

MAGNESIUM DEFICIENCY OF PALMS.

prepared by Joe Garofalo*, and Teresa Olczyk*

Magnesium(Mg) deficiency is a common disorder of the Canary Island date, *P. canariensis*, in South Florida. It is also seen on the pigmy date, *P. roebelenii*, and other species where Potassium (K) fertilizers have been applied without Mg. The older foliage discoloration seen routinely on pygmy date palms is K deficiency (described below), not Mg deficiency.

Plants that suffer nutrient deficiencies exhibit various symptoms, some seriously affecting growth. Among palms, some species are very sensitive to K, Manganese (Mn), and Boron (B) deficiencies, and they will die if these nutrients are not regularly supplied as fertilizer. Mg deficiency will not kill a palm by itself; it can, however, be confused with other deficiencies, and Mg interacts with K.

This fact-sheet was prepared to meet the needs of professional nursery and landscape personnel, and other interested persons, who often request information “in writing” describing how to prevent or correct Mg deficiency in nursery and landscape palms.

SPECIES AFFECTED.

Most species of palms grown in South Florida can be affected by Mg deficiency, but *P. canariensis* seems to be highly susceptible. *Washingtonia* spp appear to be highly resistant.

CAUSES.

Mg deficiency is caused by insufficient Mg in the soil. Mg is readily leached from sandy and rock soils and other soils having little cation exchange capacity. On palms growing in muck soils in South Florida, Mg deficiency is a common problem. High levels of K

and Calcium (Ca) in the soil also can induce Mg deficiency.

Mg deficiency is very common on highly leached soils in both Florida and Hawaii. It can also occur in container-grown palms if dolomitic lime has not been added to the medium.

Mg deficiency can also be caused by an antagonism with K. When correcting a K deficiency, it is necessary to apply Mg at about the same rate to prevent a K-induced Mg deficiency. If fertilizer is applied to correct a Mg deficiency, it is necessary at the same time to apply K (as K sulfate) at the same rate to prevent this K-Mg imbalance.

The practice of removing older leaves which exhibit the symptoms of Mg deficiency can speed up the progression of symptoms. The plant uses these older leaves as a source of Mg for the new leaves. This practice removes Mg and simply makes the deficiency symptoms move up to the younger leaves.

SYMPTOMS.

Mg is mobile within the plant, therefore is translocated from older to new leaves as new leaves develop. Because of this, symptoms always appear first on the oldest leaves, and progress upward through the canopy as the deficiency becomes more severe, or as older leaves are removed.

Symptoms vary somewhat among species, but basically involve a marginal chlorosis of the oldest leaves.

The oldest leaves of Mg-deficient pinnate- and costapalmate-leaved palms typically have broad chlorotic bands along the margins with the chlorosis starting at the leaflet tips and expanding towards the

rachis as the deficiency progresses. In severe cases, only the rachis and the adjacent bases of the leaflets remain green. In *Phoenix* spp leaflet tips may become necrotic (brown) in severe cases.

The progressively younger leaves have wider bands of green along the centers of the leaves. This is especially obvious in *Phoenix* spp.

In palmate-leaved palms symptoms are similar except that the chlorosis appears as a broad yellow band around the margins of the oldest leaves, the center of the leaf remaining green. In palmate-leaved species with deeply dissected leaves, the chlorosis appears as broad bands on the margins of each leaflet tip.

DIAGNOSIS.

In everyday practice visual symptoms are considered sufficient to identify this disorder. However, in the *Phoenix* palms Mg deficiency symptoms are similar to those of K deficiency. The two deficiencies can often be distinguished because in K deficiency the green and chlorotic parts of the leaf are not sharply delimited, whereas in Mg deficiency the green and chlorotic parts are sharply delimited. Also in Mg deficiency the chlorosis is bright yellow, whereas in K deficiency the chlorosis is more an orange-brown or dull yellow.

If there is any questions about the actual deficiency in a given case, leaf nutrient analysis may be required to distinguish between the two.

CONSIDER YOUR OPTIONS.

On soils known through previous experience or soil test to be deficient in Mg, the regular use of a special palm fertilizer formulation can be effective in

preventing or alleviating mild symptoms.

If, however, symptoms are more advanced, a soil-applied Mg supplement, followed by regular use of the palm special, will probably be needed. Another consideration is the time required for a real “cure.” Keep in mind that palms grow very slowly, many of them at the rate of about one leaf per month during the warm season, and less than that during Winter. A palm with fifteen leaves, for example, will require a year or more to replace its foliage at one leaf per month. Mg-deficient leaves cannot be made green again—they must be replaced with new, healthy leaves. So, expect recovery to be slow. To prevent the problem from recurring, you should routinely use a fertilizer containing both Mg and K in controlled-release form.

PREVENTION.

The following general fertilizer recommendation for palms is based on ongoing University of Florida research conducted on palms in South Florida. If followed, it will prevent most nutritional deficiencies, including Mg, in most situations. It is also properly *balanced*, so that too much of one nutrient won't interfere with the uptake of others.

IN FIELD NURSERIES AND LANDSCAPES.

Granular fertilizers should be applied to the soil at a rate of 1.5 lbs./100 sq. ft. of canopy area every 3 months. One pound every month would be even better, and represents the same yearly rate. Fertilizers should be uniformly broadcast under the canopy rather than concentrating it in bands where some roots may be injured & others may never be in contact with fertilizer.

In landscapes, roots of groundcovers, shrubs, and broadleaf trees are intermingled with those of palms,

and share the same soil conditions, so they will also benefit from this fertilization. Do not apply additional fertilizer—this rate is adequate for all the plants in a landscape, including the turf.

Fertility varies greatly among soil types in South Florida, but certain nutrients are consistently lacking in all soil types, and must be supplied by fertilizer. These are nitrogen (N), K, Mg, and manganese (Mn). A good balanced fertilizer for South Florida should provide N, P, K, and Mg in a 2:1:3:1 ratio, & contain some sulfur (S), 1-2% iron (Fe) and Mn, & trace amounts of zinc (Zn), copper (Cu), and boron (B). It is important that the N, K, and Mg be present in 100% controlled-release forms like resin- or sulfur-coated products. If these recommendations are followed, deficiencies and antagonistic interactions are less likely to occur.

Foliar fertilization is a common practice in palm production, and is very useful for supplying micronutrients when soil conditions prevent adequate uptake by the roots. But foliar sprays of the macronutrients, like Mg, are ineffective in correcting deficiencies because the amount supplied by a foliar spray is insignificant compared to the amount needed to correct the problem.

Liquid fertilization is not the most efficient delivery system for landscape or field-grown palms, especially with overhead irrigation. If drip irrigation is being used, injection of liquid fertilizer through the system might be a feasible alternative.

IN CONTAINER NURSERIES. For containers, a fertilizer having a ratio of 3:1:2 is recommended. A controlled-release 18-6-12 or something similar can be incorporated into the medium at planting time at the rate recommended by the manufacturer. 1.5 to 3 lbs of a micronutrient amendment (rate depends on product), should also be incorporated per cubic yard of medium, plus 12-15 lbs of dolomite/cubic yard to provide Ca and Mg.

TREATMENT OF Mg-DEFICIENT PALMS.

Palms with mild deficiency symptoms often respond to an application of the fertilizer recommended above for prevention, the symptoms clearing up in 6 months to a year. You can make applications at any time deficiency symptoms are observed, but especially during periods of active growth (Spring through Fall).

If symptoms are more severe, or if the complete fertilizer does not correct the problem, it will be difficult to correct. Treatment of deficient palms requires one or more years.

You should make a broadcast application of prilled kieserite (a less soluble form of Mg sulfate), or preferably coated kieserite, at 2 to 4 lbs. per tree. At the same time also apply coated K sulfate at the same rate to prevent a K-Mg imbalance from occurring. Once Mg deficiency has been corrected, additional soil applications of supplement should be made only if symptoms recur.

Selected References.

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In Writing

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