Tips for Producing Vinca Bedding Plants

AFTER TRANSPLANTING HEALTHY PLUGS, HERE ARE SOME TIPS FOR GROWING HIGH-QUALITY FLOWERING VINCA. ***By Ron Derrig***

Last month, I discussed tips for vinca plug production. However, transplanting a healthy plug is just the first step in producing high-quality flowering vinca, as there are always challenges with nutrition deficiency, disease and insect management and growth control.

This article will provide some tips on how to successfully produce flowering vinca

Success in the Greenhouse

For optimum quality, adjust the amount of limestone incorporated in the media to maintain the pH between 5.5 and 5.8, no higher than 6.0. Since vinca do not readily root into a media with high soluble salts, transplant seedlings into a media with EC < 0.8 mS/cm. Maintain the soil EC of young, actively growing vinca transplants between 0.8-1.2 mS/cm, and once the roots are established, maintain the media EC between 1.2 and 1.8 mS/cm, tested via saturated media extract method.

It is extremely critical to maintain at least 70° F media temperature and moderate moisture until the roots have grown to the bottom of the containers. If the roots are too cool and/or too wet, the transplants are predisposed to root rot pathogens and nutrient deficiency.

Lightly irrigate after transplant to only wet the upper media, and then apply additional water as the roots grow downward into the media. Once roots are established, begin the wet/dry cycle to encourage root development, but avoid saturating the media; apply enough water to wet ¾ of the media, and allow capillary action to pull the moisture to the bottom of the container.

The media temperature of established, actively growing vinca can be as low as 65° F without reducing the plant quality as long as there is proper moisture management. However, to prevent root rot and promote growth, strive to maintain a minimum soil temperature of 68° F. Monitor temperature in the media by sticking soil thermometers in the root zone, as the soil temperature may be 5° F less than air temperature when using overhead heat. If bottom heat is not available and vinca are grown on the floor, grow crops on PVC pipes or inverted web trays and use horizontal air movement fans to increase media temperature and help manage soil moisture.

To encourage lateral branching and root growth, maintain light intensity at least 5,000 foot-candles, with minimum average daily light integral at least 12 mols/day, ideally more than 15 mols/day. During low light conditions, supplement with HID/LED lighting at 450 to 700 foot-candles.

Vinca have a day-neutral flowering response, and flower buds on most varieties develop after the seventh set of true leaves have expanded when the average daily light integral is at least 12 mols/day. To hasten flowering, increase the "leaf unfolding rate" by maintaining warm temperature and high light intensity.

Fertilization

Vinca are light-to-moderate feeders, so once roots have grown halfway down the side of the container, begin fertilizing on a constant basis, adjusting the fertility rate based on the media EC and environment. When fertilizing less than twice a week, fertilize with 175 to 200-ppm nitrogen, 30 to 35-ppm phosphorus pentoxide, adjusting the fertility rate as needed to maintain the media EC 1.2-1.8 mS/cm, tested via saturated media extract method.

Thrips are the most common insect pest of vinca and will cause white streaking on vinca flowers. Cool temperatures also can cause white streaking.

Monitor the media EC and adjust the fertility rate as needed, as high-soluble salts accumulating in the media will predispose the plants to root rot fungi. Once the weather improves and plants are fertilized at least on a twice-a-week basis, reduce the fertility rate to 100- to 150-ppm nitrogen, 20- to 25-ppm phosphorus pentoxide to assist with growth control and maintain the EC within the optimum range. Nitrogen influences the leaf size, and phosphorous influences cell elongation, which equals stem stretch, so adjust the ppm nitorgen and ppm phosphorus pentoxide based on the desired leaf size and plant height.

When fertilizing with less than 200-ppm nitrogen, supplement with micronutrients to maintain 1-ppm iron, ½-ppm manganese, ¼-ppm boron, ½-ppm zinc, ¼-ppm copper and 1/10-ppm molybdenum in the fertilizer solution to prevent micronutrient deficiency. Fertilizer selection depends on media pH, root development, and environment. During low light and slow drying

conditions, fertilize with a high nitrate, low ammonium formulation, such as 13-2-13 or 15-3-16, but as the weather improves, fertilize with a moderate ammonium formulation, such as 17-4-17. Avoid fertilizing vinca with high ammonium formulation, such as 20-5-20 or 20-10-20, unless the roots are healthy and plants have been drenched with a fungicide for disease prevention, as the saprophytic Thielaviopsis fungi feeds on ammonium in media.

Chlorotic immature foliage is a common symptom of micronutrient deficiency on vinca when root growth is delayed due to cool, wet media, but it can also occur when there is inadequate micronutrients in the fertilizer solution, the media pH is above 6.0 and/or plants are infected with a root rot pathogen. Prevent micronutrient deficiency by moisture, fertility, temperature and disease management, and improve foliage color by promoting healthy root growth and drenching 20-ppm iron EDDHA chelate.

Drenching the iron chelate will improve the foliage color as long as the roots are healthy enough to absorb the micronutrient, as the iron chelate will correct iron deficiency and "mask" other micronutrient deficiency symptoms. Unfortunately, high media pH + high iron in media can predispose the plants to manganese deficiency. If the media pH is higher than 6.0, drench 20-ppm iron EDDHA chelate + 16 to 32 ounces iron sulfate/100 gallons,

Off-colored, clubby secondary roots is a common symptom of Thielaviopsis root rot, while the bare strand of tough vascular tissue at the end of the roots is a common symptom of Pythium root rot.

followed by rinsing off the treated plants within 15 minutes of the application to prevent phytotoxicity from the iron sulfate. The iron in iron sulfate will precipitate out of solution when the water pH is higher than 5.5, so add enough citric or mineral acid to the stock tank to reduce the pH of the water coming out the end of the hose to below 5.5 before adding the iron sulfate crystals to the water.

Unfortunately, a single application of iron sulfate to a media with a high amount of limestone will only reduce the pH for only a few days. Never apply more than 32 ounces iron sulfate/100 gallons to prevent high soluble salt damage and high residual of iron in the soil, resulting in a nutrient imbalance.

Drenching a high potential acidity fertilizer, such as 21-7-7 Acid Special, will also reduce the soil pH over time, but the high ammonium will promote soft growth and increase the risk of Thielaviopsis and Fusarium root rot infection. For best results, add mineral or citric acid to the ammonium fertilizer stock tank to reduce the pH of the water coming out the end of the hose to between 4.0 and 4.5 to neutralize the water alkalinity, allowing all of the ammonium nitrate in the fertilizer to react and reduce the soil pH. Never drench plants susceptible to Thielaviopsis root rot, such as vinca, with 21-7-7 Acid Special unless plants have healthy, active growing roots and have been drenched with a fungicide for Thielaviopsis prevention. Avoid

having to drench iron sulfate or an acidic fertilizer by adjusting the amount of limestone in the media and promoting healthy root growth.

Calcium and magnesium are less available when media pH is less than 6.0, so maintain at least 100-ppm calcium and 50-ppm magnesium in the fertilizer solution, including calcium and magnesium in the irrigation water. When it is not possible to maintain adequate magnesium in the fertilizer solution, drench every 2½ to 3 weeks with 16 to 24 ounces magnesium sulfate/100 gallons to prevent magnesium deficiency.

Controlling Growth

Growth control of vinca is enhanced by moisture management, but keeping the media too dry may reduce flower size, especially when growth regulators have been applied after visible bud stage. Reduce the need to apply growth regulators via fertility and environment management, and when growth control is desired, spray B-Nine (daminozide) at 2,500 to 5,000 ppm, B-Nine at 2,500 ppm + Cycocel (chlormequat chloride) at 750- to 1,000-ppm combo, A-Rest (ancymidol) at 4 to 8 ppm, B-Nine at 2,500 ppm + A-Rest at 2- to 4-ppm combo, or Sumagic (uniconazole) at ½ to 2 ppm. Spraying B-Nine or B-Nine + A-Rest/Cycocel combo after visible flower bud stage may reduce the flower size. Drenching Sumagic at 1/15 to 1/10 ppm also provides effective control with less threat of reducing the flower size, especially when plants are lightly rinsed off within 15 minutes of the application. Applying paclobutrazol, flurprimidol and high rates of uniconazole may cause black spots to develop on vinca foliage.

If plugs were drenched with fungicides for Pythium and Thielaviopsis prevention within a week prior to transplant and the roots are healthy, drench 10 to 12-day-old transplants with mefenoxam + fludioxonil combo, or etridiazole + thiophanate-methyl combo.

If plugs were not drenched within a week prior to transplant, drench one of the fungicide combos within a few days after transplant, but only wet the upper media with the fungicide solution to prevent excessive moisture. Manage soil moisture, temperature and fertility to prevent having to apply another fungicide drench for root rot pathogens, but if root growth is delayed, or roots have symptoms of root rot infection, drench every 2½ to 3 weeks, rotating the two fungicide combos.

Always focus on maintaining optimum sanitation protocols, such as removing plant debris and disinfecting the greenhouse between crops, to prevent disease infection and transplant plugs into steam-treated or bagged soilless media and new plastic. If plants are grown in used plastic containers, ensure they are cleaned and disinfected to kill Pythium and Thielaviopsis chlamydospores. Delay transplanting plugs with limited root growth, off-colored roots and/or chlorotic leaves until plants have white, healthy new roots. If you suspect plugs are infected with a root rot pathogen, send symptomatic plugs to the lab for disease assay, and

discuss with your plug supplier.

Once roots are established, avoid excessive spot watering, irrigate the plants early enough to allow enough time for the foliage to dry prior to sunset, and maintain less than 80 percent relative humidity within the foliage canopy to prevent Phytophthora Aerial Blight and Botrytis stem canker. Enhance air movement within the foliage canopy via HAF fans and controlling leaf size by fertility and moisture management.

It can be difficult to visually identify stem rot pathogens, so send symptomatic plants to a lab for disease assay to determine the best fungicides to apply for disease control. If infected plants are in flower, rotate fungicides safe to apply on open flowers, such as fludioxonil (or cyprodionil + fludioxonil combo), fenhexamid, and poloxin-D for Botrytis control, and amnistar, cyazofamid, and mandipropamid for Phytophthora Aerial Blight.

Vinca are also susceptible to other stem rot pathogens, such as Fusarium, Myrothecium, Rhizoctonia and Rhizopus, so send symptomatic plants to the lab for disease assay to identify the pathogen and ensure the correct fungicides are applied for control.

Fungal leaf spot pathogens are not a common issue when there is adequate moisture management, but vinca are susceptible to Alternaria leaf spot when exposed to prolonged moisture and/or high relative humidity. Rotate fungicides effective in controlling Alternaria, such as fludioxonil (or cyprodionil + fludioxonil combo), amnistar and poloxin-D when black lesions develop on foliage, or environment is conducive to disease infection. Sooty mold may develop on vinca grown under high humidity, which can look similar to symptoms of Alternaria leaf spot, so send untreated symptomatic plants to a lab for disease assay to determine what is causing the foliar leaf spot.

Pest Management

Thrips are the most common insect pest of vinca and will cause white streaking in the flower petals and deformed leaves and may predispose the plants to Impatiens Necrotic Spot Virus (INSV) and Tomato Spotted Wilt Virus (TSWV). However, the white streaking may also be a genetic response to cool temperature, so scout weekly for thrips via visual inspection and the use of blue or yellow sticky cards.

Maintain weekly preventive insecticide sprays for thrips control, increasing the spray frequency to twice a week when the thrips population is increasing, or control thrips via beneficials, such as Neoseiulus cucumeris, Amblyseius swirskii, Hypoaspis miles, Amblydromalus limonicus and Orius insidiosis. Recommended insecticides for thrips control depends on the insect population, but include abamectin + azadirachtin combo, methiocarb + pyrethroid combo, pyridalyl, chlorfenapyr, novaluron and thiamethoxam or acetamiprid, as well as soft bioinsecticides, such as Beauveria bassiana, Metarhizium anisopliae, Paecilomyces fumosoroseus and Isaria fumosorosea. Spinosad + azadirachtin combo may also provide control, if thrips have not developed resistance to spinosad.

Stem lesions on vinca are symptoms of Phytophthora Aerial Blight and Botrytis stem canker.

Lastly, Steinernema feltiae predatory nematodes will provide very good to excellent control of thrips, as long as the nematodes are applied according to the supplier's recommendations.

For optimum control of insects and mites, it is imperative to obtain adequate spray coverage of the lower leaf surface and apical meristems. To ensure there is adequate coverage, spray some plants with water + surfactant and immediately inspect the lower leaf surface, or attach water-sensitive paper to the underside of lower leaves.

Fungus gnats and shore flies should not be a concern when soil moisture is properly managed. If needed, drench cyromazine or pyriproxyfen for prevention, and drench chlorpyrifos, bifenthrin, or azadirachtin for control. Another option is to apply Steinernema nematodes, and/or Hypoaspis mites to prevent and control fungus gnat and shorefly larvae. Aphids will also feed on vinca and are controlled by spraying pymetrozine or flonicamid, or applying a neonicotinoid insecticide, such as thiamethoxam. Methiocarb will also provide good control of aphids, as long as there is adequate spray coverage, since the insecticide does not have systemic properties. Beneficials for aphid control include Aphidius ervia, Aphidius colemani, Aphidius matricariae, Aphelinus abdominalis, Aphidoletes aphidimyza and Chrysoperia carnea.

Even though there are challenges associated with growing vinca, transplanting healthy plugs and paying attention to culture details will eliminate these challenges and sleepless nights. g

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