Fall 2014 Georgia Guide for Production and Landscape Use of Pansy and Violas

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Fall of 2014 happily brings an increase in market demand for Pansies and Violas not seen in 6 years. With the increase in production come the many questions that arise during production and landscape installation. It's been a while for many growers and landscape professionals whom dropped pansies and violas due to the landscape market decline, and there has been a huge turn over in growers in most firms with some not having grown the crop before, so we felt it important to review.

There are a few important things to remember for proper greenhouse grown pansies.

Watch for Shifting Soil pH

Monitoring soil pH is key to pansy production. Dr. Woodward will show later on in this article that disease control starts with controlling soil pH. Secondly, plant nutrition suffers if the soil pH is not correct. For all pansies and violas, a pH of 5.4 to 6.2 is workable. If your pH rises above 6.2, you will run into nutritional and disease problems. If your pH falls below 5.2, you risk nutrient toxicities. Greenhouse soil pH readings change rapidly in southern greenhouses due to frequent watering and high soil temperatures. The lime particles in the soil react to the acidity in the peat, and with frequent irrigation, (especially with water that has itself a high or low pH or high alkalinity), can cause rapid shifts in soil pH. This shift can happen within a week's time frame so do check your soil pH weekly. Most cultivars of violas and pansies respond well to on-the-fly adjustments of pH using traditional means such as iron sulfate if the pH rises and additions of dolomitic lime if the pH drops. (See Resources below for details). If you lower pH with iron sulfate, be careful. A 50 ppm solution as a drench will lower the pH about one unit within a few days. If you get impatient, and mistakenly add a higher concentration, the pH will usually go below 5.2 and you likely will wind up with iron toxicity. This is expressed by the leaves having very strong white-yellow chlorosis on the leaf margin. It is really hard to make that go away once the toxicity occurs. When in doubt, use less….be patient.

Use the Proper Form of Nitrogen

The second item to consider is the form of nitrogen you use when fertilizing. Nitrate nitrogen is preferred year-round for pansy production. It is taken up more readily in cold weather, and it does not cause as much stretching in hot weather. Products such as 15-2-20, and other products especially formulated for pansies have enhanced nitrate over ammoniacal nitrogen ratios, possess low phosphorus, and generally have the trace elements and macro elements in the right ratios for pansies. In late spring, summer and Early Fall, there are three things that will turn your pansies into "spaghetti," meaning the plants stretch and become ugly, vine-like and flower poorly. The three items are high soil temperatures (above 80 Fahrenheit, high phosphorus levels in your fertilizer or in the soil you are planting them in, and high ammoniacal nitrogen. A good fertility program designed for pansies will greatly reduce the problem and extend the late spring and early fall production seasons in the greenhouse. Keep the plants moist but never wet for days. Keep the EC (salt levels) moderate near 1.5 mmhos, and do not ever over-fertilize as a way to push or speed up the crop production schedule.

The third item to watch is your boron/calcium levels and ratio. If you use [$Ca(NO_3)_2$] as a fertility supplement or as a cyclic substitute without boron, as some growers do to control stretch, you run the risk of saturating the plant with calcium. This competes with boron, and alters the calcium/boron ratio. This abundance of calcium causes the boron deficiency as calcium basically blocks boron uptake by the roots. Frequent irrigation and use of less-expensive fertilizers without balanced trace elements can also cause serious boron imbalances.

A deficiency of boron also commonly develops if boron is missing from the fertility program. You will notice tightly bunched up new growth that eventually leads to deformed leaves and poor flowering. It cannot be reversed quickly and most crops where it is discovered are not salable for months, if at all. If you need to supplement Boron, use a drench by mixing 0.85g borax(11%B) or 0.48g Solubor(20%B) per 100 gallons water.

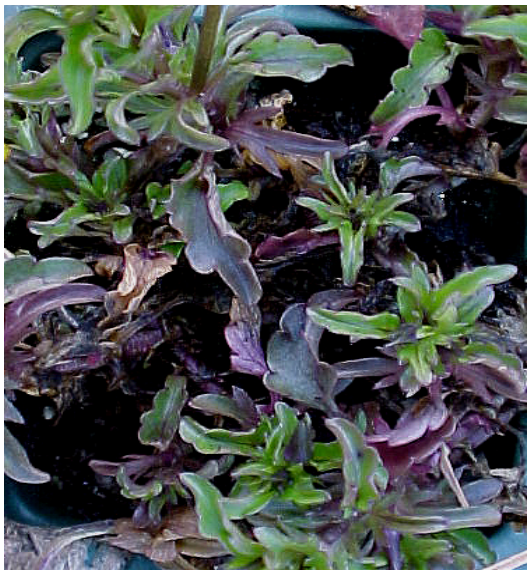
Open-Field Production

Soil pH, nitrate nitrogen use, and monitoring boron levels are even more critical in open-field production. pH changes and imbalances happen twice as fast. To this list we must add increased vigilance to irrigation. You cannot let pansies dry out, nor can they tolerate sitting in puddles or kept soggy. Given the heavy downpours we can get, fertility can be lost to leaching in a matter of an hour. Slow release fertility supplements containing high nitrate form of nitrogen are recommended to be added to the soil at plug transplant. Check your EC and pH weekly without fail and scout that crop as often as you can. Pansies benefit from overhead shade structure with 35% shading. It keeps the plants cooler and also cuts down on rain/wind damage. Make sure you don't have huge areas covered. Leave gaps and drivable rows for air movement and harvesting/shipping considerations.

Landscape Installation

Pansies tend to transplant well if the plant roots are not exposed to the sun. Do not de-pot and set out bare rooted plants. Depot as you plant. Landscape professionals adding 3" or more of mulch to the soil plus the high nitrate fertility program will experience faster re-flowering, tighter growth and will need less irrigation thus greatly extending their early Fall pansy season and the early Spring Pansy revival.

Landscape Freeze Protection and Cold Weather Response



When air temperature drops below 25 degrees F, pansy foliage will seem to wilt and turn a gray-green color. This is a normal defense response to cold weather. Soil temperature gradients, especially in raised beds, can vary greatly due to micro-climate differences. On one site in metro Atlanta, for instance, soil temperature on the south-facing slope of a pansy bed was approximately 45 degrees F on a cold winter day, while 10 feet away, soil on the northern side of the same bed was frozen solid to the depth of the root ball. The roots could not absorb water from the frozen soil, and the plants on the north side of the bed dehydrated and died. Frozen soils combined with drying winds can spell disaster for a pansy bed, even though the plants were healthy prior to these conditions.

Pine straw, applied 2 to 4 inches thick, over the top of the entire bed (plants and all) during extreme cold is one of the best ways to save a pansy planting from

freeze injury. This helps trap heat in the soil, prevents it from freezing and greatly reduces exposure to cold, desiccating wind. Carefully rake the pine straw off the bed when the cold weather passes. These freeze protection measures are generally taken only when the air temperature is expected to drop below 20 degrees F for a considerable length of time, and when dry, cold winds accompany the weather change, and especially when the soil is in jeopardy of freezing solid. Healthy plants can generally survive short periods of temperatures down to the single digits without protection.

Care of Established Beds

Pansies actually do need fertilizing in late December, late January and late February. However, granular fertilizers are not the best thing to use when the soil is very cold. They are primarily fast release ammonium nitrate or urea formaldehyde based materials. When the weather cools and soil temperature drops below 50 degrees F, ammoniacal nitrogen is not taken up well by pansy roots. Better to undertake a liquid feed program using a fertilizer containing at least 50 percent of its nitrogen in nitrate form. 15-2-20, or other pansy designed fertilizers that are high nitrate formulas are best. Applied at 14-day intervals through March 15, it provides excellent results for beginners and professionals alike. You simply add the material to a watering can full of water, and water the bed thoroughly. You may also use potassium nitrate (KNO_3), calcium nitrate [$Ca(NO_3)_2$], and even magnesium nitrate [$Mg(NO_3)_2$] in the winter and get good results provided you read the section about boron deficiency in the greenhouse growers section above.

Fertilization frequency depends on the vigor and performance of the planting. Consult the label for recommended application rate. When foliar feeding (over the top of the plants) is performed, apply enough liquid not only to wet the foliage but also to saturate the root zone to a 4- to 6-inch depth. By March 15th, soil temperatures are on the rise, and use of that nitrate based fertility program becomes critical. Pansies stretch less in spring soil warm up when nitrate based, low P fertility is used. Don't forget to mulch!!!

Landscape Irrigation

Excessive moisture in the soil reduces oxygen and root growth. Carefully monitor irrigation and try to keep pansies slightly on the "dry side of moist soil" to "harden" growth prior to very cold weather. If your beds are continuously wet, even in periods of normal rainfall, consider adding organic matter and other materials next year to increase drainage for the next pansy season.

Diseases

Several diseases are of concern with pansies in the landscape. Black root rot, caused by the fungus, *Thielaviopsis basicola*, has become a major problem for pansies and violas. It has become increasingly prevalent within pansy and viola production. Roots of infected plants are shriveled and darkened, especially at the root tips. Foliage on infected plants is chlorotic and stunted. For landscapers, assume every pansy and viola is infected with *Thielaviopsis*. Preventively drench plants either prior to or after

transplanting with the highest labeled rate of a fungicide containing thiophanate methyl. Generally, this is either 16-20 oz/100 gal rate depending upon the product and formulation. Lower rates of thiophanate methyl are not as effective. Other fungicides that provide fair to good control of black root rot disease include triflumizole, fludioxonil, and polyoxin D containing fungicides.

Black root rot symptoms and signs from left to right: Chlorotic, weak foliage that resembles nutrient deficiency; darkened, weak roots that are difficult to see against the rooting substrate; dark, block-shaped chlamydospores of *Thielaviopsis basicola* within pansy root.

Thielaviopsis basicola produces darkly pigmented chlamydospores (survival spores) that can contaminate containers, greenhouse benches, and garden soil. Repeated planting of black root rot susceptible plant species, such as pansy, viola, snapdragon, petunia, calibrachoa, and vinca, can increase *Thielaviopsis* inoculum in garden soils. If black root rot becomes a problem in landscape beds, rotate plant selections to lesser susceptible plants including salvia, geranium, marigold, zinnia, dusty miller, coleus, and celosia.

Black root rot disease development is favored by moist soils, damaged roots, and alkaline soil pH. A soil pH above 5.8 can not only result in boron and iron deficiency, but may also lead to an increased incidence of black root rot. If the soil pH rises above 5.8, drench at 10-day intervals with 1 to 3 lb per 100 gallons of either iron sulfate or aluminum sulfate to help lower the pH. Lightly rinse pansies after application to prevent any foliage injury from the drenches. Continue these corrective treatments until the soil pH drops and stays in the 5.4 to 5.8 range. Also to reduce root disease development, avoid overwatering and saturated soil conditions.

The most common leaf spot disease on pansy is Cercospora leaf spot, caused by the fungus, *Cercospora violae*. Symptoms of Cercospora leaf spot begin as small purplish spots with a fringed margin. Leaf spots enlarge and may develop a tan center. *Cercospora* spores are produced within the center of each spot and may be seen on their spore-bearing stalks with a hand lens. Prolonged leaf wetness, high humidity, poor air circulation and moderately cool temperatures favor infection

and disease development. Reducing leaf wetness periods by changing irrigation pattern, timing, and type so that plant foliage will dry quickly can reduce disease development. Spray applications of fungicides containing thiophanate methyl, chlorothalonil, mancozeb, copper hydroxide, azoxystrobin, pyraclostrobin, tebuconazole, and myclobutanil can reduce Cercospora leaf spot infection.

Powdery mildew disease is also common on pansy foliage during the fall and spring. Powdery mildew infection causes white fungal growth in patches usually seen on the upper leaf surface. If infection is severe, leaves may become distorted and purplish (see image). Powdery mildew develops under high humidity conditions. Plants that are nutritionally stressed are more susceptible to powdery mildew infection than non-stressed plants. The fungicides used to reduce Cercospora leaf spot infection can also reduce powdery mildew infection. Nutritionally-stressed and cold weather damaged pansies are very susceptible to Botrytis blight or gray mold disease.

The fungus, *Botrytis* sp., infects weakened and senescing tissues during wet, humid conditions. Infected tissues become covered with fuzzy, gray-colored fungal growth (center of image on decaying leaf tissue). Fungicides including chlorothalonil, mancozeb, iprodione, copper hydroxide, and azoxystrobin can reduce *Botrytis* infection. However, keeping landscape beds clean and free of decomposing flowers and leaves will do more to reduce Botrytis blight disease development than fungicides alone. The important maintenance task is to keep the bed clean, and free of decomposing flowers and leaves. Frequent deadheading (removing spent blossoms) from old, damaged flowers and cleaning up beds by removing debris and leaves should be a top priority with pansies. This not only prevents insect and disease problems but also improves the visibility of the color display. Bi-monthly deadheading is an essential requirement of a professional color display. Also, trim lanky pansy stems periodically to encourage branching, compact growth and improved flowering.

Soil Test Guidelines for Pansies

Nitrogen	NO3 @ 100 ppm, NH4 @ >20ppm
Phosphorus	P2O5 @ 5 - 10 ppm
Potassium	K20 @ 100-120 ppm
Magnesium	Mg @ 60 -80 ppm
Calcium	Ca @ 100 – 120 ppm
Iron	Fe @ 100 - 130 ppm
Manganese	Mn @ 70 -100ppm
Boron	B@ 25-30 ppm
Copper	Cu @ 5 - 10 ppm
Zinc	Zn @ 35 - 85 ppm
Sulfur/Sulfates	S @ <80 ppm,
Sodium	Na @> 50 ppm

Foliar Guidelines for Pansies (1.0% = 10,000 ppm)

Nitrogen	3.44-4.20%
Phosphorus	0.37-0.64%
Potassium	2.39-2.92%
Magnesium	0.36-0.49%
Calcium	0.90-1.16%
Iron	80-398 ppm
Manganese	41-203 ppm
Boron	20-46 ppm
Copper	6-23 ppm
Zinc	44-137 ppm
Molybdenum	0.08-1.60 ppm
Sulfur/Sulfates	1500-2800 ppm
Sodium	766-3069 ppm
Aluminum	36-251 ppm

Additional Resources:

For an introductory guide to greenhouse pansy production, see: Bailey, Doug., 1998. Commercial Pansy Production Guide. North Carolina Cooperative Extension Service. http://www.ces.ncsu.edu/hil/pdf/hil-521.pdf .

For a review of commercial pansy production and diagnostics: Pansy Production Handbook, 2nd Edition. Brian E. Whipker and Todd J Cavins, eds. North Carolina Commercial Flower Growers Association. 3906 Wake Forest Road, Raleigh, NC. 27609. 919-334-0093

For a pictoral guide to pansy maladies: PICT Guide of Pansy Disorders. Brian E. Whipker, Todd J. Cavins, and James L Gibson, eds. North Carolina Commercial Flower Growers Association. 3906 Wake Forest Road, Raleigh, NC. 27609. 919-334-0093