

# Greenhouse Production of Annual Vinca

Annual Vinca (*Catharanthus roseus*), also known as Madagascar periwinkle, is one of the best bedding plants for dry, warm locations in full sun or part shade. It often performs well in situations where few other annuals will survive. In the Southeast, Vinca tolerates the hot, humid summers and still remains attractive into the fall. Vinca is drought-tolerant if allowed to establish before water becomes limited. However, it does not tolerate cool growing conditions or poorly drained sites.

Although gardeners treat Vinca as an annual, it is actually a tropical perennial. Vinca has 1- to 3-inch-long glossy leaves and grows 1 to 2 feet tall. The 1½-inch phloxlike flowers are produced in abundance and remain fresh during the worst summer conditions.

Many greenhouse growers consider Vinca a difficult crop to grow because it is very sensitive to overwatering, excessive fertilizer, cool growing conditions, and low light intensity. The best-quality Vinca is usually grown late in the spring season and in greenhouses where high temperatures and high light levels can be maintained. Growers and retailers should discourage consumers from purchasing and planting Vinca in the garden too early in the spring. Early market Vinca is often not the best quality and will not usually perform well in the customer's garden.

## Cultivars

Vinca is usually grown as a bedding or pot plant. Some excellent breeding has resulted in large-flowering cultivars available with pink, lavender, white, blue, magenta, or bicolor flowers. Vinca cultivar series include Cooler, Little, Pacifica, Pretty, and Tropicana.

The Alabama Agricultural Experiment Station has established a trial garden at the E.V. Smith Research Center near Shorter, Alabama, to evaluate annual garden plants. Thirty Vinca cultivars were visually rated bimonthly on a scale of 0 (dead) to 5 (superior plant in flower) for garden performance during the summer of 1997. The ten best-performing Vinca cultivars are listed in Table 1. Pacifica Orchid and Pacifica Punch were the two best performers in 1997.

## Plug Production

For best results in starting Vinca seed, purchase F<sub>1</sub> hybrid seeds fresh each season from a

reputable supplier. Purchase refined seeds that have been cleaned and graded by size or weight. Some Vinca seed may be purchased pretreated with a fungicide as a preventative against damping-off diseases. In planning the number of seed to order for production, consider that there are about 21,000 seeds per ounce, depending on the cultivar. If seeds must be kept from one season to the next, store them in a dark, cool, dry environment away from insects and rodents. As a general rule, store seeds under conditions where the sum of the Fahrenheit temperature and percent relative humidity does not exceed 100. For example, where seeds are stored at 45°F, the humidity should not exceed 55 percent. Refrigerators dedicated to seed storage are often used, with the seeds sealed in containers containing a desiccant material. Be sure to label and date all containers.

Growers pay a premium price for high-quality Vinca

**Table 1.** Best-Performing Vinca Cultivars in the 1997 Trials<sup>1</sup>

Cultivar	Flower Color	Rating
Pacifica Orchid	Magenta	3.5
Pacifica Punch	Red	3.3
Blue Pearl	Light Blue	3.1
Heat Wave Grape	Blue	3.1
Pacifica Blush	Light Pink	3.1
Apricot Delight	Peach	3.1
Grape Cooler	Blue	3.1
Blush Cooler	Light Pink	3.0
Pacifica Pink	Pink	3.0
Rose Cooler	Rose	2.9

<sup>1</sup>Trials held by Auburn University and the Alabama Agricultural Experiment Station at the E.V. Smith Research Center.

seeds. Therefore, care and planning are necessary to ensure that the maximum number of transplantable seedlings will be produced from an ounce of seed. The most effective way to sow seeds is using an automatic seeder. The 406 or 512 plug flat is often used because it is small enough for economic production but large enough to accommodate growth until transplanting. However, larger plug sizes may be used to meet special production goals.

Sow seeds in plug flats containing a moist, well-drained, sterile medium such as one of the many peat-lite mixes available commercially for plug culture. Because of the potential for disease problems, always use new plug flats. Do not reuse old flats. Darkness is recommended during germination, although light for less than 12 hours per day does allow acceptable germination. Continuous light has been found to reduce germination percentage. Sow seeds directly on the medium surface, and cover the seeds with a thin layer of #2 course-grade vermiculite, which helps maintain adequate moisture around the seed.

### **Germination Medium**

Many growers add dolomitic limestone to adjust pH, micronutrients, and a small amount of superphosphate to the germination medium. However, macronutrients are rarely added to the plug medium because Vinca seed are very sensitive to even moderate soluble salts levels during germination. The germinating medium should have a 5.5 to 5.8 pH, with the electrical conductivity below 0.75 mmhos/cm based on the 2:1 extraction method. Avoid ammonium levels greater than 10 ppm.

### **Seed Germination**

In germinating Vinca seed, maintain very warm and moist conditions until the radicals emerge. Generally, superior germination occurs in 4 to 6 days at 78° to 80°F, 95 to 100 percent relative humidity, and high soil moisture (visible soil moisture on medium surface). After the radicals emerge, reduce the temperature to 72° to 75°F and the relative humidity to 75 to 80 percent until the cotyledons unfold. It is critical that the moisture and temperature be reduced once the radicles emerge because high moisture and temperature may cause damping-off disease. Ensure that the soil is moist to the touch at this stage but is not visible on the medium surface. It usually takes 7 to 10 days after the radicals emerge for the cotyledons to unfold.

Some growers start germination at 90° to 95°F for the first 3 days and then drop to 78° to 80°F to encourage the seeds to take up moisture. Bottom heat greatly benefits seed germination and early growth. The medium should be at least 70° to 74°F during germination.

### **Fertility**

Begin fertilizing seedlings once or twice per week at 50 to 75 ppm nitrogen, using 15-0-15 or calcium nitrate and potassium nitrate when cotyledons unfold. Increase this rate to 100 to 150 ppm nitrogen when true leaves develop. Apply a protective fungicide for *Thielaviopsis*, *Pythium*, and *Rhizoctonia* once a full seedling stand is achieved.

### **Height Control**

Control seedling growth and prevent stretching by managing the environment, nutrition, and water first, and then apply chemical growth retardants if needed. To control stretching,

B-Nine at 2,500 ppm (multiple applications as needed), Bonzi at 5 to 10 ppm, Sumagic at 1 to 3 ppm, or A-Rest at 5 to 10 ppm can be applied to seedlings when they have one or two mature leaves. Adjust the rate depending on the microclimate, cultivar, and desired response. Bonzi has been reported to cause spotting of the lower foliage at high rates and under high temperatures. The potential exists for overapplication of growth retardant on slow-growing cultivars, causing stunting and poor regrowth after transplanting. Slow-growing cultivars therefore require the lower rate, and fast-growing cultivars require the higher rate. Table 2 lists fast- and slow-growing cultivars.

**Table 2.** Fast- and Slow-Growing Annual Vinca Cultivars

Fast-growing	Slow-growing
Apricot Delight	Other Cooler colors
Raspberry cooler	Pacifica Blush
Rose Cooler	Pacifica Lilac
Pacifica Punch	Pacifica Polka Dot
Pacifica Red	Pacifica White
Tropicana series	

### **Growing On**

If Vinca plugs are purchased from a propagator, unpack and examine the seedlings carefully. Are the plants a correct size for transplanting? Overgrown plugs are difficult to grow into a high-quality plant; seedlings that are too small are difficult to transplant and slow to establish. Remove several seedlings from sample flats, and examine the root system. Vinca roots should be large, white, and fuzzy, covering about two-thirds of the outer surface of the medium. Look for signs of overwatering and root diseases. Examine the foliage for diseases, insects, or nutrient deficiencies. Be prepared to transplant plugs immediately. Plugs are usually

shipped at a size that is ready to transplant. Holding plugs in the greenhouse will only decrease their quality.

Generally, Vinca seedlings are ready to transplant from plugs when three to four mature leaves are present, or about 5 to 6 weeks after sowing seed. It is important to transplant when seedlings just begin to crowd but before they stretch. Because of the potential for disease problems, always use new flats—do not reuse old flats. Plant the seedlings at about the same level they were growing in the plug trays, but no deeper. Vinca has brittle roots, so avoid rough handling that might damage the roots and increase the potential for disease. Dibble the transplant medium to the depth of the root ball, and firm-in the seedling gently. Water newly planted seedlings thoroughly immediately after transplanting.

### Temperature

Vinca requires warmer temperatures for production than many other bedding plants do. This frequently requires a separate greenhouse or greenhouse section with temperature control for growing Vinca. Growers should think of Vinca as a specialty crop like pansy in this regard. Grow Vinca at 68° to 72°F night temperatures and 80° to 85°F day temperatures. Night temperatures below 65°F cause foliar yellowing, stunted growth, poor quality, and increased risk of root diseases. Low temperature is the major cause of poor Vinca crops.

Recent work shows that average daily temperature is a better indicator of time to flower in Vinca than either day temperature or night temperature alone. Time to flower decreases and the rate of leaf unfolding increases with increasing average daily temperature between 59°

and 95°F. The average daily temperature can be altered to speed or slow the progress of a crop to meet market dates.

Improved air movement around the Vinca crop can reduce the potential for disease. Box fans suspended 3 feet above the crop or other forms of internal turbulent air flow can be operated when ventilation fans are not turned on, especially at night. Additional air movement reduces condensation on the foliage and maintains air circulation among plants and flats.

### Light

Give Vinca as much light as possible, especially with early spring crops. When arranging bedding plants in the production area, place Vinca crops in the brightest areas possible, preferably areas with glass or clear plastic glazing. Be sure the greenhouse glazing is clean and free of shading compound.

### Growing Medium

Transplant seedlings into a well-drained, sterile, peat-lite medium with a pH of 5.5 to 6.0 to ensure a disease-free start. Medium pH above 6.5 can cause iron deficiency. Be sure the growing medium contains micronutrients but is otherwise low in fertility.

Overwatering is a common problem in Vinca production. Allow the growing medium to dry between waterings, but do not allow the plants to wilt. Water plants early in the morning or when the temperature is

increasing so that the foliage dries quickly to reduce the potential for diseases.

### Fertilization

Do not fertilize Vinca for 7 to 10 days after transplanting or until the roots reach the sides and bottom of the container. Thereafter, fertilize on a constant liquid fertilization basis at 100 to 150 ppm nitrogen, using a fertilizer about equal in nitrogen and potassium but low in phosphorus. Many growers alternate between 20-10-20 and 15-0-15 or calcium nitrate and potassium nitrate applied once or twice per week. The medium's electrical conductivity should not exceed 1.0 mmhos/cm based on the 2:1 extraction method. Growers should test the medium's pH and soluble salts in-house on a weekly basis and send samples for laboratory testing every 2 weeks. Table 3 lists recommended foliar analysis ranges for Vinca.

Supplemental magnesium sulfate can be applied at a rate of 16 ounces per 100 gallons once a month to prevent magnesium deficiency. Avoid fertilizers high in ammonium, such as some 20-20-20 formulations, because ammoniacal nitrogen greater than 25 ppm can inhibit root development. Phosphorus levels greater than 20 ppm can cause plants to stretch excessively. Fertilizer rate can be reduced by one-half in the last week or two to harden-off the plants before they are shipped to the retail market.

**Table 3.** Normal Foliar Analysis Ranges for Annual Vinca

Element	percentage	Element	ppm
N	2.72 to 6.28	Fe	72 to 277
P	0.28 to 0.64	Mn	135 to 302
K	1.88 to 3.48	Zn	30 to 51
Ca	0.93 to 1.13	Cu	6 to 16
Mg	0.32 to 0.78	B	21 to 49
S	0.22 to 0.50	Mo	0.14 to 0.46

Source: Plant Analysis Handbook II, MicroMacro Publishing, 1996.

## **Growth Retardant**

Plant growth retardants are usually not required if Vinca is grown with adequate light intensity. A-Rest (10 to 15 ppm), B-Nine (2,500 ppm), Bonzi (10 to 15 ppm), and Sumagic (1 to 3 ppm) are registered for Vinca application and are often applied about 2 weeks after transplanting or when new growth has occurred. Do not apply growth retardant when temperatures are higher than 80°F because foliar damage may occur.

## **Scheduling**

Vinca requires 5 to 6 weeks from seeding to transplant in plugs, depending on the cultivar and climate, followed by 5 to 6 weeks in market flats for a total production time of 10 to 12 weeks. Four-inch pots require about 2 or 3 weeks longer than market flats do. Ten-inch hanging baskets with five plugs per container will finish in about 12 to 14 weeks from transplanting, again depending on the environment and time of year. Crop production time will also decrease as light intensity and temperature increase in late spring. Growers should keep detailed records of crop performance and timing to improve future scheduling efforts.

## **Common Problems**

### **Physiological**

Cool temperatures, high fertilization, and overwatering are the most common problems both in the greenhouse and in the landscape. Trickle or drip irrigation rather than overhead irrigation is best for watering Vinca in the landscape. In the retail area, Vinca should be marketed in an enclosed area in early spring to prevent cold stress.

### **Insects**

Vinca has very few insect problems except occasional thrips or aphids.

### **Diseases**

*Thielaviopsis*, *Pythium*, and *Rhizoctonia* are most prevalent in Vinca when the plant is under stress, usually resulting from cool temperatures and overwatering. *Pythium* causes black lesions on the roots, and the medium has a musty smell. *Thielaviopsis* (Black root rot) produces similar lesions on the roots and causes older leaves to yellow and abscise. The best prevention for Black root rot is to maintain the proper growing conditions, especially proper temperature and medium pH, and pay careful attention to sanitation.

The major garden disease of Vinca is aerial *Phytophthora*. This disease is prevalent where overhead watering splashes soil and fungus spores onto lower foliage and stems. Lesions develop on leaves and stems, killing the shoot but leaving a healthy root system. The best preventative is to use drip irrigation.

Specific control measures for insect and disease problems can be found in the *Alabama Pest Management Handbook, Volumes 1 and 2* (Extension Circulars ANR-500A and ANR-500B) and in Extension Circular ANR-1023, "Diseases of Annual Vinca in the Greenhouse and Landscape." For information about obtaining these publications, contact your county Extension agent.



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**For more information**, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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