

# BORON DEFICIENCY IN COCONUT

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Coconut occupies about one million acres (410,000 ha). Most soils in coconut growing areas are deficient in potassium (K), magnesium (Mg) and nitrogen (N). The two recommended general fertilizer mixtures i.e. Young Palm Mixture (YPM; 13-12-17) and the Adult Palm Mixture (APM ; 12-6-32 or 0-6-32-5 with dolomite) would provide the general nutrient requirement of coconut palms.

The commonly observed nutritional deficiencies are those caused by potassium and magnesium. The common symptom in both these conditions is the yellowing of fronds, although the pattern of yellowing in the two cases is distinct from one another. Apart from these common deficiencies, a peculiar condition in 12 young coconut palms of age 1-3 years on a hilly land at Poojapitiya, near Kandy was reported and an inspection revealed crinkled, withered, and stunted upper leaves. A survey showed that at least 10 more young coconut palms in the neighbouring lands had succumbed to similar symptoms. However, adult palms in the same vicinity did not show any of these peculiar symptoms.

Careful and detail investigations of the affected young coconut palms showed that the symptoms were definitely not associated with any insect, fungus or other known condition. They were very similar to the symptoms of boron (B) nutrient deficiency in coconut reported from India, Indonesia, Ivory Coast, and the Philippines.

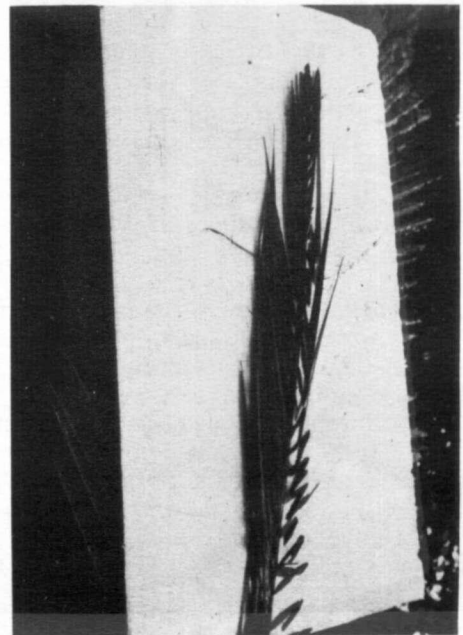
Leaf analysis revealed that the boron level in the affected palms was low (i.e. less than 0.00001% or 10 parts per million) while the other nutrients were within the "normal" levels. Affected palms were categorised depending on the severity and different rates of borax (sodium tetraborate;  $\text{Na}_2\text{B}_4\text{O}_7 \cdot 5\text{H}_2\text{O}$ ) dissolved in water were applied to the soil

around the palms. Afterwards, the condition of the palms was monitored regularly.

The affected palms which received 28 or 58 g (1 to 2 oz) of borax per palm recovered completely within eight months with consequent increase in their leaf boron levels, confirming that the symptoms were due to boron deficiency. The affected palms which were not treated with borax succumbed within 6-8 months.

From the experience gathered, it is now possible to document the symptoms of boron (B) nutrient deficiency in young coconut for diagnosis. They are:

1. Incipient stage of deficiency - palms have slightly withered and stunted apical leaf; crinkled leaves; hooked and fused leaflets (Fig. 1).
2. Advanced stage of deficiency - palms have severely withered, stunted, and dying apical leaf; crinkled leaves; hooked and fused leaflets, and some fronds without leaflets (Fig. 2).



Results of the trial showed that boron deficiency in young coconut could be easily corrected at the incipient stages by application of borax to the soil at the rate of 28-56 g/palm.

The boron requirement of adult coconut is low, compared to other macro- and micro-nutrients. Also, with the extensive and deep root system, adult coconut palms could extract the boron available in the deeper layers of soil. Although boron deficiency in young coconuts may be observed in localised high rainfall areas where the soil is acidic and in lands that are intensively intercropped, we have not observed boron deficiency symptoms in adult coconut palms.

The coconut growers are kindly requested to bring to the notice of the Coconut Research Institute any suspected cases of boron deficiency to provide the necessary assistance.



## THE COCONUT TREE

Visitors to this lovely island of Sri Lanka are bound to be struck by the natural beauty of our palm-fringed coasts, while the traditional "coconut oil lamp" and "Gokkola" decorations portray the cultural and historical significance of the coconut tree to the indigenous population. This graceful palm gained prominence in Sri Lanka as a commercial plantation in the eighteen forties, and now comprises about a third of our cultivated land. As it is the source of many useful products it is also referred to as the "tree of heaven".

For instance, the trunk is used for timber and the leaves as thatch, and it yields a fibre that makes it a textile plant of much value. House-hold items like baskets, mats, brooms and rope are manufactured from coir of the husk. The deliciously refreshing coconut water is a nutritious drink, and coconut treacle and jaggery are favourites with both young and old. Further, it is inextricably linked with traditional Sri Lankan cooking, supplying essential food adjuncts of high dietetic value.

The coconut industry ranks high in affording employment opportunities and a means of livelihood to many. It also offers wide scope for expanding our future economy. Copra, desiccated coconut and coconut oil find export markets, while arrack is a popular alcoholic beverage produced for local consumption. Crude sugar could be recovered from fresh coconut toddy, and the effluents could be used as a fertilizer. Products like soap and margarine prepared from coconut oil find extensive use locally, with a great potential for export.

The coconut palm is unique in Sri Lanka, and closely linked with the life of its inhabitants. This "tree of a hundred uses" is really symbolic of our nation, and could well be given pride of place in the future.

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