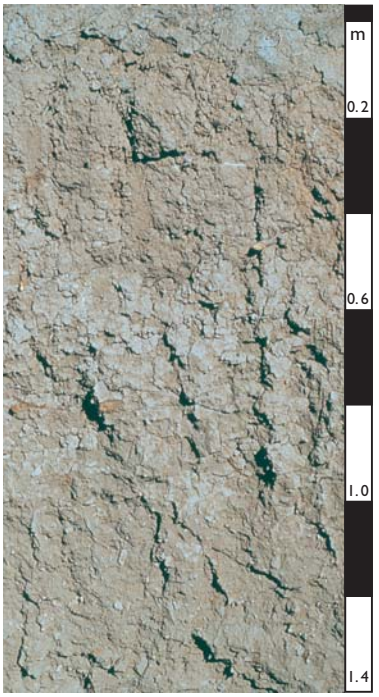
# VE7: Episodic-Epiacidic, Self-mulching, **Grey Vertosol**




**Chinchilla district, south Queensland**

## General description of the soil

A grey, shrink-swell, self-mulching, cracking clay soil that is sodic (i.e. ESP>6) in the upper 0.1 m of the solum and the major part of the upper 0.5 m of the solum is strongly acid (i.e. pH<5.5).

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| **Distribution:** | A widespread soil extending intermittently from north-central Queensland to central inland New South Wales. |
| **Typical land use:** | Sparse grazing, some cereal cropping in adjacent areas. |
| **Common variants:** | Gilgai dimensions, pH and sodicity of the soil may vary and the strong acidity may extend to the soil surface. |
| **World Reference Base:** | Salic Vertisol. |
| **Other names:** | Grey Clays, Brown Clays and Cracking Clays. |

## Environment and location of the example profile

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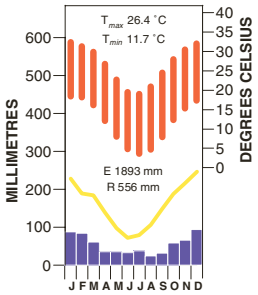
| **Landform:** | Gently undulating plain. |
| **Parent material or substrate:** | Probably weathered siltstone. |
| **Drainage class:** | Imperfectly drained, but drainage away from the mound is rapid. |
| **Surface condition:** | Self-mulching, loose and periodic cracking. |
| **Site disturbance:** | Cleared. |
| **Native vegetation:** | Originally brigalow (*Acacia harpophylla*), belah (*Allocasuarina cristata*) and wilga (*Geijera parviflora*) forest. |
| **Microrelief:** | Large melonhole gilgai with vertical interval of 1.0 m. The profile is situated on the mound of the gilgai. |

## Site location

## Site climate



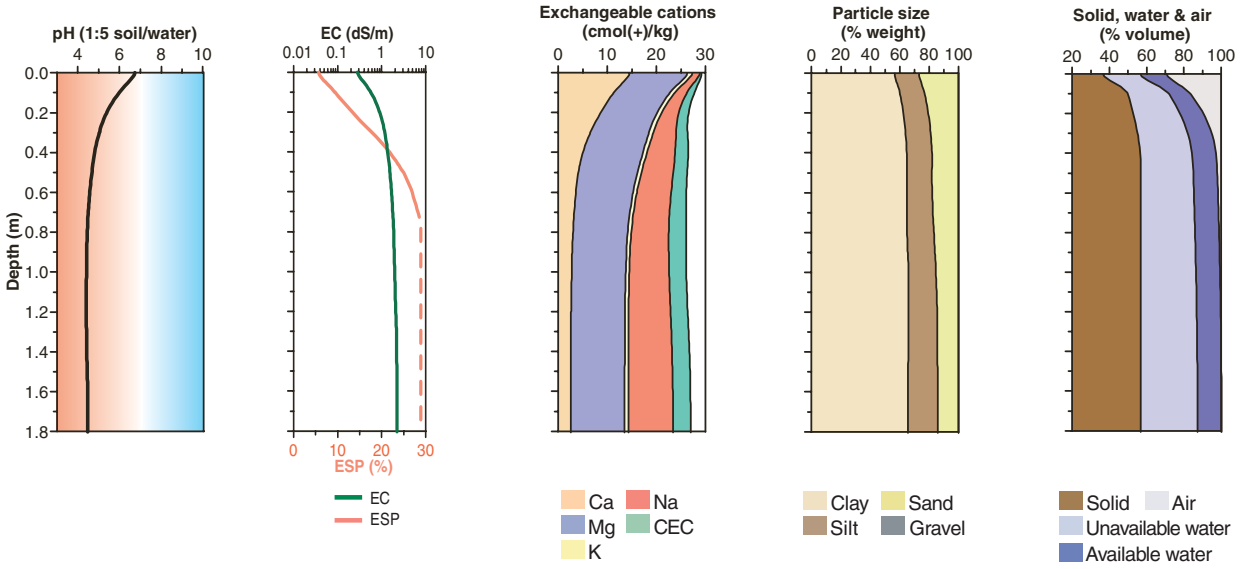

## Soil morphology

| Horizon | Depth (m) | Colour | Mottles | Texture | Structure | | | Consistence | Coarse fragments | Segregations | Boundary |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Grade | Shape | Size | | | | |
| A1 | 0.00–0.05 | grey brown (10YR 4.5/2) | – | light medium clay | strong | granular | 5–10 mm | strong (dry) | – | – | clear |
| B21 | 0.05–0.20 | brown (7.5YR 4/2) | – | medium heavy clay | strong | subangular blocky | 50 mm parting to 5 mm | very firm (moist) | – | – | diffuse |
| B22 | 0.20–0.46 | brown (7.5YR 4.5/2) | – | medium heavy clay | strong | subangular blocky parting to polyhedral | 50 mm parting to 5 mm | firm (moist) | – | – | diffuse |
| B23 | 0.46–0.90 | brown (10YR 5/3) | – | medium heavy clay | moderate (minor slickensides) | polyhedral | 50 mm parting to 10 mm | firm and slightly plastic (moist) | – | – | diffuse |
| B31 | 0.90–1.50 | greyish brown (10YR 5/2) | strong brown (7.5YR 5/8) | medium heavy clay | moderate (slickensides) | lenticular | 150 mm parting to 10 mm | slightly plastic | – | – | diffuse |
| B32 | 1.50–2.70 | light brownish grey (10YR 6/2) | light olive brown (2.5Y 5/4) faint (15–30 mm) brown (7.5YR 5/3) faint (15–30 mm) | medium heavy clay | strong | lenticular | 150 mm parting to 10 mm | moderately plastic | – | – | diffuse |
| BC | 2.70–3.30 | light brownish grey (10YR 6/2) | reddish brown (5YR 5/3) distinct (<5 mm) very pale brown (10YR 8/3) distinct (<5 mm) | medium heavy clay | moderate | lenticular | 150 mm parting to 10 mm | moderately plastic | 2–10% soft weathered siltstone (5 mm) increasing in amount with depth | – | |

## Soil chemical and physical properties

| Horizon | Sample Depth (m) | pH $H_2O$[A] | pH $CaCl_2$[B] | Elect. Cond. dS/m[A] | $CaCO_3$ % | Org. C %[E] | Extr. P mg/kg[A] | Tot. P %[A] | Tot. K %[A] | Cation exchange properties[E] cmol(+)/kg | | | | | | | ESP %[A] | Bulk dens. Mg/m³ | Particle size %[F] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Ca | Mg | K | Na | H+Al | CEC | ECEC | | | CS | FS | Silt | Clay |
| A1 | 0.00–0.05 | 6.9 | 5.6 | 0.18 | | 1.7 | 36 | 0.02 | 0.44 | 15 | 12 | 1.0 | 1.3 | | 28 | | 5 | 1.0 | 3 | 22 | 16 | 54 |
| B21 | 0.05–0.10 | 6.0 | 4.8 | 0.45 | | 1.3 | 15 | 0.02 | 0.42 | 11 | 11 | 1.0 | 2.5 | | 28 | | 9 | 1.4 | 2 | 19 | 16 | 58 |
| B21 | 0.10–0.20 | 5.3 | 4.3 | 0.77 | | 1.3 | | 0.01 | 0.42 | 7.7 | 11 | 1.0 | 3.2 | | 25 | | 13 | 1.4 | 2 | 16 | 16 | 60 |
| B22 | 0.30–0.46 | 4.7 | 3.8 | 1.40 | | 0.8 | | 0.01 | 0.41 | 4.4 | 13 | 0.8 | 6.0 | | 27 | | 22 | 1.5 | 1 | 15 | 17 | 63 |
| B23 | 0.46–0.60 | 4.6 | 3.6 | 1.60 | | | | 0.01 | 0.42 | 3.5 | 12 | 0.8 | 7.0 | | 26 | | 27 | 1.5 | <1 | 17 | 16 | 64 |
| B23 | 0.60–0.90 | 4.4 | 3.8 | 1.90 | | | | 0.01 | 0.40 | 2.9 | 11 | 0.7 | 7.6 | | 26 | | 29 | 1.5 | <1 | 16 | 18 | 64 |
| B31 | 0.90–1.20 | 4.4 | 3.5 | 1.96 | | | | 0.01 | 0.41 | 2.6 | 11 | 0.7 | 8.3 | | 26 | | 32 | | <1 | 14 | 19 | 67 |
| B32 | 1.50–1.80 | 4.5 | 3.6 | 2.22 | | | | 0.01 | 0.43 | 2.5 | 11 | 0.8 | 9.1 | | 27 | | 34 | | <1 | 13 | 20 | 65 |

## Key profile properties




## General qualities of the soil

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| **Infiltration:** | Slow but dependent on soil water content. |
| **Available water store:** | Small to moderate depending on subsoil salinity. |
| **Permeability:** | Moderate to low. |
| **Physical root limitations:** | Unlikely to occur, apart from restricted aeration when wet. |
| **Erosion hazard:** | Minor run-off into associated depressions. |
| **Nutrient availability:** | Moderate but phosphorus may be low. |
| **Toxicities:** | Subsoil salinity is usually very high increasing to extreme with depth. |

**The acid cracking clay comes from the mound of the strongly gilgaied landscape**

*Acknowledgements:* Soil image, soil description and laboratory data: CSIRO Land and Water. Stace et al. (1968), Profile C, page 88. Landscape image: CSIRO.