Ti-Tree - Pmara Jutunta (Six Mile).
Soil Investigation on an area proposed for Horticulture Development.

Report No.: 14/2003A

Rudy Lennartz
Land Resource Assessment Scientist

Alice Plaza Level 1
Alice Springs
April 2003
A collaborative work program between Center Farm (CLC) and the Department of Infrastructure, Planning and Environment (DIPE) into the investigation for potential areas for horticulture development in central Northern Territory is on going. As a part of the program, a specific area close to the Pmara Jutunta Aboriginal community near Ti-Tree was examined on 31st March to 2nd April 2003.

This particular survey was designed to gain an understanding of the region and to enable comment to be made on the general suitability of the soils in the area to support horticulture development. Auger holes were used as the primary method of survey.

Soil descriptions are based on The Australian Soil Classification (Isbell, 1996) guidelines.

Specific Pmara Jutunta Soil Survey

The five soil sites examined are presented in Attachment 1 and are in an area identified as having suitable water availability. Sites were selected to the east of the track servicing the power lines running from Ti-Tree to the community. Thick Mulga inhibited access to more central regions of the proposed area and it was deemed to be impractical, at this stage, to traverse through the bush to access central areas.

Site 1 (338030mE, 7543927mN)

Soil Classification: Earthy Sand, Tenosol – TE, DS, ZZ, AR, A, E, K, L, W

Soil Description: Well drained. Firm surface, easily broken. Mild cryptogam surface in lower lying areas. Moist from 0.40 to 1.00m

<table>
<thead>
<tr>
<th>Layer</th>
<th>Depth (m)</th>
<th>Color</th>
<th>Texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>0.00m – 0.15m</td>
<td>Dark reddish brown (2.5YR3/3); Coarse clayey sand; massive sandy fabric. Field pH 4.5</td>
<td></td>
</tr>
<tr>
<td>B21</td>
<td>0.15m – 0.40m</td>
<td>Dark reddish brown (2.5YR3/4); Fine sandy loam; massive sandy fabric. Field pH 5.5</td>
<td></td>
</tr>
<tr>
<td>B22</td>
<td>0.40m – 1.00m</td>
<td>Dusky red (10R3/4); Medium sandy loam; massive sandy fabric. Field pH 6.0</td>
<td></td>
</tr>
</tbody>
</table>

Site 2 (338079mE, 7544383mN)


Soil Description: Well drained. Loose surface. Cryptogam in lower lying areas with loose sand in other areas. Moist from 0.30 to 1.60m.

<table>
<thead>
<tr>
<th>Layer</th>
<th>Depth (m)</th>
<th>Color</th>
<th>Texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>0.00m – 0.10m</td>
<td>Dark reddish brown (2.5YR3/4); Medium loamy sand; massive earthy fabric. Field pH 4.5</td>
<td></td>
</tr>
<tr>
<td>B21</td>
<td>0.10m – 0.30m</td>
<td>Dark reddish brown (2.5YR3/4); Medium loamy sand; massive earthy fabric. Field pH 5.5</td>
<td></td>
</tr>
<tr>
<td>B22</td>
<td>0.30m – 1.60m</td>
<td>Dark red (10R3/6); Medium sandy loam; massive earthy fabric. Field pH 5.5</td>
<td></td>
</tr>
<tr>
<td>B3</td>
<td>1.60m – 1.80m</td>
<td>Dark red (2.5YR3/6); Medium sandy clay loam; massive earthy fabric. Field pH 6.0</td>
<td></td>
</tr>
</tbody>
</table>
Site 3 (338116mE, 7545028mN)

**Soil Classification:** Earthy Sand, Kandosol – KA, AA, AG?, CD, B, E, K, L, X

**Soil Description:** Well drained. Flaking cryptogam surface.

A1 0.00m – 0.15m Dark reddish brown (2.5YR2.5/4); Medium loamy sand; massive sandy fabric. Field pH 4.5

B21 0.15m – 0.20m Dark reddish brown (2.5YR3/4); Medium loamy sand; massive sandy fabric. Field pH 5.0

B22 0.20m – 1.60m Dark red (2.5YR3/6); Fine sandy loam; massive sandy fabric. Field pH 5.5

Site 4 (338148mE, 7545377mN)

**Soil Classification:** Earthy Sand, Kandosol – KA, AA, BJ, CD, A, E, L, M, X

**Soil Description:** Well drained. Mostly loose sandy surface with cryptogam surface in low-lying areas.

A1 0.00m – 0.10m Dark reddish brown (2.5YR2.5/4); Coarse sandy loam; massive sandy fabric. Field pH 5.0

B21 0.10m – 1.50m Dark reddish brown (10R3/6); Medium sandy clay loam; massive sandy fabric. Field pH 6.0

B22 1.50m – 1.70m Dark red (10R3/6); Fine clay loam sandy; massive sandy fabric. Field pH 6.0

Site 5 (338182mE, 7545874mN)

**Soil Classification:** Earthy Sand, Kandosol – KA, AA, AG, CD, A, E, K, M, X

**Soil Description:** Well drained. Mostly loose sandy surface with cryptogam surface in low-lying areas. Moist from 0.90m to 1.80m.

A1 0.00m – 0.06m Dark reddish brown (2.5YR3/4); Fine loamy sand; massive sandy fabric. Field pH 4.0

B21 0.06m – 0.40m Dark reddish brown (2.5YR3/4); Fine loamy sand; massive sandy fabric. Field pH 5.5

B22 0.40 – 0.90m Dark reddish brown (2.5YR3/4); Medium sandy loam; massive sandy fabric. Field pH 5.5

B3 0.90 – 1.80 Dark red (2.5YR3/6); Coarse sandy clay loam; massive sandy fabric; usually 5% 2-6mm rounded quartz gravel. Field pH 6.0. Restricted drainage due to increased clay percentage.
Whilst in the area, a general reconnaissance trip was undertaken to inspect the surrounding areas for possible suitable soils. Site inspection access was restricted to cleared tracks. It was not deemed practical nor appropriate at this stage of inspection to traverse uncleared bush areas to survey soil profiles.

**Nturiya - Ti Tree south west area**

Image 1 represents some of the spinifex sand plains that are evident west of Ti Tree. The satellite image (Attachment 1) shows evidence of a remnant drainage system in the observation area. On the ground the interpreted drainage area characterized by spinifex ground cover and few Mulga shrubs appears to be elevated above the surrounding Mulga sand plains. A brief inspection of the soil to 0.70m indicated a loamy sand texture with a field pH of 6.5. From initial observations the area appears to present few restrictions for horticultural development.

The second Ti Tree soil observation site as presented in Image 2 is a broad representation of the Mulga sand plains of the region. The maximum texture observed was a sandy clay loam at 0.80m with a field pH of 6.0. This soil observation site represents a very small portion of the overall region. The heavier texture of the soil should not be inferred to be representative of the regional soils. There is scope for further survey work in the area if the interest in establishing a horticulture project is pursued.

**North east Pmara Jutunta area**

The area to the east of the Pmara Jutunta community is vast and occupies about half of the Ahakeye Community Land Trust district. A brief vehicular traverse on bore access roads was undertaken to inspect the area. Visual observation suggests that the spinifex sand plains would present few inhibiting characteristics for the establishment of horticulture ventures in the area. Photo representation is depicted in Views 3 and 4 taken from recently drilled water bores.

View 3. Taken looking south east from RN17605

View 4. Taken looking south east from RN17844
Observations / Conclusions

The soils observed during the initial site visits appear to offer few, if any, restrictions to the use of the land for horticultural ventures. Soils surveyed close to the Pmara Jutunta community are classified as being deep to very deep (Isbell, 1996) with textures generally having less than 20%-30% clay content. The low clay content would suggest well-drained soils exist in the area.

It should be noted that the density of investigation sites was broad and that soils outside that immediate survey area may show variation in character. It would be pertinent that developers undertake closer spaced investigations if projects were to proceed. If it was decided that further detailed auger work was unnecessary it would be strongly advised that developers excavate some well placed backhoe pits to investigate the depth extent and underlying characteristics of the soil.

Consultants with personnel from Department of Infrastructure, Planning and Environment (DIPE) offering advice as necessary can undertake further work prior to development.

SOIL CLASSIFICATIONS

In this report, soils are classified according to two different classification systems widely used throughout Australia:

(a) Great Soil Groups (Stace et al, 1968) - This classification is now superseded but relatively easy for non-professionals to use. The following Great Soil Groups were recorded on the station

Red Earths - These are medium-textured soils, red in colour, with a massive structure and earthy fabric. There is a gradual increase in clay content with soil depth.

Alluvial Soils - These are brown sandy soils associated with floodplains, floodouts and range frontage fans.

Lithosols - Shallow gravelly soils such as occur on rocky hillslopes.

Siliceous Sands - These occur as red dune soils with less then 5% clay content, single grain structure and a sandy fabric.

Earthy Sands - These soils are found in sandplain areas. They have deep, uniform profiles with little increase in clay content with depth, massive structure, earthy fabric and are red in colour.

Red Calcareous Soils - These soils are shallow, medium-textured and highly alkaline. They have developed directly from underlying calcareous rocks or calcrete.

Brown and Red Clays - Deep, heavy-textured soils that are strongly structured. These soils may present deep cracking when dry and often display gilgai micro-relief.

Solonized Brown Soils - These soils are characterised by large amounts of calcareous material in the profile, increasing in concentration with depth.

Red-Brown Earths - These soils are characterised by an abrupt boundary between a sandy topsoil and a heavy textured subsoil. They are often highly erodible, saline, and calcareous at depth.

Non-calcic Brown Soils - These soils are very similar to red-brown earths, although generally shallower, and carbonate free.
(b) The Australian Soil Classification System - 3rd Approximation (Isbell 1993) is a key based on both soil characteristics and laboratory data. The main soil orders found in central Australia are as follows.

**Calcarosols (CA)** - soils are normally calcareous throughout the profile (often highly calcareous).

**Chromosols (CH)** - these soils have a strong texture contrast between the A and B horizons, are weakly acid and are non-sodic.

**Dermosols (DE)** - soils lacking strong texture contrast between the A horizon and the structured B horizon. This order is diverse.

**Ferrosols (FE)** - The structured B horizons of these soils are high in free iron oxide, and lack strong texture contrast between the A and B horizons.

**Kandosols (KA)** - These soils lack strong texture contrast, B horizons are massive or weakly structured and the profile is not calcareous throughout. These soils are a widespread group in central Australia, and occur locally in large areas.

**Rudosols (RU)** - Soils in this order have little if any pedological organisation. They are usually young soils that vary widely in terms of texture and depth. These soils may be stratified and some may be highly saline.

**Tenosols (TE)** - This order is made up of a diverse range of soils, with generally weak pedological organisation, apart from the A horizons.

**Vertosols (VE)** - These are clay soils that exhibit strong cracking tendencies when dry due to swell-shrink properties. Slickensides and/or lenticular peds appear at depth.

Each order has a series of keys that are used to classify the suborder, great group, subgroup and family classes.

**Bibliography**


52.162 NT Portion 3289: DPI&F Ti-Tree Farm.