open areas. The half-hardy plant types include all of the commercially grown varieties and these tend to be upright in growth.

Cultivars

Osteospermum cultivars are currently sold under varying series: Cape Daisy®, Sunny®, Starlight®, Spring Star®, or Side®. There are also two new introductions from Proven Winners: ‘Lemon Symphony’ and ‘Cream Symphony’. The Henry F. Michell Company has also introduced a new line of cultivars in the ‘Sea Mist’ series. There is also a seed propagated ‘Passion Mix’ (a mixture of white, pink, rose and purple flowers) from American Takii that is reported to be heat tolerant. American Takii states that the ‘Passion Mix’ is drought resistant, naturally dwarf, and are multi branched.

Garden Performance

Osteospermums prefer well drained soil in full sun. *Osteospermums* normally require cooler nights ($\leq 55^{\circ}\text{F}$) for production of the flower buds. Therefore, if the night temperatures remain high, flowering will be inhibited. Both the ‘Passion Mix’ and the two varieties from Proven Winners may perform better in the heat than the other vegetative *osteospermum* series cultivars. Deadheading is suggested in order to maintain constant flowering. As night temperatures increase during late spring and early summer flowering diminishes, stem tissue becomes woody, and the foliage remains a deep green color. Plants can be trimmed in late spring or early summer to a few nodes, and plants will flower again in the fall.

Crop Importance

An excellent window of opportunity in the Southeastern U.S. for *osteospermum* is early spring. It is this time when temperatures are too warm for pansies and too cool for heat loving annuals. *Osteospermum* are the “garden mum” of the early-spring, and a major advantage of *osteospermum* over chrysanthemums is their continual blooming time.

Osteospermum plants can be marketed in the Southeast during the early spring with dianthus, primrose, ranunculas, snapdragon, and other half-hardy herbaceous plants, which can withstand several frosts. *Osteospermum* have large attractive flowers and can form a dramatic display of color when planted in mass. Landscapers should take advantage of these plants as they represent early-spring color, contrast bulbs very well, provide continuous color until early summer, provide a mass of dark green

foliage in summer, and flower again in fall when night temperatures drop below 55°F.

Propagation

As the name implies, vegetative osteospermum are propagated by cuttings. Most cultivars are patented, therefore cuttings cannot be taken unless the greenhouse facility is a licensed rooting station or the cultivar being propagated is a non-patented variety. Certain firms allow growers to purchase unrooted material, but royalty fees are charged to the grower.

Osteospermum have an erect leaf arrangement which makes propagation easier because more cuttings can be rooted per square foot of bench area. Stem cuttings should be 1.5 to 3 inches in length with more than 5 leaves per cutting. Rooting hormones aid in the initiation of adventitious roots. Concentrations of IBA (indolebutyric acid) at 3000 ppm initiate roots, and the addition of NAA (naphthalenacetic acid) at 500 ppm is also effective. Foliar sprays of rooting hormones with a spray bottle can be applied to the stem base. Substrate temperatures should range between 68 to 75°F during the first two weeks of rooting. Once roots emerge from the bottom of the tray, the bottom heat should be reduced to 60°F to prevent unnecessary stretch of the cuttings on the propagation mat. Internode elongation can be inhibited by foliar applications of B-Nine at 850 to 1250 ppm (use a higher rate at 2500 ppm for more aggressive cultivars) or Cycocel at 1500 ppm one week after sticking. Misting should be monitored routinely until cuttings retain turgidity.

Scheduling and Temperature

The basic production schedule, which takes about 12 weeks, is plant/ pinch/ vernalize/ force/ market. Table 1 contains a typical schedule of osteospermum production. Appropriate market dates in the Southeast should be between March 1 to May 10. Early sales can establish a niche market to landscapers for early spring installation, Earth Day, or Easter. Fall production is not recommended in the Southeast because night temperatures in early-fall are usually above 55°F. If hanging baskets are produced, monitoring the growth weekly is necessary as osteospermum can become stretched due to warmer temperatures in the upper regions of the greenhouse.

Substrate and Transplanting

An ideal substrate for osteospermum should allow for rapid root development, while maintaining good water holding capacity. Mixes which stay too moist may cause shoot growth to become weak and chlorotic due to the lack of oxygen in the substrate. The chances for root rots to occur are greater in substrates which are saturated continually.

Osteospermum can be planted in pots as small as 4” to large gallon containers or hanging baskets. Pot size is important for two main reasons: the number of cuttings required per pot and the number of weeks of warm temperatures for rooting to allow for root development prior to inducing the vernalization period. One plant per pot is recommended for 4” pots while 2 plants per pot is recommended for 6” pots and larger. Osteospermum rooted cuttings should be planted 1” to 3” apart. Night temperatures for osteospermum should be between 63 to 68°F for proper root establishment prior to pinching. High light levels (5,000 to 6,000 footcandles) also need to remain high during root establishment (1 week for 4” material, 1 to 2 weeks for 6” plants, and 3 weeks for 8” pots or hanging baskets). After root initials have reached the sides of the container, a fertilization of 100 to 175 ppm N can be applied, and one week after planting apply a preventative fungicide substrate drench like Aliette, Banrot, or Subdue Maxx.

Pinching and Vernalization

Osteospermum plants can be pinched to 5 or 6 nodes for 4” containers and hanging baskets, while 6

Table 1. A suggested vegetative osteospermum production schedule for a 6” azalea pot. Based on Southeast U.S. conditions for plants grown between December 15 to March 15.

Time	Cultural Practice
Week 0	Plant rooted cuttings Fertilize at 100 to 150 ppm N Apply preventative substrate drench
Week 2	Pinch to plants to 5 to 6 nodes
Weeks 3-7	Vernalization treatment (45 to 55°F) Fertilize at 200 to 250 ppm N
Weeks 6-10	Cycocel or Sumagic drenches applied at 6th or 7th week - OR - Foliar PGR sprays between 8 and 10th week (before visible buds)
Weeks 8-12	Increase night temperature to 60 to 65°F Flower buds visible by week 11 Apply side-dressing of slow release fertilizer
Weeks 12-14	Plants are marketable

to 7 nodes should remain for larger pots. A sharp instrument should be used when making pinching thick stems; sanitizing the blade with a 10% Chlorox solution between plants is recommended to prevent disease transmittance.

For flowering to occur, a vernalization period has to be provided. *Osteospermum* require 4 to 5 weeks of continuous 45 to 55°F night temperatures for flower bud initiation, and after this cold treatment has completed, flower buds will become visible within 2 to 3 weeks (about 9 to 11 weeks after potting). The ideal environment for vernalization is the “cold frame type” greenhouse structure with roll-up sides. Usually growing *osteospermum* will occur earlier than the first planting of bedding plants allowing the greenhouse to achieve an additional production turn during the spring. After the vernalization requirement has been met, grow the plants at night temperatures of 60 to 65°F for faster flowering. Vernalization increases the number of flowers per plant, but has minimal effect on shortening the flower time.

Irrigation and Spacing

Osteospermum should never be water stressed. Unlike chrysanthemums, which can be very forgiving, yellowing and leaf necrosis can occur if *osteospermum* plants are dried down. An automated watering system similar to one used on garden chrysanthemums is recommended. Water management is very important during the establishment phase, because saturated soils can stall growth, introduce disease and nutritional problems, and delay crop time. Once root systems are developed multiple irrigations per day may be required.

Once *osteospermum* leaves begin to expand laterally beyond the sides of the pot, space the plants to avoid stretch, lower leaf drop, and the possibility of disease from reduced airflow between plants. Use 8-inch to 9-inch centers for a 4-inch pot, 14-inch centers for 6-inch to gallon size pots, and 24-inch centers for 8-inch pots.

Fertilization and Nutrition

For the vegetative plug stage, fertilize at a rate of 75 to 100 ppm of N with a constant liquid feed. During active growth, rotate weekly between 15-0-15 and 20-10-20 with a constant

liquid feed. Apply 200 to 250 ppm N. By rotating these two soluble fertilizers, growers can provide calcium and low phosphorus amounts with the “Dark Weather Feed” (15-0-15) and adequate micronutrients and ammoniacal-nitrogen with the 20-10-20. High levels of NH₄-N (> 40%) and/ or urea in a fertilizer mix should be avoided to prevent excessive stem elongation. To supply Mg, monthly applications of epsom salts (MgSO₄ · 7H₂O) should be made at the rate of 1 to 2 lbs per 100 gallons of water. The root substrate pH and electrical conductivity (EC) should be monitored on a weekly basis because of the potential of salt accumulation and/ or the development of high or low pH values. An ideal pH range for *osteospermum* should be between 5.8 and 6.2 and EC levels during active growth should be maintained between 0.75 to 1.2 mS/cm for the 2:1 extraction method, 1.6 to 2.6 mS/cm for the saturated paste extraction method, or 2.5 to 4.0 mS/cm for the PourThru extraction method. The use of a slow release fertilizer is recommended if plants are grown outdoors; side-dressing the plants before sale is also recommended for post-harvest considerations in the landscape or containers.

Light

Osteospermum are non-photoperiodic, but earlier flowering can be achieved with high light levels (5,000 to 6,000 foot candles), and supplemental lighting (14 to 16 hours) after the vernalization period has been completed.

Height Control

Most of the plant growth regulators (PGRs) available today have been effective in limiting internode elongation of *osteospermum*. Applications

Table 2. Common insects of vegetative *osteospermum* and control measures.

Insect	Recommended Insecticides
Aphids	Orthene, Azatin, Duraguard, Knox-Out, Thiodan, Tame, Ultra-Fine Sun Spray, Marathon, M-Pede, and Mesurol
Caterpillars	Orthene, Dipel, Talstar, Decathalon, Mavrik, and Astro
Fungus gnats	Adept, Azatin, Dycarb, Knox-Out
Leafminers	Avid, Orrthene, Azatin, Citation, Duraguard, and Astro
Spider mites	Avid, Talstar, Kelthane, Tame, Ultra-Fine Sun Spray, and Sanmite
Thrips	Avid, Orthene, Azatin, Naturalis-O/ Botaniguard, Duraguard, Knox-Out, and Tame
Whiteflies	Astro, Azatin, Marathon, Mavrik, and Orthene

should be made 3 to 4 weeks after pinching and before visible bud. The Paul Ecke Ranch suggests foliar sprays of Bonzi at 30 ppm, B-Nine at 2,500 ppm, or Cycocel at 750 ppm foliar spray, or Cycocel as a drench at 1,500 ppm. Be aware that late B-Nine foliar sprays can delay flowering and cause spoon-type flower petals to flatten. Cycocel can cause marginal chlorosis of the leaves if sprayed at concentrations greater than 750 ppm. PGR research at NC State has been conducted on three cultivars of osteospermum: ‘Congo’, ‘Wildside’, and the vigorous cultivar Lusaka. For controlling height of compact or medium cultivars B-Nine at 2,500 ppm applied twice (10 to 14 days apart) is recommended, while tall or vigorous cultivars should be treated with Sumagic substrate drenches of 0.125 to 0.5 mg a.i. per pot (Figure 1). This treatment is recommended because the cost of a Sumagic drench was \$0.05 cheaper per pot than a Cycocel drench at 1,500 ppm. Foliar sprays of Bonzi at 10 to 80 ppm or Sumagic at 3 to 24 ppm did not inhibit internode elongation.

Insects and Diseases

A number of insects and diseases can attack vegetative osteospermum. A descriptive listing of insect and disease pests and management strategies are listed in Table 2 and Table 3, respectively. (*Mention of chemical trade names does not constitute and endorsement. Omission of any registered chemical does not imply criticism.*) When using chemicals be

Disease	Recommended Control Measures
Botrytis	Medallion, Chipco 26019, Protect T/O, and Ornalin
Root rots	Aliette, Banrot, and Subdue
Stem rots	Clearys 3336, Fungo, Terraclor, Terraguard
Viruses	Rouge plants immediately, monitor for thrips, and purchase rooted cuttings from a reputable propagator

sure to read the label and wear appropriate protective clothing. Also, apply chemicals when the environmental conditions are favorable to avoid phytotoxicity.

For Further Reading:

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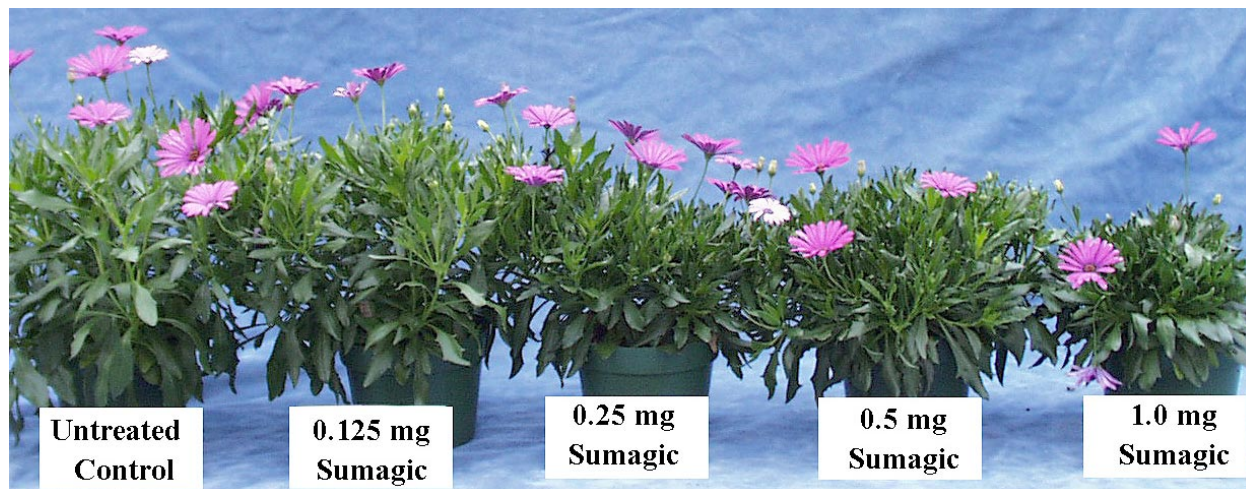


Figure 1. Sumagic drench effects on the cultivar Lusaka. Lusaka is a vigorous cultivar and concentrations of 0.25 to 0.5 mg a.i./pot were effective in limiting internode elongation.