



# Bermuda Grass Yield and Quality in Response to Different Salinity and N, Se, Mo and B Rates in West San Joaquin Valley

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*Bermuda grass production in the saline soils of California's western San Joaquin Valley can be an effective way to manage saline drainage water. Current indications from this study suggest that this practice is sustainable.*

We have demonstrated that moderately saline water can be used as the primary irrigation source for Bermuda grass (*Cynodon dactylon* (L.) Pers) production in the western San Joaquin Valley. Forage yield and quality have been evaluated at a severely salt-affected site near Stratford, in Kings County, and at a greenhouse trial at UC Davis. Analyses of grass samples from selected sites with 7 (S1), 14 (S2) and 21 (S3) dS/m of ECe, and a fertilization of 0 (N0), 300 (N1) and 600 (N2) kg N/ha at Kings County and at UC Davis have shown a clear effect of salinity and N on the yield and quality of the forage. Figure 1 shows the total yield (cumulative biomass) in the pot trial under different salinity and nitrogen levels. The pots were irrigated with saline water (6 dS/m) three times a week during the 2007 growing season. At a low nitrogen level (without fertilization) the crop yields are low and the effect of salinity is not important. Pots with 7 and with 21 dS/m yielded close to 60 grams of dry matter (gr DM)/year. With a fertilization equivalent to 300 kg N/ha there is a clear effect of salinity on the cumulative biomass. Pots with 7 dS/m yielded 135.6 gr DM/year, while pots with 21 dS/m yielded only 82.8 gr DM/year. There is also a clear effect of salinity and nitrogen on the quality of the forage (proportion of leaves and stems). The leaf/stem ratio increases with

fertilization, especially at the end of the growing season (see Figure 2). High salinity also increases the proportion of leaves at the end of the season. At 21 dS/m plants barely survive and the biomass is composed mostly by leaves and inflorescences, with almost no presence of stems. The accumulation of trace elements at potentially toxic levels remains a possible limitation for the use of pastures and hay crops in managing saline drainage waters. During the 2008 growing season we have been adding 0.5 mg/L of Mo and Se, and 50 mg/L of B to the irrigation water at the greenhouse trial, and collecting forage samples every 30 days. This will allow for a systematic assessment of the capacity of Bermuda grass to accumulate these trace elements as a function of



Students taking forage samples at UC Davis.

salinity, fertilization and trace element content. There is little systematic information of this sort in the literature upon which to base reasonable predictions about forage productivity and quality performance under variable field conditions. Such information is essential to help make the widespread use of saline drainage water as a means of managing salinity in the San Joaquin Valley feasible.

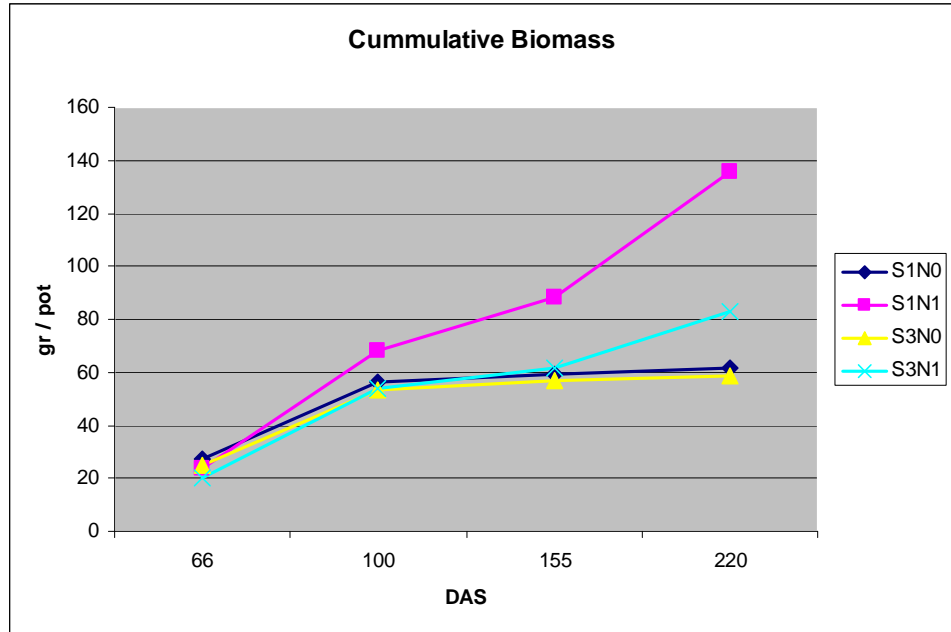


Figure 1. Forage yield at the greenhouse trial. DAS: Days after seeding

**Professional Presentations**

Alonso, Maximo and Stephen Kaffka, Modeling Bermuda grass yield and quality in the western San Joaquin Valley of California, American Society of Agronomy, 2007, International Annual Meeting, New Orleans, LA, November 2007.

Alonso, Maximo and Stephen Kaffka, Bermuda grass as an alternative for retired farmland in the western San Joaquin Valley of California, Farming with Grass Conference, Soil and Water Conservation Society, Oklahoma City, OK, October 2008.

**Collaborative Efforts**

Dr. James Oster, University of California, Riverside.

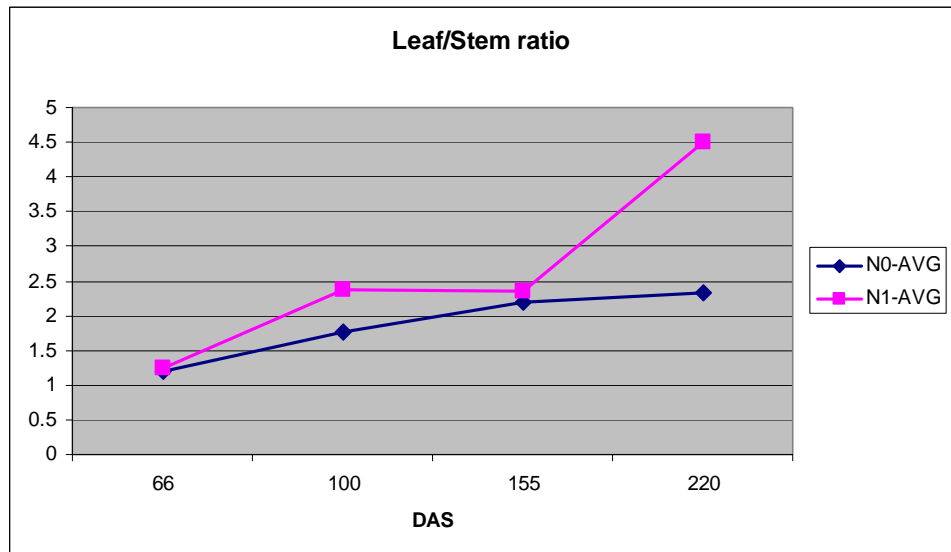


Figure 2. Leaf/stem ratio at different nitrogen levels

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