

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: **Aparima**

Overview

Aparima soils occupy about 14,700 ha on high terraces in the Otautau/Nightcaps district in the Aparima river valley. They are formed in deep loess deposits derived from tuffaceous greywacke rock. They have heavy silt loam textures and are imperfectly drained, with a dense fragipan between 60 and 90cm depth which restricts water drainage. They respond well to mole and tile drainage and are used for intensive sheep, dairy and deer production, with some cropping. Regular summer rainfall occurs, though inland soils may be seasonally dry.

Soil classification

NZ Soil Classification (NZSC):

Mottled-acidic Firm Brown; stoneless; silty

Previous NZ Genetic Classification:

Yellow-grey earth

Classification explanation

Aparima soils have been reclassified from the previous classification based the soil properties being more similar to Brown soils than Pallic soils, with P-retention of >30% throughout the profile. Due to perching of water on a dense fragipan, Aparima soils are imperfectly drained. The subsoil above the fragipan also typically has high density, which limits root growth. Aparima soils have silty textures throughout, but the lower subsoil is typically more clayey due to the accumulation of clay in or above the fragipan. The soils typically have pH of <5.5 in the upper subsoil, and are stone-free.

Soil phases and variants

Identified units in the Aparima soils are:

- Aparima undulating deep (ApU1): has no gravel within 90cm; occurs on slopes of 0–7°
- Aparima rolling deep (ApR1): has no gravel within 90cm; occurs on slopes of 7–15°

The soil properties described in this Technical Data Sheet are based on the most common phase, Aparima undulating deep (ApU1). 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., Aparima rolling deep (ApR1).

Associated soils

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

- Makarewa: Gley soil with clayey textures on the floodplain.
- Mossburn: poorly drained soil, due to water perching on a fragipan. Occurs on fans flanking the hills.
- Ohai: poorly drained soil with a degraded fragipan; formed from mixed loess and mudstone, and has clayey textures throughout.
- Woodlands: imperfectly drained Brown soil without a fragipan.

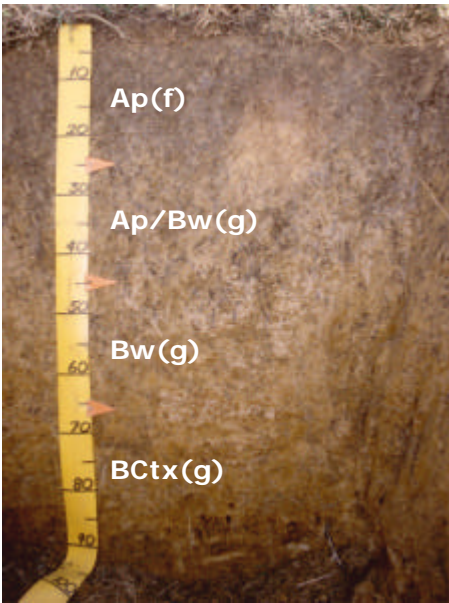
Similar soils

Some soils that have similar properties to Aparima soils are:

- Waianiwa: same soil, should be correlated into the Aparima series. Waianiwa series was defined and published prior to the investigation of the Aparima map units. Occurs on high terraces east of the Aparima River.
- Pukemutu: poorly drained equivalent of the Aparima soil.
- Woodlands: imperfectly drained Brown soil without a fragipan.

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.

Aparima profile	Horizon	Depth (cm)	Description
	Ap(f)	0–25	Greyish yellow-brown silt loam; few dull yellow orange mottles; weak soil strength; strongly developed fine polyhedral structure; many roots.
	Ap/Bw(g)	25–45	Dull yellow silt loam; few bright yellowish brown and light grey mottles; common worm casts; weak soil strength; moderately developed coarse prismatic and medium polyhedral structure; common roots.
	Bw(g)	45–66	Bright yellowish brown silt loam; many greyish yellow and common bright brown mottles; few wormcasts; weak soil strength; moderately developed coarse prismatic breaking to fine and medium polyhedral structure; common roots.
	Bw(g)	66–90	Bright brown silt loam; common light grey mottles; firm soil strength; weakly developed coarse platy structure; many clay coats on plate faces; few roots between plates.
	BCtx(g)		

Key profile features

Aparima soils have a 20–30cm deep topsoil that has strongly developed structure. Subsoil structure is moderate above a compact fragipan. The fragipan is distinctive from the fragipans of other soils by the bright brown colour, and having a densely packed blocky or platy sub-structure. Mottles are common in the upper subsoil, indicating the imperfect drainage caused by water perching on the fragipan.

Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap(f)	0–25	Moderate – High	Moderate	Silt loam	Gravel free
Ap/Bw(g)	25–45	Moderate – High	Moderate	Silt loam	Gravel free
Bw(g)	45–66	Moderate – High	Slow	Silt loam	Gravel free
BCtx(g)	66–90	Moderate – High	Slow	Silt loam	Gravel free

Profile drainage: Imperfect
Plant readily available water: Moderately high
Potential rooting depth: Moderately deep
Rooting restriction: Fragipan

Key physical properties

Aparima soils have a slightly deep rooting depth that is restricted by the fragipan at 60–90cm depth. The depth of the fragipan means the Pukemutu soils typically have moderately high to high plant available water. The soils are imperfectly drained with slow permeability through the fragipan. Textures are heavy silt loams but tend towards silty clays in the lower subsoil. Topsoil clay content is 20–30%, and stone-free.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap(f)	0–25	Moderate	Moderate	Moderate	Low	Low	Moderate	Very low	Low
Ap/Bw(g)	25–45	Moderate	Moderate	Moderate	Very low	Very low	Low	Very low	Low
Bw(g)	45–66	Moderate	Moderate	Moderate	Low	Low	Moderate	Very low	Low
BCtx(g)	66–90	Moderate	Moderate	Moderate	Low	Low	Moderate	Very low	Low

Additional chemical properties (as a profile average)

Sulphate sulphur levels high in subsoil

Key chemical properties

Topsoil organic matter levels are 4–9%; P-retention values 25–35% and pH values moderate. Cation exchange values are moderate and base saturation low without lime application. Available cations are usually low with magnesium levels moderate. Reserves of phosphate are low with increasing sulphate sulphur levels down the profile. Micronutrient levels are generally adequate although boron responses in brassicas and molybdenum responses in legumes can occur.

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	moderate	These soils have a moderate vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the imperfect drainage and medium P-retention.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the imperfect drainage, slow subsoil permeability and moderate water holding capacity.
Topsoil erodibility by water	slight	Due to the moderate clay and organic matter content, topsoil erodibility in these soils is slight. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	slight	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	moderate	These soils have a moderate vulnerability to waterlogging during wet periods. This rating reflects the imperfect drainage and slow subsoil permeability.

General landuse versatility ratings for Aparima soils

Note: The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive landuse. 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.

ApU1 (Aparima undulating deep)

Versatility evaluation for soil ApU1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Risk of short term waterlogging after heavy rain; restricted rooting depth
Arable	Moderate	Inadequate aeration during wet periods; vulnerability to structural compaction.
Intensive pasture	Moderate	Inadequate aeration during wet periods; vulnerability to structural compaction.
Forestry	Moderate	Restricted rooting depth; vulnerability to sustained waterlogging.

ApR1 (Aparima rolling deep)

Versatility evaluation for soil ApR1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Short term waterlogging risk after heavy rain; restricted rooting depth
Arable	Limited	Rolling slope
Intensive pasture	Moderate	Inadequate aeration during wet periods; vulnerability to structural compaction.
Forestry	Moderate	Restricted rooting depth; vulnerability to sustained waterlogging

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 subsurface 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 Aparima soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
ONT2	ApU1	25	✓	✓	✓	✓
SB7692	APu1	8	✓	✓	✓	
EMT3	APu1	18	✓	✓	✓	✓
EMT6	ApU1	18	✓	✓	✓	✓
ONT3	ApR1	25	✓	✓	✓	✓

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Crops for Southland
PO Box 1306, Invercargill. New Zealand



www.cropssouthland.co.nz