

HARD LOAM OVER SODIC RED CLAY

General Description: *Hard sandy clay loam overlying a coarsely structured sodic red clay, highly calcareous with depth, grading to clayey lacustrine sediments*

Landform: Eroded lunette adjacent old lake bed in depression of ancient coastal dune - corridor systems.

Substrate: Heavy clay

Vegetation:



Type Site: Site No.: SE036

1:50,000 sheet: 6825-4 (Santo)

Hundred: Santo

Annual rainfall: 500 mm

Sampling date: 24/03/95

Landform: Elevated flat adjacent to salina

Surface: Hard setting with no stones

Soil Description:

| <i>Depth (cm)</i> | <i>Description</i> |
|-------------------|--|
| 0-15 | Hard reddish brown sandy clay loam with weak coarse blocky structure. Clear to: |
| 15-22 | Reddish brown hard massive sandy loam with sporadic bleaching. Sharp to: |
| 22-35 | Dark reddish brown very hard heavy clay with coarse prismatic structure. Gradual to: |
| 35-55 | Reddish brown and orange hard medium heavy clay with strong very coarse lenticular structure. Clear to: |
| 55-75 | Firm highly calcareous olive medium clay with strong very coarse lenticular structure and 20-50% soft carbonate. Gradual to: |
| 75-160 | Firm highly calcareous pale olive medium clay with strong very coarse lenticular structure and 10-20% soft carbonate and manganese segregations. |



Classification: Hypercalcic, Hypernatric, Red Sodosol; medium, non-gravelly, clay loamy / clayey, moderate

Summary of Properties

Drainage Moderately well drained. The upper part of the soil is likely to remain saturated for up to a week after heavy rain because water "perches" on top of the impermeable clay subsoil.

Fertility Natural fertility is high as indicated by the high CEC values. The high organic carbon levels also help maintain nutrient retention capacity. Phosphorus is very low at the pit site.

pH Slightly alkaline at the surface, strongly alkaline with depth.

Rooting depth 160 cm in pit, but there are very few roots below 75 cm.

Barriers to root growth

Physical: The hard coarsely structured soil prevents even root proliferation.

Chemical: Very high sodicity (more than 35% ESP) from 55 cm, high pH from 35 cm, Class I carbonate layer from 55 cm, and marginal salinity from 55 cm in combination restrict root growth.

Water holding capacity Approximately 100 mm in root zone, but a proportion of this is effectively unavailable due to poor root distribution patterns.

Seedling emergence Fair, due to hard setting surface.

Workability Fair to good, provided that organic matter levels are maintained.

Erosion Potential

Water: Moderately low.

Wind: Low.

Laboratory Data

| Depth cm | pH H ₂ O | pH CaCl ₂ | CO ₃ % | EC1:5 dS/m | ECe dS/m | Org.C % | Avail. P mg/kg | Avail. K mg/kg | SO ₄ -S mg/kg | Boron mg/kg | Trace Elements mg/kg (DTPA) | | | | CEC cmol (+)/kg | Exchangeable Cations cmol(+)/kg | | | | ESP |
|-------------|------------------------|-------------------------|----------------------|---------------|-------------|------------|----------------------|----------------------|-----------------------------|----------------|--------------------------------|----|----|----|-----------------------|------------------------------------|------|------|------|------|
| | | | | | | | | | | | Cu | Fe | Mn | Zn | | Ca | Mg | Na | K | |
| Paddock | 8.2 | 7.6 | 0.7 | 0.24 | 1.10 | 2.6 | 8 | 482 | 30 | 2.4 | - | - | - | - | 31.1 | 21.4 | 6.72 | 0.72 | 1.63 | 2.3 |
| 0-15 | 7.9 | 7.4 | 0.1 | 0.20 | 1.26 | 2.4 | 7 | 541 | 20 | 2.5 | - | - | - | - | 22.1 | 13.6 | 5.36 | 0.55 | 1.66 | 2.5 |
| 15-22 | 8.5 | 7.6 | 0.1 | 0.09 | 0.81 | 0.8 | <4 | 171 | 8.0 | 1.2 | - | - | - | - | 9.5 | 5.74 | 2.63 | 0.62 | 0.39 | 6.5 |
| 22-35 | 8.7 | 7.8 | 0 | 0.56 | 3.72 | 0.8 | <4 | 558 | 27 | 6.0 | - | - | - | - | 37.1 | 11.8 | 14.5 | 9.16 | 2.15 | 24.7 |
| 35-55 | 9.3 | 8.6 | 2.5 | 0.96 | 3.83 | 0.5 | <4 | 633 | 46 | 10.2 | - | - | - | - | 32.8 | 7.89 | 14.5 | 9.80 | 2.25 | 29.9 |
| 55-75 | 9.7 | 8.7 | 35.4 | 1.15 | 5.25 | 0.1 | <4 | 704 | 162 | 8.9 | - | - | - | - | 27.8 | 4.93 | 13.1 | 11.5 | 2.07 | 41.2 |
| 75-160 | 9.2 | 8.7 | 27.5 | 2.38 | 6.40 | 0.2 | <4 | 1040 | 371 | 7.8 | - | - | - | - | 33.2 | 5.12 | 15.5 | 14.6 | 3.05 | 43.9 |

Note: Paddock sample bulked from 20 cores (0-10 cm) taken around the pit.

CEC (cation exchange capacity) is a measure of the soil's capacity to store and release major nutrient elements.

ESP (exchangeable sodium percentage) is derived by dividing the exchangeable sodium value by the CEC.