

## A NOTE ON FOLIAR DIAGNOSIS OF BORON DEFICIENCY IN BEETROOT

A pot trial was conducted with beetroot on Coolum sand to examine the relationship between visual and chemical foliar diagnosis of boron deficiency. Coolum sand is almost completely lacking in major plant nutrients and in trace elements.

Treatments with boric acid solution were given to bring the concentration of boron in the sand to levels ranging from 0.01 p.p.m. to 5.00 p.p.m. The nutrient solution used was one devised by Colwell (1943), and the general procedure followed that suggested by Hewitt (1952). Pots received nutrient solution every second day.

An ammonium molybdate spray was given to all plants at an early stage of growth to rule out the possibility of molybdenum deficiency.

Leaf analysis for boron was carried out when the roots had reached maximum size.

The observations are summarised as follows:—

Treatment.	B in leaf at maturity. (p.p.m.)	Remarks.
Control .. ..	15	Severe deficiency symptoms. Death of growing point. Stems growing almost horizontally. Some multiple topping
0.01 p.p.m. B ..	16	Similar symptoms but less severe
0.02 p.p.m. B ..	18	Growth better, but still some necrosis at growing point
0.05 p.p.m. B ..	18	Growth fair
0.10 p.p.m. B ..	27	Growth normal
0.20 p.p.m. B ..	32	Growth normal
0.40 p.p.m. B ..	45	Growth normal
0.80 p.p.m. B ..	83	Growth normal
5.00 p.p.m. B ..	61	Severe toxicity symptoms at first, then normal growth, but smaller than 0.80 p.p.m. plants at maturity

It appears that the minimum leaf content of boron for normal growth is about 20 p.p.m.

**Table 1.**

## COMPOSITION OF NUTRIENT SOLUTION.

Salt.	Concentration of Stock Solution.	Ml. of Stock Solution for Each Litre of Nutrient Solution.
$\text{KH}_2\text{PO}_4$	1.0M	5
$\text{K}_2\text{HPO}_4$	0.2M	5
$\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$	1.0M	7
$\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$	1.0M	7
$\text{NaNO}_3$	1.0M	7
$\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$	0.20 gm/L	} 5
$\text{ZnCl}_2$	0.10 gm/L	
$\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$	0.02 gm/L	

## REFERENCES.

- COLWELL, W. E. 1943. A biological method for determining the relative boron contents of soils.
- HEWITT, E. J. 1952. Sand and water culture methods used in the study of plant nutrition. Commonw. Bur. Hort. Plant. Crops Tech. Comm. 22.

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