

EFFECT OF SALINITY ON GROWTH PARAMETERS IN *VIGNA MUNGO* CV. ADT 5

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ABSTRACT

Sodium chloride salinity altered the growth and yield of *Vigna mungo* under different salinity levels ranging from 0 to 100 mM. The growth parameters such as percentage of germination, Shoot length and root length, number of leaves, fresh and dry weights and yield were increased at 10mM NaCl and there after all these attributes were decreased sharply.

Key words:

Sodium chloride, leaves, Growth and yield,
Vigna mungo, NaCl

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INTRODUCTION

Salinity is one of the most severe environmental stresses and affects crop production. Generally, salinity increase with increasing salt concentration in irrigation water. The reduction in production of urdbean cultivars reach up to 50% under salt stress. The growth reduction in *Vigna sp* under salt stress results a combination of ions toxicity and altered water relations that cause large accumulation of sodium and magnesium ions and reduced calcium and potassium concentration in the shoots and roots.

plants are reported to endure salinity (Jain *et al.*, 2001, Ashraf and Tufail, 1995, Garg *et al.*, 2001). The objective of the present study was to examine the response of *Vigna mungo* at different concentrations of exogenous addition of NaCl during the early stages and developmental stage.

MATERIALS AND METHODS

The seeds of *Vigna mungo* cv. ADT 5 were surface sterilized with 0.2% mercuric chloride and then washed with distilled water. In petriplates containing various

Table 1 Effect of NaCl on Yield Parameters in *Vigna mungo* cv. ADT 5

Concentrations (mM)	No. of Pods (plant-1)	Pod Fresh Weight (g plant-1)	Pod Dry Weight (g plant-1)	No. of Seeds (plant-1)	Seed Fresh Weight (g plant-1)	Seed Dry Weight (g plant-1)
Control	6	3.84	2.22	36	1.50	0.67
10	9	6.48	3.65	54	2.40	1.08
	(+50.10)	(+68.75)	(+64.41)	(+50.00)	(+60.00)	(+61.19)
20	7	4.90	2.66	42	2.10	0.94
	(16.66)	(+27.60)	(+19.81)	(+16.66)	(-40.10)	(+40.29)
30	6	4.62	2.28	36	1.75	0.78
	(0)	(+20.31)	(+2.70)	(0)	(+16.66)	(+16.41)
40	5	4.05	1.85	30	1.55	0.69
	(-16.66)	(-5.46)	(-16.66)	(-16.66)	(+3.33)	(+2.98)
50	5	3.52	1.80	30	1.50	0.67
	(-16.66)	(-8.33)	(-18.91)	(-16.66)	(0)	(0)
60	4	3.15	1.36	24	1.37	0.61
	(-33.33)	(-17.96)	(-38.73)	(-33.33)	(-8.66)	(-8.95)
70	3	2.86	0.99	18	1.04	0.46
	(-50.00)	(-25.52)	(-55.40)	(-50.00)	(-30.66)	(-31.34)
80	2	2.41	0.96	12	0.92	0.41
	(-66.66)	(-37.23)	(-56.75)	(-66.66)	(-38.66)	(-38.80)
90	2	2.00	0.60	12	0.71	0.32
	(-66.66)	(-47.91)	(-72.97)	(-66.66)	(-52.66)	(-52.23)
100	1	1.74	0.54	6	0.45	0.20
	(-83.33)	(-54.68)	(-75.67)	(-83.33)	(-70.00)	(-70.14)

Moreover, water potential, osmotic potential, transpiration, stomata conductance and hydraulic conductance decreased as salinity increased. By making changes in biochemical constituents, the salt tolerant crop

NaCl level (0-100mM) twenty-five seeds were sown for germination percentage. The percentage of germination was calculated by observing the seedlings at 7th and 15th

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Day after sowing.

The sterilized seeds were sown in pot culture in Department of Agricultural Botany, Annamalai University during July, 2011. Each pot contained 20 seeds and they were treated with various NaCl concentrations ranging from 10 – 100 mM NaCl. Control plants were irrigated with tap water.

RESULTS AND DISCUSSION

The highest germination percentages was observed at 10 mM on 7th (92%) and 15th (100%). Beyond this level the germination percentage declined sharply. The morphological growth parameters were higher in 10mM *ie.* the shoot and root lengths (14.27%, 11.76%), number of leaves (30.76%) leaf area (5.67%) fresh weight (33.20%, 21.30% and 12.32%) and dry weight (25.44%, 44.88% and 0.76%) were higher than those of other concentrations on 60th day (values not given in Table). This was due to faster accumulation of ions and minerals and water in the tissues (Flowers *et al.*, 1986, Gill and Sharma, 1994).

The pod number and number of seeds were subsequently increased at the concentration of 10mM. Also, pod fresh weight (6.48g) and pod dry weight (3.65g) were high at 10mM. The seed yield (fresh weight- 2.40g; dry weight – 1.08g) was also higher at 10mM when compared to control and other concentrations. Beyond this level the yield parameters were found to be reduced drastically (Table-1). The reduction of yield in various crops by salinity was reported already (Sharma and Dubey 1995, Gworgwor *et al.*, 2002). It is concluded that 10mM NaCl

Is the recommendable level of soil salinity for cultivation of urdbean cultivars.

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