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Review Paper

Effect of Sodium Chloride and Calcium Chloride Salinity on the Seedling Growth of Cowpea

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Abstract

Cowpea (Vigna sinensis (L) Savi exhassj.), is used as a fodder vegetable, pulse and a green manure crop. It is grown all over India, more particularly in the central and peninsular regions, though on a limited area. It has considerable promise as an alternative pulse crop in dry land forming.

An experiment was conducted to study the seedling growth of cowpea in distilled water and in various saline solutions of sodium chloride and calcium chloride concentration (1000, 3000 and 5000 ppm) after 96 h of sowing. The root, shoot and total seedling length decreased significantly at salinity levels of both the salts. The fresh and dry weight also decreased with increase in salinity levels of both the salts.

Key words : Salinity, concentration, seedling.

Among various crop plants tested, legumes have generally been found relatively more sensitive to soil salinity[1]. Among the grain legumes, cowpea is of much economic importance with greater nutritive and medicinal value. As little information is available on the effect of sodium chloride and calcium chloride salinity on the seedling growth of cowpea this study was conducted.

Graded and certified Rhizobium treated seeds of cowpea (Vigna sinensis (L) Savi exhassj var. C-152 was obtained from the Govt. Agricultural seed farm, Sehore (M.P.). Ten seeds were germinated in sterilized moistened filter paper (Whatman No.1) placed in petridishes. Petridishes were supplied with distilled water and various saline solutions with varying concentration of 1000,3000 and 5000 ppm sodium chloride and calcium chloride individually upto 96 h under normal laboratory conditions (28 ± 2^0C).

A decreasing trend in root, shoot and total seedling length was observed with increase in salinity levels. The total seedling

Table-1. Effect of sodium chloride and calcium chloride salinity on root length, shoot length and number of lateral root and dry weight of cowpea seedling after 96 h of sowing

Character	Concentration								
		(1000 ppm)		(3000 ppm)		(5000 ppm)		CD a 5%	
	Distilled water	Nacl	$Cacl_2$	Nacl	$Cacl_2$	Nacl	$Cacl_2$	Nacl	$Cacl_2$
Root length (cm)	5.53	3.40	4.17	2.56	3.53	1.80	2.93	NS	NS
Shoot length (cm)	10.77	10.07	10.17	7.50	9.57	6.53	8.27	2.37	NS
No. of lateral roots	13.67	10.33	10.67	8.00	9.00	6.33	4.00	3.89	2.90
Dry weight (mg)	37.2	19.7	35.1	19.4	30.9	10.2	22.2	3.07	NS

length was reduced by 50% in sodium chloride while it was only 25% in calcium chloride. Similar trend of reduction in plant height and dry matter with increase in salinity have been reported in pearl millet[2]. The number of lateral roots was more affected by calcium chloride salinity. The fresh and dry weight of samples showed a gradual and significant reduction with increasing sodium chloride salinity levels while in case of calcium chloride, a similar trend was observed which was non-significant. Similar findings have been reported in Broad bean[3]. Cowpea can tolerate sodium chloride and calcium chloride salinity upto 3000 ppm[4]. Germination and seedling growth differed with the nature of the salt and its concentration levels in the same species which may be due to the accumulation of inhibitors or imbalance of growth hormones. Similar findings were observed by Bernstein[5] Remadevi and Gopalakrishnan[6].

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