

Iron toxicity and phosphorus deficiency in coconut palms under highly acidic soil condition

A. Abdul Haris and Jeena Mathew

ICAR-CPCRI, Regional Station, Kayamkulam.



Browning and necrotic lesions seen in lower leaves of young bearing palms in low lands subject to periodic water logging

Iron is an essential micronutrient for plant development. It plays a key role as it is involved in the synthesis of chlorophyll and in other enzymatic and metabolic processes without which plants cannot carry out their life cycle. It functions to accept and donate electrons and plays important roles in the electron-transport chains of photosynthesis and respiration. Lack of iron causes yellowing in young leaves due to the plant not being able to produce chlorophyll. When iron chlorosis becomes severe old leaves also get affected. In time, it may result in leaf necrosis. However, excess iron in the soil causes stunted growth, when plants appear small and sick, and can also cause “bronzing of leaves.” and necrotic lesions on leaves.

Though coconut cultivation is seen in soils with pH 5.0-8.0, ideal soil pH is between 6.0 to 7.0. Low lands with prolonged submergence during rainy season shows soil acidification. This results in the release of soluble iron when ferric iron will be in the ferrous form and leads to the fixation of available phosphorus. Consequent to this there will be occurrence of phosphorus deficiency symptoms in coconut, manifested as purplish discoloration of the outer leaves.

High iron concentration in soil solution and consequent stunted appearance of seedlings and young palms, necrosis of lower leaves and leaf browning is generally observed in waterlogged lowlands and earth filled areas and lateritic areas.



Browning of leaves and stunted appearance of young palms in red loam soils and land fills

Red coloured scum can also be seen in waterlogged areas on soil surface. Iron toxicity may be one reason affecting seedling vigor and subsequent palm productivity. Analysis of soil samples from farmers’ field at Koippallikaraima (Onattukara region) showed the pH of the soil as 4.85. The available phosphorus content was as low as 12.5 kg/ha. The iron content in the soil was as high as 87.5 ppm, confirming the observation.

Management Practices

Provide adequate drainage in the soils. Apply liming materials such as lime or dolomite @ 1-2 kg per palm and incorporate in the soil. After correcting the soil reaction rock phosphate may be applied as recommended. Follow all the recommended INM practices. Green manuring and green leaf manuring may be followed along with mulching with crop residues to increase aeration and promote microbial activity.