

Palms, 43(2), 1999, pp. 73-76

Nutrition and Fertilization of Palms

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There are approximately 16 elements considered essential for normal palm growth and development. Fortunately, only a few of these elements are routinely deficient in palms and they will be the focus of this discussion.

Palms grown in pots are primarily susceptible to nitrogen (N) deficiency. In all species, N deficiency appears as a uniform light green to yellow discoloration of the foliage (Fig. 1, top). Plant growth will also be reduced. Palms grown in pots should be given fertilizers with a ratio of about 3 nitrogen: 1 phosphorus: 2 potassium. Since N is readily leached through all soils, slow release N fertilizers are the most effective products.

Most native soils in the tropics have very low nutrient holding capacity and the most widespread deficiency on palms growing in them is usually potassium (K) deficiency. K deficiency symptoms vary among species, but usually include yellow, orange, or necrotic (dead) spotting on the oldest leaves. This spotting is usually accompanied by necrotic tissue starting along the margins (not the tips) of the leaflets (Fig. 2, upper left). K deficiency appears as a bronze or orange discoloration of the older foliage in species such as *Dypsis lutescens*. Entire older leaves may appear dead or frizzled, yet the petiole remains alive. As this deficiency progresses, the entire canopy may become discolored, the trunk diameter will taper, and the palm may die. K deficiency is best treated with sulfur-coated potassium sulfate.

The second most common deficiency in landscape palms is magnesium (Mg) deficiency. It also appears first on the oldest leaves, but as broad yellow bands along the outer margins of the leaf. The centers of these leaves remain distinctly green (Fig. 2, upper right). Slow release Mg fertilizers such as dolomite or magnesium oxide are excellent for treating this disorder in acid (pH below 7.0) soils, but are ineffective on alkaline soils. For these soils, soluble materials like magnesium sulfate (epsom salt) are effec-

tive, but must be applied at least monthly if heavy rainfall or irrigation are present.

In alkaline soils, manganese (Mn) deficiency is a common problem on some species. This is often called frizzle-top, since the new leaves emerge with small, necrotic, and curled leaflets (Fig. 2, lower left). Earlier symptoms include longitudinal necrotic streaks on otherwise yellow new leaves. This deficiency is quickly fatal to affected palms, but can be treated in early stages with manganese sulfate.

When palms are planted too deeply or are grown on waterlogged soils (including poorly drained potting soils), they often produce yellow new leaves (Fig. 1, bottom). In some species these yellow leaves are covered with pea-sized green spots. This is iron (Fe) deficiency and it is

Some common nutrient deficiencies and palms most susceptible to them.

Pot culture

N deficiency

all species of palms

Fe deficiency

Licuala spp.

Rhapis spp.

Landscapes

K deficiency

Cocos nucifera

Dypsis lutescens

Elaeis guineensis

Roystonea regia

Syagrus romanzoffiana

Mg deficiency

Phoenix canariensis

Mn deficiency

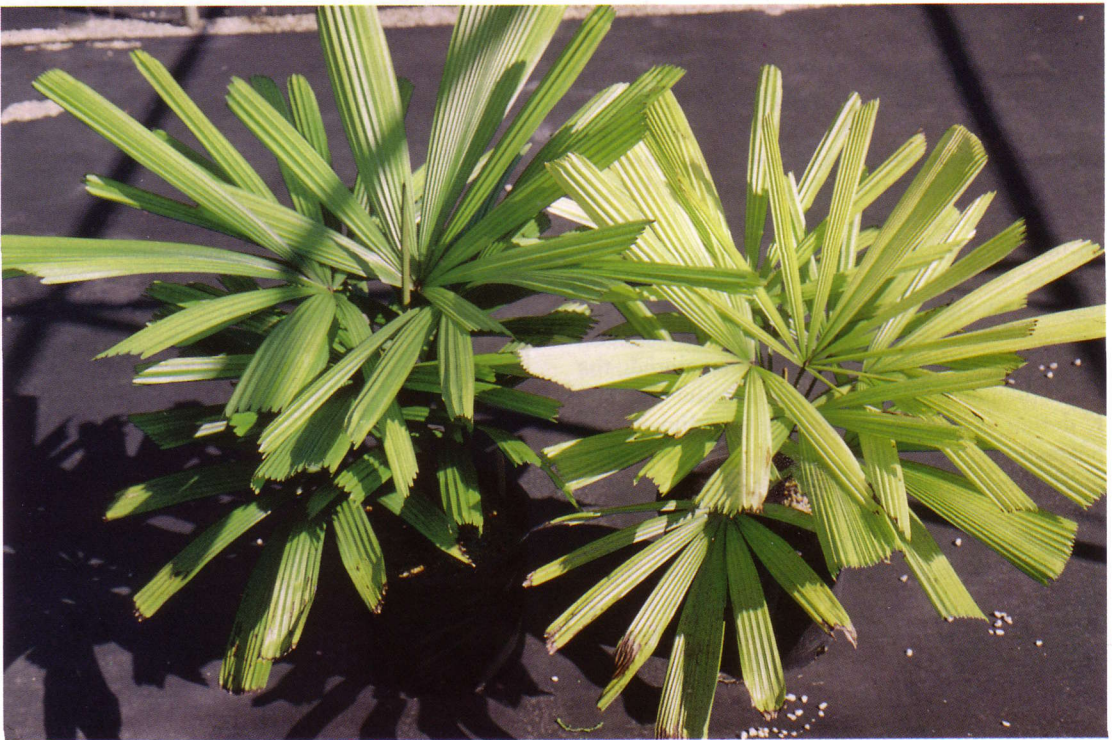
Acoelorrhaphe wrightii

Elaeis guineensis

Syagrus romanzoffiana

B deficiency

Cocos nucifera



1. (Top) Nitrogen deficiency of *Chamaedorea elegans*. (Bottom) Iron deficiency of *Licuala spinosa*.



2. (Upper left) Potassium deficiency of *Hyophorbe verschaffeltii*. (Upper right) Magnesium deficiency of *Phoenix roebelenii*. (Lower left) Manganese deficiency of *Syagrus romanzoffiana*. (Lower right) Boron deficiency of *Heterospathe elata*.

caused by poor soil aeration, not by a lack of Fe or even high soil pH as is the case for broadleaf plants. Correcting the soil aeration or planting depth problem is far more effective than Fe fertilizers in preventing or treating this problem.

One last deficiency problem that affects palms in the humid tropical regions of the world is boron (B) deficiency. It is similar to Mn deficiency in that new leaves emerge stunted and necrotic and death of the bud can follow (Fig. 2, lower right). In *Cocos nucifera*, this deficiency produces triangle-tipped new leaves, or even a

series of triangles within a single new leaf. Boron deficiency is best treated with boric acid or sodium borate (borax).

All nutrient deficiencies are much more easily prevented than treated once they occur. Application of a low release palm fertilizer having a ratio of 2 or 3N:1P:3K:1Mg plus micronutrients every three months should prevent such problems from occurring. A typical rate would be about 1 Kg of this fertilizer for every 10 sq.m of canopy area. In drier climates, lighter and less frequent applications may be adequate.

