

## Boron Deficiency is Fatal: It'll Curl your Palm's Fronds!

Doug Caldwell, University of Florida Extension  
Collier County Commercial Landscape Horticulture

There are several catchy descriptors for boron deficiency: fishbone leaf, hook leaf, fasciation, blind leaf, and accordion leaf. Foxtail palms tend to throw a new frond that resembles a buggy whip with leaflets that don't open except at the tip.

These are terms used to describe the malformed new growth caused by the lack of just a tiny amount of an element called boron, a micronutrient. Boron is associated with cell division and cell production in buds and root tips. Because this element is water soluble, it appears to leach faster than the palm roots can pick it up, especially in sandy soils and especially during particularly rainy periods or if over-irrigated. Normal growth may resume once the heavy watering events cease, but in some situations additional Boron may need to be supplied or the palm will die. The "feather" frond palm group is more prone to this boron sensitivity than the fan (palmate) shaped frond group. The problem is most common with queen, royal, and foxtail palms.

Some symptoms of boron (B) deficiency could be confused with those of manganese (Mn) deficiency. However, B deficiency symptoms tend to be worse at the leaf tips, while Mn deficiency symptoms are more severe towards the base of the frond. Boron deficient leaves usually are not chlorotic (yellowed) as are Mn and iron (Fe)-deficient new leaves.



*Queen palm with accordion leaf malformation and multiple heads.*



*With royal palms new fronds fail to open and curl downward.*

## Boron Deficiency Symptoms



*As multiple heads develop, this queen palm has become an eyesore and will eventually die.*



*On queen palms, the leaflets have wrinkles as well as a zig-zag mid-vein.*



*This queen palm developed a crooked head but started to recover, however, it is a hazard tree now.*



*This presumed boron deficiency has turned this queen palm into an ugly mop head.*

**What To Do:** Dr. Tim Broschat (University of Florida palm researcher, Ft. Lauderdale) suggests the following treatment. Because there is a fine line between correction and overdose (death) with B, treatment must be approached with caution. Recommended rates for B products such as 20 Mule Team® products: Borax or Solubor and boric acid are two to four oz per medium to large palm. Dissolve the product in about four to five gallons of water and pour slowly over the root zone under the palm canopy. If a heavy rain occurs, B can be reapplied, otherwise, if only light rainfall or irrigation is received, do not reapply for about 3 months, and then only if new leaves continue to show symptoms. Correction of leaf symptoms should be apparent when the next two or three new leaves emerge, but bent trunk symptoms may take a year or more to correct. Smaller palms can be treated with foliar sprays of soluble boron fertilizers at a rate of four to eight oz per 100 gallons of water. Foliar sprays can be repeated on a monthly basis until a response is observed.

See more on this at: [http://www.ftld.ufl.edu/Hort/Palms/Boron\\_Deficiency/Deficiency\\_in\\_Florida\\_Landscape\\_Palms.htm](http://www.ftld.ufl.edu/Hort/Palms/Boron_Deficiency/Deficiency_in_Florida_Landscape_Palms.htm)