

Recent surveys confirm that vinca (*Catharanthus roseus*) is one of the top 10 best selling bedding plants in the United States. It tolerates heat, flowers profusely all summer, and comes in a wide variety of colors and sizes. Consumers seem enthusiastic about it, and its role as a basket or potted summer crop is expanding! Sadly, some growers tend to shy away from increasing production because of past failures or mistakes.

Today's Cultivars

Vinca series currently on the market are more vigorous, with an expanded range of colors and larger flowers. Many of the new series are more specialized to regional growing conditions, and each new series brings forth new uses. The 'Heat-Wave' Series from Bodger is a promising line that appears to be more tolerant of cooler, cloudy weather than other cultivars; it may be a better selection for Northern growers. The 'Cooler' series performs exceptionally well under relatively cool, bright greenhouse conditions, making it a great crop in the West. Cultivars 'Tropicana' and 'Pacifica' perform well in seemingly excessive heat and humidity, and they are fast becoming favorites in the South. 'Morning Mist' is a border-type vinca that shows remarkable heat tolerance. 'Parasol' is an "All American Selection" winner that has excellent branching and heat tolerance as noted characteristics.

Our understanding of the growing requirements for vinca is also improved. We now know that the environmental requirements for vinca are the most stringent of any commercial bedding plant crop grown. Vinca is best considered a specialty bedding crop just like fall pansies. If grown correctly, vinca will outperform most other summer bedding plants in baskets, bowls, and decorative pots. Success with vinca requires that growers be prepared to rethink their cultural program and make the necessary greenhouse adjustments. Those who implement growing program changes will see how trouble-free and profitable vinca can be.

Origins Suggest Culture Requirements

Vinca (*Catharanthus roseus*) originated in Madagascar, a large island off the African coast, and is wonderfully adapted to hot, dry or windy slopes,

bright sunshine, well-drained soil, and prolonged summer heat. This is why it is such a popular plant in summer landscapes, especially in the South. Older hybrid lines of vinca were bred for flower color, not vigor; they tend to be weak-rooted and much more demanding in their environmental requirements, especially when young. The secret to growing and maintaining high quality vinca is to keep the root environment optimal. To accomplish this, there are many simple but important changes you must undertake in your growing program.

The Four Considerations To Evaluate Before You Order Seed or Plugs

1. Prepare your greenhouse environment first. Vinca requires long periods of high light levels and warm growing conditions to produce strong roots. Strong roots are the key to growing vinca. Light levels in January and February in most parts of the country are not exactly conducive to growing vinca. Supplemental lighting up to a total of 18-hour days at 1,200 to 1,500 footcandles is optimal, but any supplemental light above 200 footcandles will help. Colder regions of the United States must limit the use of venting, so humidity levels are elevated – making the constant use of HAF fans for vinca critical. This crop needs twice the airflow, hence twice the number of fans than other bedding plants.

Heating the greenhouse to 70°F+ at night is expensive, but it is necessary for vinca. Bottom heat will greatly improve vinca seedling growth and accelerate transplant flower production. Installation of soil heating systems will be a wise investment in Northern greenhouses over the long run if you have repeat contracts to grow large amounts of vinca in January or February. Another solution is to grow vinca much later in the season; warmer outdoor temperatures and increased sunlight make production easier.

These greenhouse modifications do cost money. However, the additional cost of a customized house for vinca is offset by reduced losses and on-time production of high quality plants. Doing so for an entire crop of bedding plants does not make sense economically, and mixing impatiens with vinca never works well. I recommend growing vinca in specially modified greenhouses where the proper environment can be maintained efficiently. Most

growers who use decorative pots or baskets set aside one house just for vinca. Salvia and other heat-loving annuals requiring warm temperatures can also be grown in the "vinca house" successfully.

2. Consider cultivar selection. There are three classifications of vinca. Each group defines a growing characteristic that may make its use for a particular basket or pot a good experience or a poor one. You should select the vinca cultivars with the desired growth characteristics that match your customers' needs.

"Creeping-Type Vinca" plants spread out rapidly, forming a colorful 8- to 10-inch mat across the landscape bed. They are slow growing and easily contained. They are good candidates for small hanging baskets, odd-shaped decorative con-

tainers (they can be grown oblong or any odd shape with pinching), and can be used in elevated planters where cascading flowers are desired. They are very effective as ground covers in very large outdoor planters if the plants receive full sunlight. An example is the 'Magic Carpet' series.

"Dwarf-Type Vinca" have smaller flowers, form more dense plants, and have a more upright character than the carpet type. An average height for a dwarf type is 10 to 14 inches. Examples include the 'Little' and 'Cooler' series. They make attractive 10-inch and 12-inch hanging baskets and do not flop over like the larger "border" types do in baskets. However, they are best used in small patio planters and decorative pots, providing a very neat, upright flower display that does not get too big too fast.

"Border-Type Vinca" have larger 2-inch flowers, are more vigorous, and form upright mounds 14 to 20 inches tall. The majority of new cultivars for use in the landscape are classified as border vinca. The 'Heat Wave,' 'Tropicana,' and 'Pacifica' series fall into this category (Figures 25-1a and 25-1b). Some authorities also place the 'Cooler' series in the "border" class, because it matches the other series in plant and flower size. These vinca are great for use in large color bowls, large barrels, city planters, and large, "main-street" baskets 15 to 17 inches in size (Figures 25-2a and 25-2b).



Figure 25-1a. Mixed 'Tropicana' as a border planting.



Figure 25-1b. 'Peppermint Cooler' as a border planting.

Vinca For Baskets and Decorative Containers

One will find many uses for vinca in the garden center market, and you may be tempted to use every container at hand, but the drainage required to grow and maintain a vinca in a container is critical. Very shallow decorative containers should not be used. Unless the growing media provides many small holes for water release, the "perched water" effect will be extreme and vinca will not survive. Drainage holes in the bottom of small ceramic pots are imperative for proper drainage. Then you can suspend the planter on gravel and/or another decorative tray if necessary.

For larger pots and baskets, drainage is still critical. Make sure that large particles of bark or small gravel are placed at a depth of 2 inches before adding the soil and plants. Do not use reservoir-style baskets for vinca. Greenhouse staff might be successful in managing the water status in greenhouse-grown reservoir baskets, but customers might not have that expertise. Remove basket trays during production. Maximize the customer's future success by planning ahead and providing containers that drain rapidly. Obviously, when planting in

baskets and shallow containers, a high porosity soil is essential. Adding one part perlite to two parts commercial peat-based mix seems to be adequate. Consumers should be told that the medium is very porous and frequent watering could be necessary.

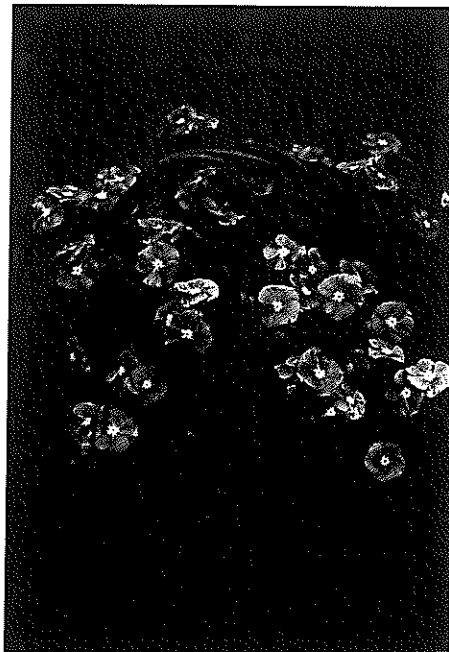
Companion plantings involving vinca in color bowls and large containers are very popular and profitable. However, they take planning and the same cultural care once placed in the landscape. For

example, a large 3-foot, round, city-street planter with tall, blue salvia 'Victoria,' mid-sized border-type 'Tropicana Pink' vinca; short, white *Nierembergia* 'Mount Blanc,' and trailing blue *Scaveola* 'New Blue Wonder' can turn out to be spectacular, especially when accented with 'Silver-Dust' Dusty Miller. Culture is important, however, for this to be successful. Fertility should be kept low; use a 15-2-20 high nitrate fertilizer and avoid drought or excess watering.

If excess water or ammoniacal fertilizer is applied, the *Scaveola* plants will become huge and lanky, the vinca and *Nierembergia* will cease growth and/or die, and salvia plants will bolt and become thin, brittle, or floppy.

3. Consider crop scheduling and use. Table 25-1 is a summary production chart based on growing climate and end use.

You can avoid many problems by ordering vinca later in the season when the longer days and sunnier conditions allow you to satisfy vinca requirements more easily.



Figures 25-2a and 25-2b. 'Tropicana' (left) and 'Cooler' (right) varieties grown in baskets.

Table 25-1. Summary production chart based on growing climate and end use.

Vinca Use	Planting Date ***	Plants/Unit	Finish Time
Hanging Basket - 12-inch	North 2/1	6	16-18 weeks
	South 3/15	5 or 6*	7-9 weeks
4-inch Pot** Landscape Installation	North 3/1	1	10-12 weeks
	South 2/15	1	8-10 weeks
4-inch or 6-inch Pot Retail/GC Market	North 2/15	3	14-16 weeks
	South 2/15	1 or 3*	8-12 weeks
Bedding Flat Retail Market	North 2/15	1	12-14 weeks
	South 2/15	1	10 weeks
Color Bowls (Using 72 plugs or flat material)	North 3/1	2 per 5-inch space	10 weeks
	South 3/15	1 per 5-inch space	8 weeks

* Use of vinca at this density allows for a two-week reduction in bench use; however, this density requires nitrate fertility and careful temperature control to avoid stretching.

** Note the delay in production due to later use of the crop by professional landscapers. This difference is usually three to four weeks later than retail market peak. Also note that plants should be in bloom, with four to five flowers showing and fully developed.

*** Assumes an April 1 wholesale shipping date for the South, a May 1 wholesale shipping date for the North, a May 15 landscape installation date for the South, and a June 1 landscape installation date for the North. Schedules should be adjusted for local markets.

4. Plan now to educate customers later. Your crop schedule and production plan should include an information sheet for your customers. Our industry must do a better job informing landscapers, garden center managers, and consumers about the specific needs of vinca. If educated on plant care, customers will experience the benefits of a heat-tolerant, easy-to-grow bedding plant, and they could become “repeat” customers.

Vinca Culture From Seed to Sale

The art of growing from seed. When you grow vinca from seed, use a high porosity soil mix designed for plugs and single seed in plug trays no smaller than 288's. Seeds should be covered lightly with a medium-grade vermiculite. The key to good germination is keeping soil temperature above 75°F for 7 to 10 days. Moist (85 percent humidity or more) and constant soil temperatures between 80°F and 85°F the first four to six days after seeding are optimal. Most seed will germinate under these conditions within two weeks. Allow five to eight weeks for seedling development in the tray prior to transplant. Supplemental lighting can speed up seedling development. The EC should be below 1.0 mmhos/cm (mS/cm) at all times. You can apply 25 ppm of a high-nitrate complete fertilizer upon removal of plug trays from the germination environment. After two weeks of seedling development, 75 ppm can be used.

Vinca seedlings should be grown in the highest porosity peat-lite plug mixes one can obtain. They do poorly if grown wet. However, they also do not respond well to even a few hours of drought under high light intensities. This is especially true of two-week-old seedlings. It is critical that growers monitor plug moisture hourly. Media should **never** be dry. This is because root damage can occur, particularly once fertilization has started. In addition, vinca root hairs are slow to grow and never recover from soil moisture stress. One afternoon of drought stress under high light levels will delay a vinca seedling at least one week, if it even survives.

The greenhouse environment selected for growing plugs on is also critical. Keep light diffuse and at moderate levels, between 2,000 to 2,500 footcandles for plugs. Supplemental lighting after sunset or before sunrise will also speed things up. Four hours of 1,500 footcandles provided via HID lamps is optimal for vinca seedlings. However, they also respond to much lower levels.

Growing plugs on. Crop timing can also be a source of poor performance. Local weather conditions strongly influence vinca production. In the

North, especially in cloudy areas, it might take 18 to 22 weeks to produce a crop (where supplemental lighting and bottom heating have not been provided). In the South, January-planted plugs will take 10 to 12 weeks to flower. Plugs planted in late March will only take 8 to 10 weeks to flower because of increased sunshine and temperatures. In all cases, keeping night air and soil temperatures above 70°F will yield a rapid crop turnover.

Growers purchasing plugs sometime complain that vinca is shipped with little or no root system. Early plug shipments can easily be chilled to near freezing during cross-country shipment in early spring. Shipping or holding vinca plugs at 50°F or below will cause serious chilling injury. Inspect purchased plugs thoroughly. Chilled plugs may recover nicely if allowed to warm up slowly over a day or two without stress. Keep chilled plants slightly on the dry side and out of bright sunlight. Whenever plugs are received, transplant them within 24 hours for best results. Water the plug trays an hour or two before transplanting to reduce transplant shock. Likewise, holding plugs in coolers while catching up with transplanting is not recommended.

Transplanting Tips

Many bedding plants are tolerant of rough treatment during transplanting and will grow out of root ball abuse just fine – but not vinca. One very common problem is irregular growth in a flat due to rough handling. The most common cause is manual transplanting by crews unaware of the fragile nature of vinca roots. If vinca is growing very irregularly, inspect the plug. If it has a “J” hook appearance with dead root tips and/or no root hairs a week after transplanting, your crew is probably planting the plug improperly, such as pushing it in sideways and/or forcing it into the soil. Vinca have brittle roots. Once damaged, they rarely regain vigor, and the potential for disease penetration is increased.

Depth of planting is important. Exposed plugs act like a wick and draw water and salts, which can accumulate, desiccate, and damage plants. Be sure employees are trained to handle vinca plugs.

Nutrition

Avoid nutrient charge in the media (Figure 25-3). Vinca does not like soil solution fertility levels higher than 1.0 mS/cm. High soluble salts tend to inhibit root growth. Root growth is the key to top quality vinca. Transplanting immediately into warm soils with a high level of nutrient charge on a sunny day doubles the stress on the roots. Transplanting plants into a soil with high starter charge

and then maintaining them under cool, wet conditions will also cause loss of roots. It is best to begin by using a low or no-charge soil. If a charged soil is used, leaching should be done prior to or at the time of transplanting.

There is also the question of whether vinca responds poorly to "green," "aged," or uncomposted bark in the soil mix. Published data suggests bark mixes do reduce growth to a small degree. However, this reduction is not sufficient to warrant changing the soil mix. One thing we do know – peat-based mixes are preferred only if they provide good porosity. Remember that vinca originated in Africa/Asia and is adapted to warm, porous soils that drain rapidly. Vinca roots need plenty of oxygen, so they need the best drainage possible. The density and porosity of the greenhouse soil mix is critical to good vinca growth. Adding large amounts of loose organic matter, sand, or perlite to heavy peat soils will go a long way toward solving overly wet production problems.

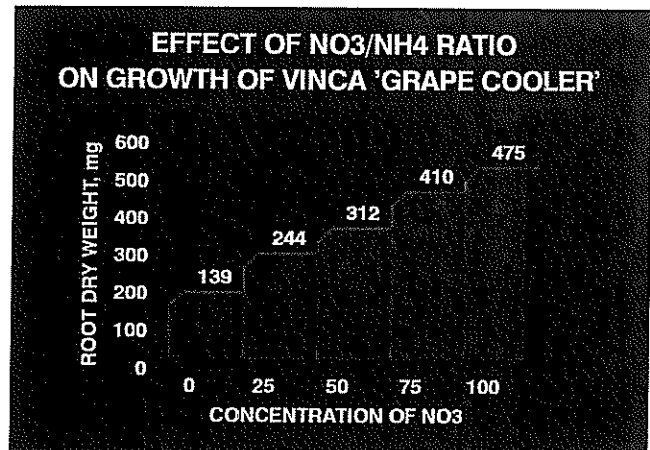
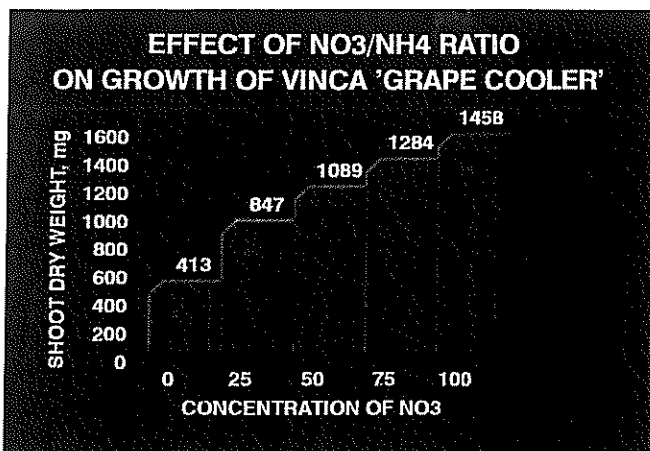
Vinca plants show rapid nutrient deficiency when grown in soilless mixes with a pH above 6.3. We suggest adjusting the pH down to at least 5.6. Iron is especially difficult for vinca to absorb when pH is higher than 5.8. Sequestered iron and magnesium sulfate as a foliar supplement may be used to green things up if this condition occurs. Keep in mind that vinca are also susceptible to *Thielaviopsis* (black-root rot) when pH rises above 6.0. Avoid this problem by monitoring soil pH often. Remember, soil pH often rises in most soil mixes for four to six weeks after transplanting. Acid-forming fertilizers, iron sulfate, and even pH-adjusted water can be used to correct the situation.

Growing Transplants

Once the roots begin growing vigorously, you can fertilize with 50 ppm of a 15-2-20 high-nitrate fertilizer for two weeks. After a few new leaves have expanded, the rate can be increased to 100 ppm. Researchers have documented that vinca do not do well at elevated levels of ammoniacal nitrogen (>25 ppm) or phosphorus (>20 ppm) in the soil (Figures 25-4a and 25-4b). Data has been published that shows that ammoniacal nitrogen as low as 50 ppm nitrogen can strongly inhibit vinca root growth and promote stretch (Figure 25-5, page 130). Ammoniacal nitrogen or slow-release urea used in some commercially prepared soil mixes can impart levels as high as 200 ppm ammonium.



Figure 25-3. Salt levels, even those present as a result of fertilizer change in growing media, will stunt root and top growth.



Figures 25-4a and 25-4b. As the proportion of nitrate nitrogen increases and ammoniacal nitrogen decreases, shoot (left) and root (right) dry weight increases.

Water Quality

Vinca growers in many parts of the United States have very hard water with pH levels between 8.0 and 9.0. The “harder” the water (i.e. calcium carbonate equivalent), the more intensely the water pH will affect the soil solution pH. For example, relatively pure water at pH 9.0 will raise the soil solution pH only slightly, if at all, in a normal fertility program. A very hard water source with a pH of 7.5 will raise soil solution pH dramatically. Vinca are very sensitive to pH.

Soil Temperature Considerations

Researchers agree that vinca require a warm, sunny environment. “Warm” means soil temperatures no less than 70°F. Vinca grow vigorously at day air temperatures ranging from 80°F to as high as 95°F. To meet these soil temperature requirements, growers should commit a whole greenhouse to vinca and adapt the structure accordingly.

Height Control

Weather and scheduling problems may require the use of height control measures. Using a nitrate-based soluble fertilizer such as 15-2-20 will give excellent stretch control unless conditions are extreme. Height control can also be achieved through the use of plant growth regulators (PGR). Foliar sprays of Bonzi are effective in holding crops under high heat. B-Nine is also recommended for temporary control. Sumagic controls height, but can also cause leaf spotting and is not recommended at this time. Do not “spray and chill” to hold plugs or plants. Plug trays treated with PGRs and then held around 45 to 50°F will exhibit very erratic growth. Most importantly, be absolutely sure to allow good root development prior to use of any PGR on vinca.

You can use negative DIF on vinca if you live in a Northern climate that allows it. Remember, vinca are very sensitive to chilling. Be sure that fans are running to average out the air temperatures rapidly during the two- to three-hour “cool day” treatments you impart just after sunrise. Try to keep “cool-day” treatments between 63 and 65°F, and never below 55°F. If automated, be sure there are no pockets of very cold air generated during the cooling process. Keep in mind that vinca are kept warmer at night, between 70 and 75°F. This allows some flexibility in the 5 to 10°F temperature reduction needed for “cool-day” treatment and more opportunity to use DIF in late spring, even in the South. Southern growers will receive more benefit from DIF if the crop is shaded a week prior to treatments and light levels are held under 3,000 footcandles.



Figure 25-5. Stretching resulting from excessive ammoniacal nitrogen (NH_4^+).

Watering

We’ve already mentioned that new seedlings must be kept moist. Newly transplanted plugs need to be thoroughly watered in and established before reducing the watering frequency. Like fertility, exposure to the correct amount of water is critical to good root establishment. If the soil has high salts or you use a heavy dose of fertilizer, low water use can cause salt damage of the new roots. Flooding or desiccating the plug will result in poor root growth. Many employees overwater vinca, seemingly unaware of its needs. I have seen employees watering both established and new vinca transplants at 4 p.m. on a rainy day.

Inadequate Air Movement

Air flow is critical. Improving air flow through the vinca crop can reduce the potential for most disease problems. Greenhouse owners can simply purchase additional HAF fans for their vinca house. Leaving the fans on day and night will give the best results. The additional air movement reduces to a minimum the condensation on the leaf surface and keeps air circulating among trays and plants. It also provides an environment where vinca soil can dry out as quickly as possible after watering or fertilizing.

Disease Prevention

If you are serious about growing vinca profitably, you must dedicate a portion of your disease control program specifically to your vinca crop. Most vinca root disease problems are associated with high pH, high fertility, poor drainage and cold temperatures. *Phytophthora parasitica* is particularly common under these conditions (Figure 25-6). Vinca foliage is also susceptible to many pathogens, most notably aerial *Phytophthora*. However, disease incidence can be reduced by consulting with a professional plant pathologist on a prevention program.

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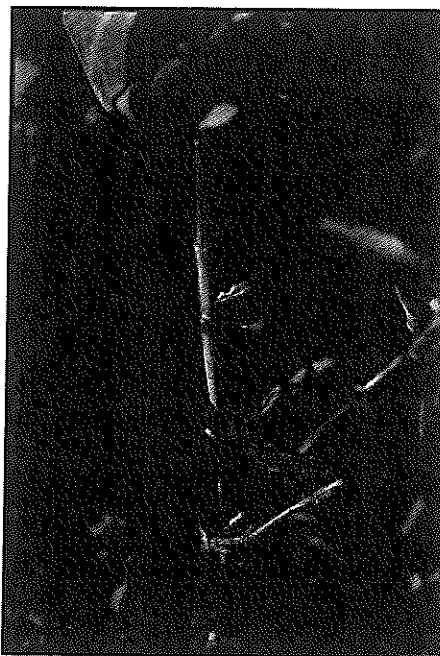


Figure 25-6. *Phytophthora* root and crown problems often associated with salt, pH, drainage, and/or temperature problems.