

Source of salinity in low coastal floodplains and effects on sugar cane yield

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Objective

(a) to identify the source of soluble salts in coastal floodplains under sugar cane production,

(b) to assess the effects on cane yield.

Methods

- 6 transects were sampled across a levee to backswamp in both the lower and mid estuarine floodplain of the Clarence River.(Fig.1)
- Detailed topographic, soil and ground water survey.
- Cane sampling and analysis of stalk material.
- Soil chemical analysis.

Results

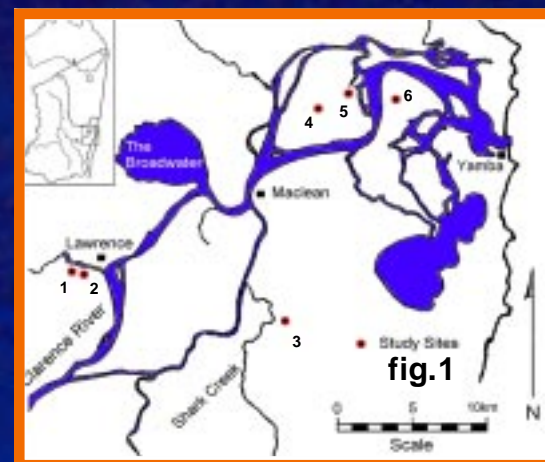
- Primary sources of salts were chloride dominated groundwater(marine) and/or sulfate dominated groundwater(sulfide oxidation derived). All sites showed some evidence of both.(Fig.2)
- Both types of salts were associated with underlying estuarine sediments.(Fig.3)
- Soil salinity increased in lower elevation areas.
- Cane yield declined with increasing soil salinity.(Fig.4)
- Cane analysis revealed that nutrients were not growth limiting.
- Reclaimed backswamp soil landscapes had higher potential (S_{Cr}) and actual acidity (Fig.5)

Conclusions

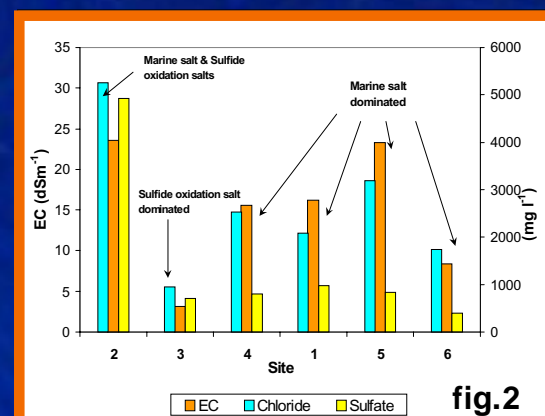
Low elevation sites had a greater likelihood of marine salts and/or sulfide oxidation related acidity in the root zone and more frequent and severe frosting, flooding and water logging.

Implications

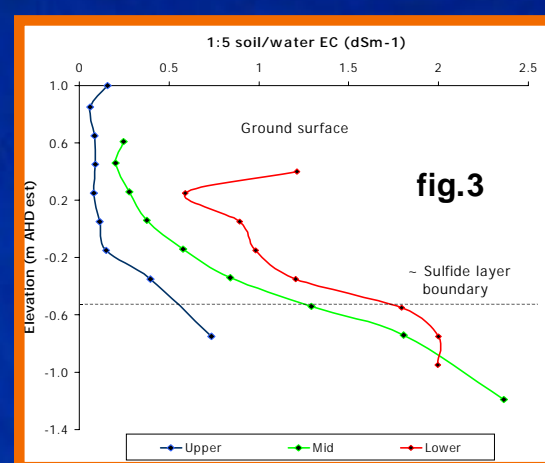
The costs of containing acid in low elevation backswamps need to be assessed in relation to lower economic returns.



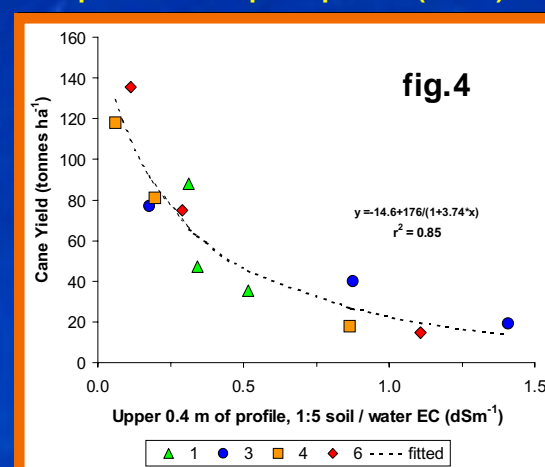
Lower Clarence floodplain study sites.



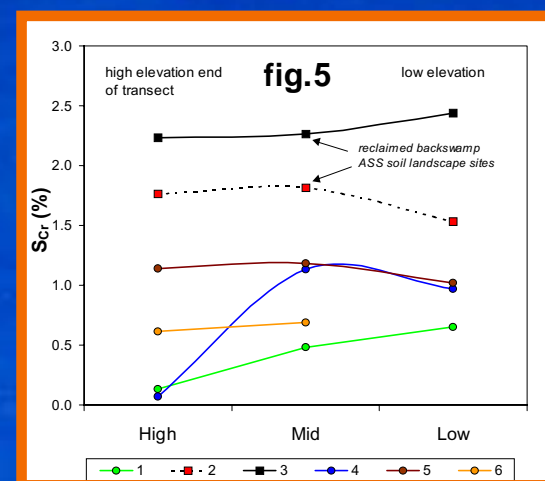
Ground water EC, Chloride and Sulfate from representative profiles at each site.



Changes in soil salinity in relation to depth across toposequence (site 4).



Decreasing cane yield in relation to increasing soil EC in upper 0.4 m of profile.



S_{Cr} content of sulfide layer across toposequence at each site.