

In the horizontal type four roller crusher, the average juice extraction efficiency and the crushing capacity was 63.1 per cent and 183.2 kg/h respectively. Juice extraction efficiency was 11 and 8 per cent more respectively than the three roller vertical type and horizontal type crushers. The average capacity of this improved four roller crusher was 33 kg/h lower when compared with the horizontal three roller crusher. But it was slightly higher over the vertical three roller crusher.

The cost of crushing 1000 kg of sugarcane was calculated as Rs. 22.70 in the case of three roller crusher, whereas it was Rs. 28.50 in four roller crusher. But net return was found to be Rs.

326 for four roller crusher and Rs. 289 for three roller crusher. Thus, by using the four roller crusher an additional income of Rs. 37 could be obtained per 1000 kg of cane crushed. This is 13 per cent higher over the three roller crusher.

REFERENCES

- MICHAEL, A.M. and OJHA, T.P. (1966). Principles of Agricultural Engineering, Vol. I. Jain-Brothers, New Delhi.
- SINGH, J (1995). Processing Sugarcane into jaggery - A look at some problems. Paper presented at xxxth ISAE Annual Convention held at TNAU, Coimbatore.

(Received : Nov. 1996 Revised : Jul. 1999)

Madras Agric. J., 85(10-12): 531 - 533 October - December 1998
<https://doi.org/10.29321/MAJ.10.A00791>

CHANGES IN THE MINERAL METABOLISM OF *GANODERMA* WILT AFFECTED COCONUT PALMS

M. SURIACHANDRASELVAN, H. VIJAYARAGHAVAN, R. BHASKARAN and N. RAMADOSS

Coconut Research Station,
 Tamil Nadu Agricultural University,
 Veppankulam - 614 906
 Tamil Nadu.

ABSTRACT

The changes in the micronutrients content of *Ganoderma* wilt affected and apparently healthy coconut palms were studied. There was a progressive increase in the content of Fe in leaf, root and bark with increase in disease severity. The content of Zn was reduced due to wilt infection in all the tissues studied. Eventhough, there was not much variation in the Mn content of leaf, root and bark from bleeding area, it increased in leaf and root tissues of wilt affected palms.

KEY WORDS : Coconut, *Ganoderma* wilt, Mineral metabolism

Coconut (*Cocos nucifera* L.) palm is affected by many diseases of which *Ganoderma* wilt is a lethal one. The characteristic symptoms of the disease include discolouration, decay and death of roots, oozing of reddish brown fluid from the base of the trunk, drooping of leaves and premature death of the palms (Bhaskaran *et al.*, 1982). Bhaskaran *et al.*, (1991) isolated *Ganoderma lucidum* and *G. applanatum* from the roots of affected palms and proved the pathogenicity. Attempts were made to study the changes in micronutrients content of *Ganoderma* wilt affected coconut palms and the results are reported in this paper.

MATERIALS AND METHODS

Three palms in each category showing mild, moderate and severe infection were selected based on the disease index computed by the method reported by Vijayan and Natarajan (1975).

Four leaflets on either side of the 14th frond and matured roots near the base of the trunk were collected. The bark and cortex from bleeding area and above the bleeding area (healthy portion) from wilt affected palms, and bark and cortex from apparently healthy palms were also sampled for this study. The samples collected were washed with 0.1 N HCl and distilled water and oven-dried at 70° C for four days.

Table 1. Changes in the micronutrients content of coconut palms affected by *Ganoderma* wilt (mean of three replications) (ppm on dry weight basis)

	Fe				Zn				Mn				Cu			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Leaf	515	795	1214	143	43	40	38	50	109	106	113	103	63	67	71	65
Root	209	428	700	193	22	28	26	32	26	52	33	33	50	65	70	45
Bark from bleeding area	360	591	741	-	32	43	42	-	21	28	25	-	128	61	113	-
Bark from healthy area	240	375	509	431	42	54	65	45	36	35	37	30	54	78	101	67
Cortex from bleeding area	131	198	113	-	35	44	40	-	23	21	31	-	69	87	71	-
Cortex from healthy area	240	193	125	280	47	64	73	60	30	33	25	98	78	102	143	101

1 = Mild affected, 2 = Moderately affected, 3 = Severely wilt affected and 4 = Apparently healthy

The dried samples were digested in tri-acid mixture of nitric acid, sulphuric acid and perchloric acid (9 : 2 : 1). The contents of Zinc, copper, iron and manganese in the extract were determined by Variant electron U.V. atomic absorption spectrophotometer.

RESULTS AND DISCUSSION

The data presented in the table 1. revealed a concomitant increase of Fe content with increase in the intensity of disease in tissues of leaf, root and bark from bleeding area of wilt affected palms, while it decreased in cortex of bleeding area. Changes in mineral content of plants in response to infection by pathogens have been reported earlier. Accumulation of Fe in bark tissues of *Ganoderma* wilt affected palms has been reported as the cause of tissue browning (CPCRI, 1985). The content of Zn was comparatively low in tissues of leaf, root, bark and cortex of bleeding areas of wilt affected palms when compared to apparently healthy palms. The reduction was more pronounced in the cortex region.

Eventhough, there was not much variation in the Mn content in leaf, root and bark from bleeding area, a significant reduction could be observed in tissues of cortex of bleeding area of wilt affected

palms. Cahill *et al.*, (1986) reported that the roots of *Eucalyptus* inoculated with *Phytophthora cinnamomi* showed a reduction in the content of most of the minerals compared to uninfected roots. In the present study, a marked reduction in the Cu content was observed in the cortex of bleeding area while it increased in leaf and root tissues of wilt affected palms. Khan *et al.*, (1985) found that except Zn, the other minerals (Fe, Mn and Cu) were high in the crown of root (wilt) affected coconut palms.

The accumulation of certain minerals might have been due to metabolic sink, created by the pathogen (Yarwood and Jacobson, 1955). Sadasivam and Kalyanasundaram (1956) suggested that there might be derangement in absorption by roots due to infection. The altered mineral metabolism could have resulted in physiological derangements in the diseased palms (Roberts and Jenson, 1970 and Khan *et al.*, 1985). Govindu *et al.*, (1976) reported that *G. lucidum* on coconut affected xylem vessels and xylem parenchyma and also noticed tyloses in the xylem vessels which might have resulted in impairment of absorption and translocation of nutrients including micronutrients. Severe decay of root system in *Ganoderma* wilt affected palms was

observed earlier impairing the transport of water and minerals (CPCRI, 1985). Hence, the altered mineral metabolism observed in the present study might be due to impairment of absorption and transport of minerals due to root rotting and vascular plugging.

REFERENCES

- BHASKARAN, R., RAMADOSS, N and SURIACHANDRA SELVAN, M. (1991). Pathogenicity of *Ganoderma* spp. isolated from Thanjavur wilt infected coconut (*Cocos nucifera* L.). *Madras Agri. J.*, 78: 137-138.
- BHASKARAN, R., RAMANATHAN, T. and RAMIAH, M. (1982). The Thanjavur wilt. *Intensive Agri.* 20: 19-21.
- CAHILL, D., WOOKEY, C., WESTE, G. and ROUSE, J. (1986). Changes in mineral content of both *Eucalyptus marginata* and *E. calophylla* grown under controlled conditions and inoculated with *Phytophthora cinnamomi* J. *Phytopath.* 116: 18-29.
- Central Plantation Crops Research Institute, India. (1985). Research Highlights. p.3
- GOVINDU, H.C., RAO, A.N.S., MURTHY, K.V.K. and SHAW, C.G. (1976). Biology of *Ganoderma lucidum* (Leys) Karst. and control of 'anabe roga' of coconut. *International symposium on Coconut Research and Development*. CPCRI, Kasaragod Dec. 28-31. 1976. p.34
- KHAN, H.H., BIDDAPPA, C.C., JOSHI, O.P. and CECIL, S.R. (1985). Micronutrient distribution in the crown of healthy and root (wilt) diseased palms. *J. Plant. Crops.* 13: 66-69.
- ROBERTS, B.R. and JENSEN, K.F. (1970). The influence of Dutch elm disease and plant water stress on the foliar nutrient control of American and Siberian elm. *Phytopathology*, 60: 1831-1833.
- SADASIVAM, T.S. and KALYANASUNDARAM, R. (1956). Spectrochemical studies on the uptake of ions by plants. The Lundegardh flame technique for ash analysis of toxin, antibiotic invaded cotton plants. *Proc. Indian Acad. Sci.*, 43(B) : 271-275.
- VIJAYAN, K.M. and NATARAJAN, S. (1975). Influence of fertilizer and manuring on the incidence and progress of coconut wilt disease of Tamil Nadu. *Coccon. Bull.* 5: 1-5.
- YARWOOD, C.E. and JACOBSON, L. (1955). Accumulation of chemicals in diseased area of leaves. *Phytopathology*, 45: 43-48.

(Received: July 1997 Revised: May 1998)

Madras Agric. J., 85(10-12): 533 - 535 October - December 1998

QUALITY CHARACTERS OF GROUNDNUT KERNEL AS INFLUENCED BY MEPIQUAT CHLORIDE (MC)

P. JEYAKUMAR and M. THANGARAJ

Department of Crop Physiology
Tamil Nadu Agricultural University
Coimbatore - 641 003.

ABSTRACT

Investigations were carried out to study the effect of Mepiquat Chloride (1, 1-dimethyl piperidinium chloride) on certain quality characters of groundnut kernel. Foliar application of MC on 35 days after sowing increased the oil content by 4.6 per cent. Carbohydrate content decreased, and protein content showed no significant change in response to MC.

KEY WORDS: Mepiquat chloride, Kernel, Groundnut quality.

Compounds such as nicotiniums, quaternary ammonium carbamates, hydrazines, phosphoniums, substituted cholines, substituted maleamic and succinamic acids, steroid synthesis inhibitors, limonene derivatives, pyrimidine and pyridones have been found as growth retardants with promising properties (Mary Ritzel Corcoran, 1974). Growth retardation is primarily induced by inhibition of gibberellin biosynthesis between ent-kaurene and ent-kaurenic acid. In addition to this,

evidence is available that the growth retardants interfere with the oxidative metabolism of abscisic acid and phytosterols as well as with the formation of cytokinins and ethylene (Rademacher, 1989). Apart from shortening of internodes and restriction of undesirable vertical and horizontal growth, growth retardants help plants in withstanding drought, disease and cold injury. Growth retardants influence the increases in chlorophyll content, shelling percentage, total dry