Soil name: Oteramika

Overview

Oteramika soils occupy about 1,600 ha on the sideslopes of terraces and downlands across the Southland plains from the Aparima River to Tokanui. They are formed where there is thin loess overlying old gravels derived from greywacke and schist rocks. Oteramika soils are typically gravelly, and are moderately well to imperfectly drained. They are used for pastoral grazing and have a cool temperate climate with regular rainfall.

Soil classification

NZ Soil Classification (NZSC):	Mottled Firm Brown; rounded-stony; quartzitic; silty
Previous NZ Genetic Classification:	Moderately to strongly leached yellow-brown earth

Classification explanation

The NZSC of Oteramika soils is consistant with the previous classification. Oteramika soils are moderately weathered soils, with a compact subsoil, and imperfect drainage. The soils typically have silty topsoils and gravel within 45cm depth. The gravels are commonly quartz, although weathered greywacke gravels are equally abundant.

Soil phases and variants

Identified units in the Oteramika soils are:

- Oteramika rolling shallow (OkR3): has gravel above 45cm depth; occurs on slopes 7–15º
- Oteramika undulating shallow (OkU3): has gravel above 45cm depth; occurs on slopes 0–7º
- Oteramika hilly shallow (OkH3): has gravel above 45cm depth; occurs on slopes 15–25º
- Oteramika steep shallow (OkS3): has gravel above 45cm depth; occurs on slopes >25º
- Oteramika rolling moderately deep (OkR2): has gravel between 45 and 90cm depth; occurs on slopes 7–15º

The soil properties described in this Technical Data Sheet are based on the most common phase, Oteramika rolling shallow (OkR3). 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., Oteramika steep shallow (OkS3).

Associated soils

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

- Woodlands: formed in deep loess, with gravel at greater than 45cm depth, and imperfect drainage.
- Pukemutu: formed in deep loess, with gravel at greater than 90cm depth, and poorly drained due to fragipan.
- Aparima: formed in deep loess, with gravel at greater than 90cm depth, and imperfectly drained due to fragipan.

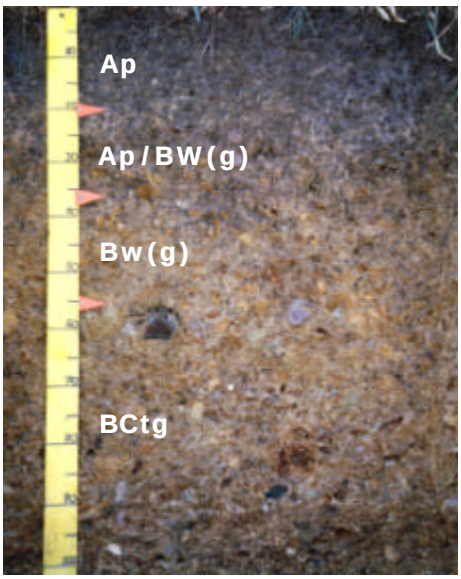
Similar soils

Some soils that have similar properties to Oteramika soils are:

- Benio: occurs in northern Southland. Typically more strongly weathered and moderately well drained.
- Wairaki: occurs on high terraces and fans from the Takitimu mountains. Formed in tuffaceous greywacke alluvium.

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.

Oteramika profile	Horizon	Depth (cm)	Description
	Ap	0–20	Greyish yellow brown silt loam; weak soil strength; strongly developed fine polyhedral structure ;abundant roots
	Ap/Bw(g)	20–37	Dull yellow slightly gravelly silt loam; few bright brown and grey mottles; many wormcasts; weak soil strength; strongly developed fine polyhedral structure; gravels slightly weathered and rounded; many roots
	Bw(g)	37–56	Dull yellow very gravelly silty clay; common bright brown and grey mottles; few wormcasts; compact particle packing; moderately developed fine polyhedral structure; gravels moderately weathered and rounded ; many roots
	BCtg	56–90	Greyish yellow very gravelly silty clay; common bright brown and grey mottles; compact particle packing; massive structure; gravels highly weathered and rounded; few roots

Key profile features

Oteramika soils have a topsoil 15–25cm deep with moderate to strongly developed structure. Subsoil structural development is moderate, becoming weak to structureless below 50cm depth. Clay has accumulated in the subsoil, resulting in clayey textures. Gravel occurs throughout the profile, and is a mixture of slightly weathered quartz and strongly weathered greywacke.

Typical physical properties

Note: values in Italics are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–20	Moderate	*Moderate*	Silt loam	Slightly gravelly
Ap/Bw(g)	20–37	Moderate	*Moderate*	Silt loam	Moderately gravelly
Bw(g)	37–56	Moderate – High	*Moderate*	Silty clay	Very gravelly
BCtg	56–90	Moderate – High	*Slow*	Silty clay	Very gravelly

Profile drainage: Imperfect

Plant readily available water: *Moderate*

Potential rooting depth: Moderately deep

Rooting restriction: Very gravelly subsoil

Key physical properties

Oteramika soils have moderately deep rooting depth and moderate plant available water, and are limited by the subsoil gravel. The soils are imperfectly drained, although those on hilly to steep slopes are well drained. Aeration is good in upper horizons but decreases with depth, with the subsoil being slowly permeable. Textures are silt loams in the topsoil, and silty clay in the subsoil. Topsoil clay content is about 25–30%, and slightly to moderately gravelly. Subsoils are typically very to extremely gravelly.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–20	Moderate	Moderate	Moderate	Moderate	Low	Moderate	Moderate	Moderate
Ap/Bw(g)	20–37	Moderate	Moderate	Moderate	Low	Low	Moderate	Moderate	Moderate
Bw(g)	37–56	Moderate	Moderate	Moderate	Low	Very low	Moderate	Very low	Moderate
BCtg	56–90	Moderate	Moderate	Moderate	Moderate	Low	High	Very low	Moderate

Key chemical properties

Topsoil organic matter levels are 5–9%; topsoil P-retention is 40–55%, with higher values in some subsoils; pH values are low to moderate and tend to decrease down the profile. Cation exchange and base saturation values are moderate, as are available calcium, magnesium and potassium. Soil reserves of phosphorus are low and sulphate sulphur levels are higher in the subsoil. Micronutrient 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.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the moderate water-holding capacity and slowly permeable subsoil.
Topsoil erodibility by water	slight	Due to the topsoil clay content, the topsoil erodibility of 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	slight	These soils have a slight vulnerability to waterlogging during wet periods, due to the imperfect drainage. The hilly and steep phases are less vulnerable to waterlogging.

General landuse versatility ratings for Oteramika 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.

OkR3 (Oteramika rolling shallow)
OkR2 (Oteramika rolling moderately deep)

Versatility evaluation for soil OkR3, OkR2		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Moderately deep potential rooting depth and vulnerability to leaching to groundwater
Arable	Limited	Rolling slope
Intensive pasture	Moderate	Ease of subsoil root growth and vulnerability to leaching to groundwater
Forestry	Moderate	Moderately deep potential rooting depth and ease of subsoil root growth

OkU3 (Oteramika undulating shallow)

Versatility evaluation for soil OkU3		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Moderately deep potential rooting depth and vulnerability to leaching to groundwater
Arable	Moderate	Risk of short-term waterlogging and ease of subsoil root growth
Intensive pasture	Moderate	Ease of subsoil root growth and vulnerability to leaching to groundwater
Forestry	Moderate	Moderately deep potential rooting depth and ease of subsoil root growth

OkH3 (Oteramika hilly shallow)
OkS3 (Oteramika steep shallow)

Versatility evaluation for soil OkH3, OkS3		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Unsuitable	Hilly to steep slopes
Arable	Unsuitable	Hilly to steep slopes
Intensive pasture	Limited	Hilly to steep slopes
Forestry	Limited	Moderately deep potential rooting depth and hilly to steep slopes

Management practices that may improve soil versatility

- Tile drains to assist drainage. Stony subsoils may prevent mole installation.
- Care with intensive grazing to minimise pugging when soils are excessively wet.
- Management of nutrient applications that minimise leaching losses
- Organic matter levels should be carefully maintained and enhanced

Soil profiles available for Oteramika soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
OkR3	IT6	8	✓	✓	✓	✓
OkR3	ET15	28a	✓	✓	✓	✓
OkU3	ET19	28a	✓	✓	✓	✓
OkU3	LT17	41	✓	✓	✓	✓
OkH3	GMT4	27	✓	✓	✓	✓
OkR2	ST16	29	✓	✓	✓	✓

Published by Crops for Southland with financial support from Environment Southland.

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www.cropssouthland.co.nz