

Troubleshooting Calibrachoa

Brian A. Krug and Cheryl Smith; University of New Hampshire Cooperative Extension
brian.krug@unh.edu; cheryl.smith@unh.edu

Calibrachoa is one of the most popular bedding plants across the country. They also can be a challenge to grow due to a couple of perennial problems that start to show up at this time of the year.

Iron Deficiency

If you've grown calibrachoa for more than one year you've probably encountered iron deficiency on calibrachoa. Iron de-

ficiency is easily identified as yellow or chlorotic foliage starting at the youngest leaves (Figure 1) and progressing down to the more mature leaves (Figure 2). In almost all cases iron deficiency is not caused by a lack of iron present in the fertilizer or in the substrate, but due to substrate pH. Iron is more available to the plant when the substrate is below 6.2 (Figure 3). Therefore, iron deficiency in calibrachoa is most often caused by a high substrate pH (greater than 6.4).

There are a number of reasons why the substrate pH on calibrachoa or any crop increases over time. Peat substrates are often amended with lime to raise the pH, check the pH of your substrate before you use it to pot up your calibrachoa to ensure that the initial pH is not too high. In areas of the country where water alkalinity is high the pH will increase over time



Figure 2. Advanced symptoms of iron deficiency.

due to the water alkalinity. Have your water tested on a regular basis (1 to 2 times per year) to monitor the alkalinity in your water. You may need to treat your water with acid if your alkalinity is



Figure 1. Early symptoms of iron deficiency



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CONTRIBUTORS

Dr. Nora Catlin
Floriculture Specialist
Cornell Cooperative Extension -
Suffolk County
nora.catlin@cornell.edu

Dan Gilrein
Entomology Specialist
Cornell Cooperative Extension -
Suffolk County
dog1@cornell.edu

Dr. Brian Krug
Floriculture Ext. Specialist
Univ. New Hampshire
brian.krug@unh.edu

Dr. Joyce Latimer
Floriculture Extension & Research
Virginia Tech University
jlatime@vt.edu

Dr. Roberto Lopez
Floriculture Extension Specialist &
Research
Purdue University
rglopez@purdue.edu

Dr. Paul Thomas
Floriculture Extension & Research
University of Georgia
pthomas@uga.edu

Dr. Brian Whipker
Floriculture Extension & Research
NC State University
brian_whipker@ncsu.edu

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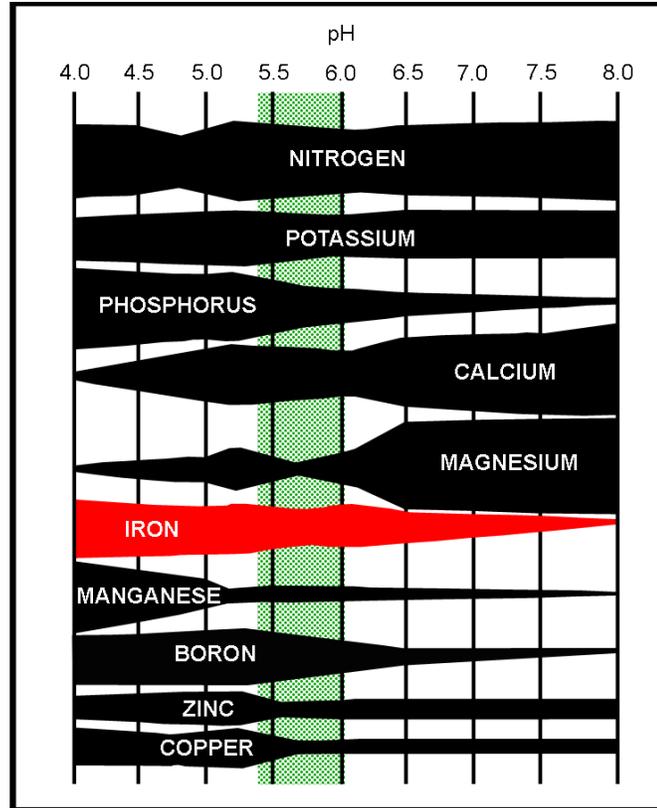


Figure 3. Availability of iron based on substrate pH.

above 2 meq/L (total alkalinity). Fertilizer selection can also have a big impact on your substrate pH. In general fertilizers are potentially acid, potentially basic, or neutral; meaning that over time the use of a fertilizer will tend to decrease, increase or not affect the substrate pH, respectively.

Many growers use a “Dark Weather Feed” like 15-0-15 or 15-0-14 early in the spring season. These fertilizers are potentially basic and will increase the substrate pH. As we move into the middle to late spring when light levels and temperatures are higher it is a good idea to switch away from these fertilizers on your calibrachoa crop to a fertilizer that is potentially acid. Be sure to monitor the pH of your substrate over time to anticipate any correc-

tive measures. If you suddenly realize the substrate pH on your calibrachoa is too high and you need to correct the problem there are a couple of options you can utilize. Apply a substrate drench of iron sulfate at a rate of 1-3 pounds per 100 gallons or iron

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Figure 4. *Thielaviopsis* symptoms on a hanging basket.

chelate at 4 oz/100 gallons, be sure to wash off the foliage with clear water following the drench. In some cases you may need to get the plants to green up in a short amount of time, iron chelate foliage sprays can be used (4 oz/100 gallons).

Thielaviopsis

Calibrachoa can also be susceptible to black root rot (*Thielaviopsis basicola*). The first symptom that you might notice in a calibrachoa crop is wilting or necrosis and sometimes only one plant in a basket or container (Figure 4). Upon further investigation you will see that the roots are distinctly black in areas (Figure 5), hence the name black root rot. If you were to look at the

Photo Courtesy of Margery Daughtrey



Figure 5. *Thielaviopsis* signs on a root system.

black areas of the root with a microscope you would see masses of chlamydo spores (Figure 6),

which are the resting structures of the fungus.

Crops are more prone to develop an infection of thielaviopsis during cool wet conditions or immediately after a stress event (cold damage during shipping, or drought conditions). In some crops, like pansies, excess amount of ammoniacal nitrogen can promote black root rot. *Thielaviopsis* chlamydo spores can be present in field soils or in reused trays and pots.

Photo Courtesy of Margery Daughtrey

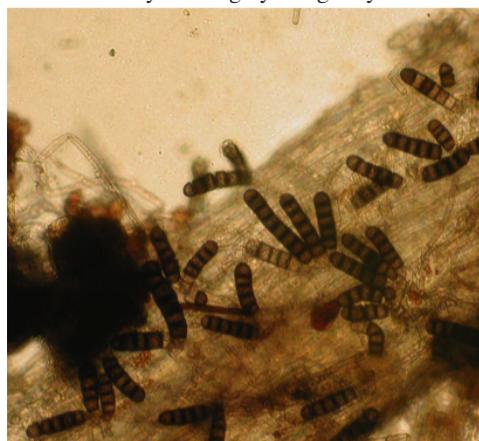


Figure 6. Close up view of chlamydo spores on an infected root.

Managing black root rot is somewhat difficult and requires good sanitation. As always, thoroughly inspect plants when they arrive at your greenhouse; look carefully at the roots for abnormal black sections of the roots. Look at the inside of the roots as well. Avoid using field soil in your potting media, and do not reuse old pots or flats, especially if you have had problems with black root rot in the past. It is very difficult to adequately sanitize used pots to rid them of chlamydo spores, even with a disin-

fecting agent because you must remove ALL organic matter prior to disinfecting. Chlamydo spores are very small and can easily be spread in dust in the greenhouse; keep media in closed containers. Finally, use a well drained media and maintain warm substrate temperatures.

If you think you might have a thielaviopsis infection it is best to have the diagnosis confirmed with your local diagnostic lab. Prevention is the best way to manage thielaviopsis; once confirmed it can be difficult to control as the fungus is living inside the roots. Figure 7 is a list of products that can be used to treat plants with thielaviopsis. Most are preventative products; products with thiophanate-methyl are systemic and will have a better chance of treating infected plants.

Calibrachoa are popular plants with consumer, and as you can see come with some challenges. However, with a little prevention and attention to detail, you can successfully grow a quality crop. ❖

Active ingredient	Trade name
Etriazazole + thiophanate-methyl	Banrot 40W
Fludioxonil + mefenoxam	Hurricane
Fludioxonil	Medallion
Thiophanate-methyl	AllBan Flo 3336 50WP 3336F OHP 6672 50WP OHP 6672 4.5 TM 4.5F TM 85 WDG T-Storm F
triflumizol	Terraguard SC

Figure 7.