Coconut Research Institute of Sri Lanka

Advisory Circular No A 7

NUTRIENT DEFICIENCIES IN COCONUT PALMS

Most soils of coconut lands in Sri Lanka are deficient in major plant nutrients which are Potassium (K), Magnesium (Mg), and Nitrogen (N). Nutrient deficiencies adversely affect the growth and production of coconut palms. Generally a severe mineral deficiency produces characteristic and striking symptoms on the foliage. Thus the condition can be readily identified in the field.

Picture 1: A healthy coconut frond

Sometimes mineral deficiencies can be present in the palms without showing any visual symptoms. Such hidden deficiencies also impose limitation on nut production. Hidden mineral deficiencies can be identified only by chemical analysis of leaf.

Visual symptoms of deficiencies

The most commonly observed symptoms are due to potassium, magnesium, and nitrogen deficiencies. Phosphorus deficiency is rare in coconut.

A. Nitrogen

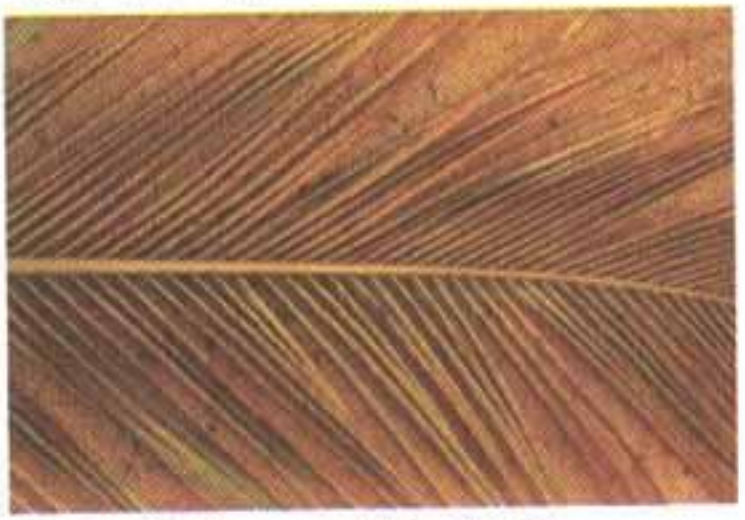
Initial symptoms of nitrogen deficiency are slight and entire yellowing of the foliage (Note: water logging, severe drought, competition from grasses may also produce similar symptoms). The leaflets of the frond will then progressively become yellow. In severe deficiencies, the older leaflets of the older fronds turn golden yellow and then reddish gray before dying. The leaflets would show uniform pale green to yellow coloration depending on the intensity of the deficiency.

In the early stages of deficiency, the crown as a whole appears pale green. As the deficiency advances, the crown appears conspicuously yellow before turning reddish gray. Ultimately, the crown will become progressively smaller with concurrent tapering of the trunk.

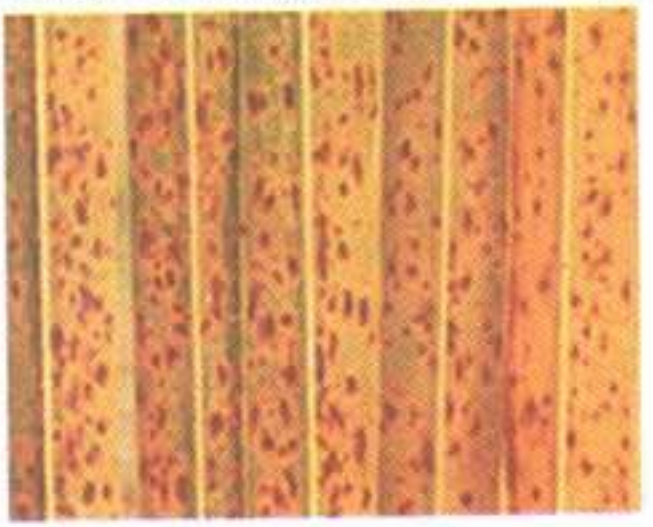
B. Potassium

Symptoms of potassium deficiency are first observed in mature fronds where scattered rust-coloured spots appear on either sides of the midrib (ekel) of the entire leaflet. The leaflets would be slightly yellowish. Yellowing is more

pronounced towards the tip. Gradually the spots enlarge and coalesce to form large brown patches, with leaflet tips showing distinct scorching(Picture 2 and 3).



Picture 2: A coconut frond with Potassium deficiency



Picture 3: A close view of leaflets of a coconut frond with Potassium deficiency

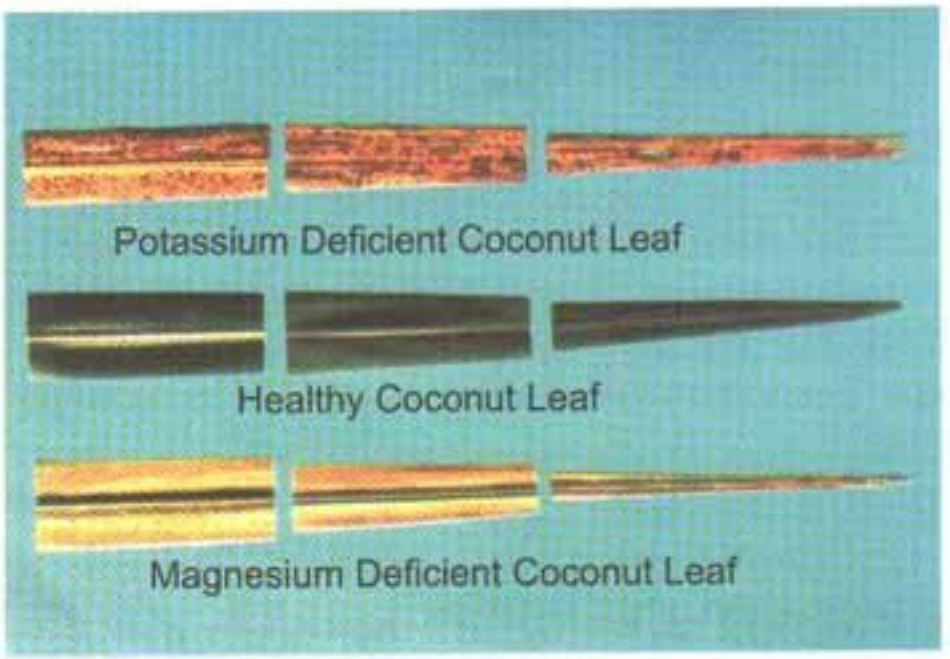
The crown would appear yellowish with the lower half showing a slightly orange colour. As the condition deteriorates the whole crown becomes smaller and yellowish orange. Tapering of the trunk is also common.

C. Magnesium

Picture 4: A coconut frond with Magnesium deficiency

Picture 5: A close view of coconut leaflets with Magnesium deficiency

Magnesium deficiency is characterized by yellowing of leaflets of the mature fronds. The leaflets would be pale yellow with a green band on either sides of the ekel. The basal areas of the leaflets remain green thereby showing a green band on either sides of the rachis of the whole frond. Gradually leaflet tips dry, giving the appearance of scorching (Picture 4 and 5). In magnesium deficient palm, the crown would be pale yellow. As the condition advances yellowing would be more conspicuous in the lower half of the crown.



Picture 6: Comparison of Potassium and Magnesium deficient coconut leaves with healthy coconut leaf

Picture 7: A coconut frond with Boron deficiency

D. Boron

Due to Boron deficiency the leaflets are wedded together and the tip of the diseased frond appeared like a hook. The lower basal region of the frond normally will not produce any leaflets (Picture 7).

Note: Symptoms are often due to deficiency of more than one nutrient and would, therefore not conform exactly with the above descriptions. Also, at times, the symptoms are deceptive or may be a temporary phenomenon due to prevailing weather e.g. continuous drought or water logging. If growers are not in a position to diagnose the cause of the symptoms, then they are advised to contact the nearest Coconut Development Office (CDO) of the Coconut Cultivation Board (CCB).

Remedial Measures

A. Nitrogen deficiency

Nitrogen deficiency occurs due to suspension of nitrogen fertilizer (urea, organic manure) application. Where fertilizer has been suspended for a short period, it is necessary to apply APM or YPM fertilizer in the normal manner to correct the deficiencies caused by nitrogen (As recommended in leaflet A5). If deficiency symptoms appear in spite of regular fertilizer application, apply 200g of urea per palm or 100g of urea per young palm per year in addition to the application of APM or YPM fertilizer until the symptoms disappear (As recommended in leaflet A5).

B. Potassium deficiency

Potassium deficiency occurs due to suspension of potassium fertilizer (Muriate of Potash) application. Where fertilizer has been suspended for a short period, it is necessary to apply 'APM' fertilizer with dolomite in the normal manner (as recommended in leaflet No. A5) to correct deficiencies caused by potassium. If deficiency symptoms appear in spite of regular fertilizer application, apply 500 g of Muriate of Potash per adult palm in addition to the application of recommended dose of APM fertilizer with dolomite.

C. Magnesium deficiency

Kieserite (24% MgO) should be applied as follows if magnesium deficiency symptoms are visible. The application should be continued until recovery.

Young palms (1 year after planting up to bearing) - 500 g per palm half yearly
Adult palms - 1 kg per palm half yearly

Kieserite should be applied at least 3 months after application of fertilizer (APM or YPM fertilizer mixtures) when the soil is moist. If the deficiency is severe, suspend NPK fertilizer for one year and apply Kieserite as recommended above.

As a long-term preventive measure against magnesium deficiency, ground dolomite limestone (Dolomite) should be applied to adult coconut palms at the rate of 1 kg per palm per year along with NPK fertilizer application. For young palms 500g of dolomite is recommended at six-month intervals along with NPK fertilizers.

D. Boron deficiency

For the recovery of the Boron deficiency apply a 10% solution of Sodium Borate as a foliar spray. The spraying has to be done every 4 days intervals up to one month.