

## Soybean response to moderately saline water

H.G. Beecher\*

NSW Agriculture & Fisheries Yanco Agricultural Institute, Yanco, N.S.W., 2703

Concern about rising watertables and the groundwater contribution of traditional rice based cropping systems in the southern irrigation areas of NSW prompted interest in alternative summer crops such as soybeans. High watertables are relieved by the use of tube wells and tile drains which result in salt loading of drainage waters. Downstream re-use of drainage waters and on-farm recycling of saline groundwaters led to this study aimed at evaluating the effects of moderately saline water on the growth and yield of soybeans.

### Methods

Five irrigation water qualities (0.25, 0.5, 1.0, 1.5, 2.0 dS/m) were applied to soybean cv Chaffey in a randomised block design with four replicates on Mundiwa clay loam (Dr 2.33) at CSIRO Whitton Field Station. Seed was sown at 80 kg/ha, with inoculum being sprayed on at sowing in December 1984 and 1985. The soybeans were established with treatment waters. Irrigations were applied at 100 mm and 60 mm ET<sup>2</sup> before and after flowering commenced respectively. Assessments of plant growth made throughout the season included plant height, plant number, plant weight, nodulation, seed weight, grain yield and leaf burn.

### Results and discussion

Germination and establishment were adequate in all treatments in both seasons. During the first season yields were significantly reduced by treatments above 0.25 dS/m. The yield decrease is attributed to curtailment of the grain filling period due to reduced N availability (poor nodulation) and increased leaf burn with increasing salinity. Application of N to one replicate confirmed the N effect although differences caused by salinity were still apparent. During the second season the yield of only the highest salinity treatment was significantly lower than other treatments (Table 1). It is considered that the higher level of nodulation achieved during the second season resulted in less N stress.

This result suggests that saline water reduces the growth potential of soybeans. However, the action of saline water on nodulation of soybean and other legumes needs to be more fully evaluated so that water quality criteria can be adequately defined.

**Table 1: Yield parameters of soybean irrigated with saline water in 1985**

Yield Parameter	Irrigation Water Quality (dS/m)					LSD
	0.25	0.5	1.0	1.5	2.0	
Plants/m <sup>2</sup>	28	24	32	23	27	NS
DM at flowering (g/m <sup>2</sup> )	435	402	442	416	231	74
100 Seed Wt (g)	19.6	20.7	19.8	19.0	13.7	2.0
Yield (kg/ha)	2680	2830	2790	2350	1350	420

\*This work undertaken whilst employed by NSW Department of Water Resources