

This Technical Data Sheet describes the *typical average properties* of the specified soil.

It is essentially a summary of information obtained from one or more profiles of this soil that were examined and described during the Topoclimate survey or previous surveys. It has been prepared in good faith by trained staff within time and budgetary limits. However, no responsibility or liability can be taken for the accuracy of the information and interpretations. Advise should be sought from soil and landuse experts before making landuse decisions on individual farms and paddocks. The characteristics of the soil at a specific location may differ in some details from those described here. No warranties are expressed or implied unless stated.

Soil name: **Mangapiri**

Overview

Mangapiri soils occupy about 4,800 ha on rolling and hilly land in the mid Waiau and upper Aparima valleys. They are formed in fine colluvium from siltstone and mudstone as well as colluvium from weathered terrace tuffaceous greywacke gravels. Mangapiri soils are deep to moderately deep, poorly drained, and have silty clay textures. Present use is extensive grazing with sheep and beef cattle. The climate is cool temperate with cold winters and regular rainfall, with soils seldom drying out.

Soil classification

NZ Soil Classification (NZSC):

Argillic Orthic Gley; stoneless; clayey

Previous NZ Genetic Classification:

Weak to moderately gleyed yellow-brown earth

Classification explanation

Mangapiri soils have been reclassified in this survey as the soil properties are consistent with Gley soils, rather than Brown soils, due to the poor drainage. Mangapiri soils have subsoils that show structural development, and significant clay accumulation. The soils typically have gravel or bedrock at greater than 90cm depth, and have silty clay textures.

Soil phases and variants

Identified units in the Mangapiri soils are:

- Mangapiri undulating deep (MgU1): has no gravel or bedrock within 90cm depth; occurs on slopes of 0–7°
- Mangapiri rolling moderately deep (MgR2): has gravel or bedrock between 45 and 90cm; occurs on slopes of 7–15°
- Mangapiri hilly deep (MgH1): has no gravel or bedrock within 90cm depth; occurs on slopes of 15–25°
- Mangapiri hilly shallow (MgH3): has gravel or bedrock above 45cm depth; is imperfectly drained and occurs on slopes of 15–25°
- Mangapiri rolling deep (MgR1): has no gravel or bedrock within 90cm depth; occurs on slopes of 7–15°
- Mangapiri undulating moderately deep (MgU2): has gravel or bedrock between 45 and 90cm; occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Mangapiri undulating deep (MgU1). Values for other phases and variants can be taken as being similar. Where they differ significantly they are recorded with a separate versatility rating, e.g., Mangapiri hilly deep (MgH1).

Associated soils

Some soils that commonly occur in association with Mangapiri soils are:

- Redcliff: occur on terrace escarpments; well drained, shallow soils forming into a complex of gravels and siltstone/mudstone bedrock
- Wairaki: occur on high terraces; well drained, shallow to moderately deep soils

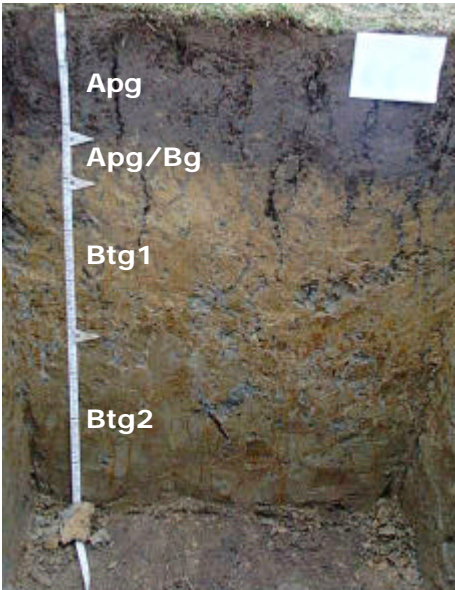
Similar soils

Some soils that have similar properties to Mangapiri soils are:

- Braxton: poorly drained soils on intermediate terraces
- Sobig: poorly drained soils on high terraces
- Chewings: poorly drained soils on floodplains and adjacent colluvial soils; formed in alluvium from banded calcareous mudstone and sandstone
- Te Mara: imperfectly drained soils formed in fine colluvium from limestone

Typical profile features

The following is a 'generic' or composite profile description representing the most common combination of characteristics for this soil type. The actual profiles for which descriptions and data are available are listed at the end of this Technical Data Sheet.

Mangapiri profile	Horizon	Depth (cm)	Description
	Apg	0–23	Brownish grey silty clay; many dark reddish brown mottles; slightly firm soil strength; moderately developed fine polyhedral structure; abundant roots
	Apg/Bg	23–31	Greyish yellow silty clay; many yellowish brown mottles; many worm casts; slightly firm soil strength; massive structure; abundant roots
	Btg1	31–62	Greyish yellow silty clay; many bright yellowish brown; few worm casts; slightly firm soil strength; moderately developed coarse prismatic structure; many roots
	Btg2	62–90	Dull yellow silty clay; common bright yellowish brown mottles; weak soil strength; weakly developed coarse prismatic structure; few roots

Key profile features

Mangapiri soils have a topsoil 20–25cm deep with a moderately developed structure. Subsoil structure is moderate, grading to weakly developed with depth. The dominance of grey colours throughout the subsoil reflects the poor drainage of these soils.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–23	Moderate	<i>Moderate</i>	Silty clay	Gravel free
Ap/Bg	23–31	Moderate	<i>Moderate</i>	Silty clay	Gravel free
Btg1	31–62	Moderate – High	<i>Slow</i>	Silty clay	Gravel free
Btg2	62–90	High	<i>Slow</i>	Silty clay	Gravel free

Profile drainage:	Poor
Plant readily available water:	<i>Moderately high</i>
Potential rooting depth:	Moderately deep
Rooting restriction:	Dense lower subsoil

Key physical properties

Mangapiri soils have moderately high plant available water and a moderately deep rooting depth that is limited by the high bulk density in the lower subsoil. The rooting depth may also be limited by poor aeration during wet periods due to the poor drainage and slow subsoil permeability. Textures are silty clays to clays, and topsoil clay content is 45–55%. The soils are typically stone free, although the moderately deep to shallow phases will have gravel or bedrock between 45 and 90cm depth.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–23	Moderate	Moderate	High	Moderate	High	Moderate	Very low	Low
Ap/Bg	23–31	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Very low	Low
Btg1	31–62	Moderate	Moderate	Moderate	Low	Low	Moderate	Very low	Moderate
Btg2	62–90	Moderate	Low	High	High	Moderate	Very high	Low	Moderate

Key chemical properties

Topsoil organic matter levels are about 9–15%; P-retention 45–60%, tending to decrease down the profile. Soil pH values are moderate and tend to be higher in the lower subsoil. Cation exchange values are high to moderate, with base saturation values similar. Exchangable calcium and magnesium are moderate to high and potassium levels very low. Soil reserves of phosphorus are also low. Micro-nutrient levels are generally adequate.

Vulnerability to environmental degradation

Note: the vulnerability ratings given in the table below are generalised and should not be taken as absolutes for this soil type in all situations. The actual risk depends on the environmental and management conditions prevailing at a particular place and time. Specialist advice should be sought before making management decisions that may have environmental impacts. Where vulnerability ratings of Moderate to Very severe are indicated, advice may be sought from Environment Southland or a farm management consultant.

Vulnerability factor	Rating	Vulnerability compared to other Southland soils
Structural compaction	slight	These soils have a slight vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the poor drainage, but is offset by the high topsoil clay content.
Nutrient leaching	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the poor drainage, high water-holding capacity and slow subsoil permeability.
Topsoil erodibility by water	minimal	Due to the high topsoil clay content, the topsoil erodibility of these soils is minimal. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	minimal	Vulnerability to long-term decline in soil organic matter levels is partly dependent on soil properties, and highly dependent on management practices (e.g., crop residue management and cultivation practices).
Waterlogging	severe	These soils have a severe vulnerability to waterlogging during wet periods. This rating reflects the poor drainage and slow subsoil permeability.

General landuse versatility ratings for Mangapiri soils

Note: The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive land use. These ratings differ from those used in the past in that sustainability factors are incorporated in the classification.

Refer to the Topoclimate district soil map or property soil map to determine which of the soil symbols listed below are applicable, then check the versatility ratings for that symbol in the appropriate table.

MgU1 (Mangapiri undulating deep)

MgU2 (Mangapiri undulating moderately deep)

MgR1 (Mangapiri rolling deep)

MgR2 (Mangapiri rolling moderately deep)

Versatility evaluation for soil MgU1, MgU2, MgR1, MgR2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rainfall.
Arable	Limited	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rainfall.
Intensive pasture	Moderate	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rainfall.
Forestry	Limited	Inadequate aeration during wet periods; vulnerability to sustained waterlogging.

MgH1 (Mangapiri hilly deep)

Versatility evaluation for soil MgH1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes
Forestry	Limited	Inadequate aeration during wet periods; hilly slopes.

MgH3 (Mangapiri hilly shallow)

Versatility evaluation for soil MgH2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes
Forestry	Limited	Restricted rooting depth.

Management practices that may improve soil versatility

- Careful management after heavy rain and wet periods will reduce the impact of short-term waterlogging. Intensive stocking, cultivation and heavy vehicular traffic should be minimised during these periods.
- Installation and maintenance of sub-surface mole and tile drains will reduce the risk of short-term waterlogging.
- If compaction occurs, aeration at the correct depth and moisture condition can be of benefit.

Soil profiles available for Mangapiri soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
MgU1	MT5	7		✓	✓	✓
MgU1	ZT6	43		✓	✓	✓

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