

Crown choke of coconut in Assam and the remedial measures

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The coconut palm, (*Cocos nucifera* Linn.), is one of the most useful trees in the world which provide all required amenities of life which include food, drink, beverage, medicine, fibre and variety of raw materials for production of an array of products of commercial importance. Every part of coconut palm is being used for some purpose or the other. On account of this, it is referred as 'Kalpavriksha' – the 'tree of heaven'. Presently, the palm is cultivated in more than 93 coconut producing countries in the world. India ranks first in productivity of coconut in the world (11,481 nuts/ha), while in production India ranks second (23,904 million nuts). It is an important cash crop of Assam mostly grown in the homestead garden as monocropping covering an area of 20.6 thousand ha with a production of 153.2 million nuts and productivity of 7440 nuts/ha which is considerably below the national average. The low production and

productivity of coconut in Assam is primarily due to lack of proper management practices, incidence of diseases and pests etc. although Assam is endowed with favorable soil and climatic condition for growing of coconut. The alluvial clay loam with acidic nature soil of Assam often exhibited boron deficiency in coconut palms resulting in a disorder called crown choking. Recently, the malady is frequently observed in coconut growing areas of Assam because of which decline in the production and productivity of coconut is recorded in the region. Earlier there was a recommendation of application of borax at 50 g/palm/year to the coconut basin for the recovery of the affected palm (Chakravarty and Goswami, 1973) while Cecil and Pillai (1978) recommended 250 g borax/palm. However, in acute cases, this recommendation alone could not receive the full recovery of the disorder which has been experienced in the experimental field under AICRP on Palms at HRS, Kahikuchi centre. Hence, to recover the palms showing the symptoms at Kahikuchi centre, an integrated approach of application of different inputs was tried during 2016 to 2018.



Fig. 1

Crown Choking

The incidence of this malady was first observed in 1964 in Assam and then in West Bengal. The analysis of soil and leaf samples indicated that the calcium content of affected palms showed significantly high, while the boron content was in very low concentration. Young palms of the age group of 5 to 10 years are mostly affected; however, the deficiency symptoms were not noticed in the bearing palms.

Symptoms

The first symptom is the emergence of shorter leaves with deformed and crinkled leaflets which are associated with severe tip necrosis. Those deformed leaflets fail to unfurl and ultimately give a choked appearance to the frond. Hence, this deformity of



Fig. 2

the palm is called ‘crown choking’. In case of young palms, peripheral leaves crowd the bud and prevent normal unfurling of the flag leaf. In acute cases, necrosis of the primordial tissue takes place and the crown dies, but not suddenly.

Remedial measures

The crown choking disorder in acute form (Fig. 1) has been observed in the eight year old nucleus seed garden of coconut (var. Kamrupa) at Horticultural Research Station, Kahikuchi under AICRP on Palms during 2015-16. With the application of borax alone to young palms, there was no recovery of the disorder. Hence attempt was made to analyse the pH of the soil. On analyzing the soil reaction it was found that it was in the range of 4.8 to 4.9. The soil of the garden was alluvial clay-loam, low in available nitrogen (236.0 kg/ha), medium in available phosphorus (23.0 kg/ha) and medium in available potassium (278.0 kg/ha) with an organic carbon of 0.45 per cent. Because of low organic carbon content coupled with low pH, palms were not recovering with the application of borax alone, hence the following remedial measures were formulated and implemented in all the affected palms for their improvement.

i. Application of dolomite ($\text{CaMg}(\text{CO}_3)_2$) @ 1.5 kg/palm and spraying of 0.2 % borax immediately after appearance of the symptom. (Dolomite application was repeated during second year also).

ii. Fifteen days after application of dolomite, half dose of recommended fertilizers + 100 g borax + FYM @ 20 kg per palm with additional 250 g MOP/palm has been applied to the affected palms. Subsequently spraying of borax at 0.2% was done and the practice of spraying of borax was repeated 15 days after first application. This may be done twice.

iii. The basins of the palms were mulched with



Fig. 3



Fig. 4

dried coconut leaves and the palms were irrigated by drip irrigation at 66% open pan evaporation providing 32-45 liters of water per palm per day.

Impact of the remedial measures

Each treated palm was critically observed at 30 days interval for the improvement in the disorder. The soil pH was analyzed 90 days after the imposition of treatment, and it was found that there was improvement in the pH and at the end of October 2018, it was in the range of 6.2 to 6.5. After six month of the treatment, the deformed unfurled leaflets started to make furling and new growth was observed. Eight month after adoption of remedial measures, there was complete recovery of the crown choking affected palms (Fig. 4) with normal emergence of fronds and leaflets.

The recovery of the malady might be due to the availability of boron in soil as a result of increase of soil pH to 6.5 by the application of the above treatments. Boron availability to plants decreases with decreasing soil pH especially strongly acid soil (pH less than 5.0) because of B sorption to iron and aluminum oxide surfaces of soil minerals. Balanced soil fertility along with adequate organic matter application also resulted in increase in soil carbon which has generally resulted in B uptake by plants.

Hence, from the above study it can be recommended that crown choking disorder of coconut in Assam may efficiently be corrected by soil application of dolomite @ 1.5 kg/palm, followed by (fifteen days after its application), half dose of recommended fertilizers + 100 g borax + FYM @ 20 kg per palm with additional 250 g MOP/palm. Subsequently spraying of borax at 0.2% is to be followed and the practice of spraying of borax has to be repeated 15 days after first application which may be done twice. ■

- References:** 1. Cecil, R. and Pillai, N.G. 1978. Role of boron in coconut nutrition. *Indian Coconut Journal*, 8(9): 1-3.
2. Chakravarty, B.K. and Goswami, R.N. 1973. Boron brings brighter future to coconut growers. *Coconut Bulletin*, 4(2): 10-11.