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Research Notes

Effect of saline water on growth, biochemical parameters and yield french bean

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Salinity plays an important role in survival and distribution of crops. Crops which are able to grow and yield under saline conditions show certain physiological attributes which make the crops adapted to salinity. Irrigation water with high chloride content causes considerable damage to plant growth and affects the crop yield. Beans are considered as sensitive crop and the performances of this crop under saline conditions are not encouraging. Earlier studies on the use of saline water high in chloride content is very much restricted to laboratory conditions (Gill and Sharma, 1999). However, studies under field conditions are scanty. The present field experiment, therefore, was conducted to study the effect of saline water with high chloride content on the growth, biochemicals and yield of french bean (*Phaseolus vulgaris* Linn.)

Experiment was conducted in a farmer's field at Oddanchatram in Dindigul districts of Tamil Nadu. French bean (Local variety) was raised in red sandy soil by following normal package of practices during 1996-1997. A field which was irrigated with saline water has been identified and simultaneously another field the same location with normal water has al been selected to serve as control. Crops we raised both with normal water as well as wi saline water high in chloride content. The irrigatio water was analyzed for chemical constituen and data are furnished in Table 1. The thir leaf from the top of the main shoot at floweri phase was used for the analysis of chlorophy and carotenoid content (Arnon 1949), Prolin (Bates *et al.* 1973) nitrate reduchese activit (Wrag and Filner, 1970) and chloride conte (Chopra and Kanwar, 1991) at Horticultur College and Research Institute, Periyakulam The green pods were harvested at vegetabl stage and the cumulative yield was recorded The percentage of Chloride injury was calculate based on the visual symptom of the leaf bur injury (Somani, 1991). The data were subjecte to statistical analysis.

Considerable reduction in plant growth and yield was observed in french bean due to irrigation with saline water (Table 2). Saline water reduced the plant height to 55 cm as

ble 1. Quality Characteristics of Saline Water

racters	Saline water	Normal water
	7.32	7.12
(dSm^{-1})	1.15	0.92
O_3^- (me/l	7.40	4.51
(me/l)	12.24	6.15
(me/l)	10.24	5.26
(me/l)	12.62	4.67
(ppm)	40.00	25.0
ppm)	0.20	0.15

ble 2. Effect of saline water on growth, biochemical attributes and yield of French beans (Mean ± SE, N=5)

racters	Saline water	Normal water
t height	55.6±1.47	79.5±3.40
ments (mg/g)		
l chlorophyll	1.21±0.04	3.17±0.10
lorophyll a	0.79±0.03	2.06±0.07
lorophyll b	0.42±0.05	1.11±0.03
rotenoids	0.087±0.01	0.117±0.02
f chloride (% dry weight)	1.61±0.02	0.14±0.03
rate reductase (m mol NO_2^-/g/hr)	45.1±2.01	77.4±3.12
line content (mg/g)	16.17±2.71	7.67±1.14
ld of green pod (t/ha)	2.75±0.12	6.19±0.17
loride injury (%)	80±2.51	0.25±0.01

ainst 79.5 cm in control. The reduction in nt height due to saline water was mainly cause of accumulation of salts in the cell hich ultimately alters the water potential, nutrient alance and physiology of the plant (Glenn *et al.* 1998). Plant pigments *viz.* chlorophylls d carotenoids were very much affected by linity. The high chloride content of the saline ater might have affected the chlorophyll osynthesis and resulted in the reduction of lorophyll content.

Salinity affects the nitrogen metabolism ght form the uptake of N. The enzyme nitrate ductase which is responsible for the N utilization, known to be highly sensitive to salinty (Somani, 91). In the present study too, crop growth th saline water recorded lower nitrate reductase tivity (m mol NO^{2-} g hr^{-1}) as compared to e crop grown with normal water (77.4 m ol NO^{2-} g hr^{-1}). The proline content was increased due to saline water. The altered balance between soluble amino acids and protein may be the cause for such abnormal increase of proline content (Sharma, 1980).

The chloride injury was observed to as high as 80% due to saline water. It is worth mentioning here that the typical symptoms of chloride injury starts visible on the 30th day of sowing *viz.* leaf burn at the tip of the leaves and later on spreads to the other margins and finally cause defoliation. The excessive accumulation of chloride (1.61%) as a result of salinity is the probable reason for the expression of chloride injury. Since french bean is being a sensitive crop to salinity the injury was severe. The reduction in green pod yield as a result of salinity could be attributed to the reduced photosynthetic production due to less chlorophyll biosynthesis coupled with reduced plant growth (Bernstein and Hayward, 1958).

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Research Notes

Genotypic and Phenotypic correlation and path analysis studies Karonda (*Carissa carandas* L.)

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Karonda (*Carissa carandas* L.) is important dry land fruit crop exceedingly hardy shrub generally found in forest. The genus Carissa to which Karonda belongs includes 32 species out of which only eight are originated from India and according to Cooke (1904) Carissa is more useful amongst all. The existing population of this crop shows the variability in plant and fruit characters due to heterozygosity (Bhagwat, 1984; Joshi *et al.* 1986) and this offers great scope for crop improvement for this crop. In selection process and crop improvement knowledge of association of various characters is primary requisite. In the present investigation, the studies were taken with objectives to study the association between ten different morpho physical characters of Karonda which will helpful for further improvement in Karonda.

The normally growing 212 genotypes selected from the ten villages of six Tahsils in hills of sub-mountain region of Kolhapur district were evaluated for growth, yield and qualit parameters during 1992 and 1993 and wer taken for the present investigation to asse the association between fourteen importa characters as indicated in Table 1. The genotypi and phenotypic correlation coefficient wer calculated for the different pairs of character The correlation coefficients between differen characters were estimated at genotypic an phenotypic levels following Johnson *et al.* (1956) while path analysis was calculated by metho suggested by Dewey and Lu (1959) takin fruit weight as dependant.

It was revealed from the Table 1 tha the magni-tude of level of significance of genotypic correlation coefficients and phenotypic correlation coefficients were more or less same for all the characters. Therefore, the results obtained only on correlation coefficient at phenotypic levels are described hereunder.