

HARD LOAM OVER POORLY STRUCTURED RED CLAY

General Description: *Hard setting reddish brown sandy loam to clay loam overlying a coarsely structured reddish brown clay with fine calcareous segregations at depth, forming in fine grained alluvium*

Landform: Flats and gently to moderately inclined outwash fans.

Substrate: Fine grained alluvium sometimes with sand and gravel, derived from hard rock hills (Pooraka Formation)

Vegetation: Peppermint box woodland



Type Site: Site No.: CM007
 1:50,000 sheet: 6630-3 (Clare) Hundred: Blyth
 Annual rainfall: 500 mm Sampling date: 14/02/94
 Landform: Midslope of long outwash fan, 2.5% slope
 Surface: Hard setting with no stones

Soil Description:

| Depth (cm) | Description |
|------------|---|
| 0-10 | Brown massive hard setting sandy clay loam. Sharp to: |
| 10-36 | Dark reddish brown light medium clay with strong coarse prismatic structure. Clear to: |
| 36-55 | Dark reddish brown highly calcareous light medium clay with moderate polyhedral structure. Gradual to: |
| 55-80 | Dark reddish brown highly calcareous weakly structured light clay. Diffuse to: |
| 80-160 | Red very highly calcareous weakly structured light clay with 20-50% soft carbonate segregations (Class I carbonate) and quartz gravel lenses. Diffuse to: |
| 160-180 | Yellowish red very highly calcareous weakly structured light clay with 20-50% soft carbonate segregations. |



Classification: Hypercalcic, Mesonatric, Red Sodosol; medium, non-gravelly, clay loamy/clayey, very deep

Summary of Properties

Drainage The soil is moderately well to imperfectly drained. The dispersive clay subsoil has low permeability and causes waterlogging in the topsoil after prolonged rain. The soil may remain wet for a week to several weeks.

Fertility The inherent fertility of the soil is moderate; the clay subsoil has a high nutrient retention capacity, as indicated by the exchangeable cation data, but the surface soil with lower clay content and very low organic matter has a poor retention capacity. Phosphorus is adequate at the sampling site, but zinc may be deficient.

pH Neutral at the surface, strongly alkaline with depth.

Rooting depth 95 cm in pit, but there are few roots below 50 cm.

Barriers to root growth

Physical: The poor structure in both the surface and subsoil impedes root growth.

Chemical: Toxic levels of boron and exchangeable sodium, and high pH (restricting nutrient availability) from 36 cm.

Water holding capacity Approximately 60 mm in the root zone, which is considerably less than the overall water holding capacity of the profile.

Seedling emergence Fair to poor due to the hard setting, poorly structured surface.

Workability Fair to poor due to the poor surface condition which has a limited moisture range for effective working.

Erosion Potential

Water: Moderate, because of the relatively gentle slope. The soil has a high erodibility and on steeper slopes has a high potential for erosion.

Wind: Low to moderately 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 | 6.8 | 5.7 | 0 | 0.08 | 1.4 | 0.8 | 37 | 400 | - | - | 2.53 | 21.4 | 44.1 | 0.39 | 6.9 | 3.98 | 1.70 | 0.54 | 0.93 | 7.8 |
| 0-10 | 6.9 | 6.2 | 0 | 0.11 | 1.0 | 0.9 | 42 | 420 | 7.8 | - | 2.16 | 23.8 | 40.5 | 0.45 | 6.0 | 3.20 | 0.82 | 0.39 | 0.83 | 6.5 |
| 10-36 | 8.1 | 6.6 | 1.4 | 0.14 | 0.9 | 0.6 | 5 | 550 | 12 | - | 5.11 | 6.3 | 12.2 | 0.06 | 22.7 | 6.65 | 8.02 | 4.08 | 1.72 | 18.0 |
| 36-55 | 9.4 | 8.2 | 3.1 | 0.89 | 6.2 | 0.2 | 2 | 530 | 180 | 17.5 | 2.15 | 2.8 | 1.5 | 0.03 | 18.6 | 3.55 | 8.92 | 6.76 | 1.62 | 36.3 |
| 55-80 | 9.4 | 8.3 | 3.7 | 1.06 | 6.2 | 0.2 | 6 | 550 | 262 | 17.7 | 2.09 | 3.2 | 1.3 | 0.06 | 17.1 | 3.23 | 8.59 | 6.77 | 1.53 | 39.6 |
| 80-160 | 9.4 | 8.4 | 22.9 | 1.10 | 9.8 | 0.2 | 7 | 670 | 267 | 17.7 | 1.06 | 1.8 | 0.9 | 0.04 | 16.3 | 3.16 | 7.51 | 6.24 | 1.77 | 38.3 |
| 160-180 | 9.3 | 8.4 | 46.7 | 1.29 | 10.3 | 0.2 | 10 | 530 | 268 | 20.9 | 1.05 | 2.0 | 0.7 | 0.08 | 14.4 | 3.00 | 6.74 | 5.83 | 1.82 | 40.5 |

Note: Paddock sample bulked from 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.