

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: **Lyoncross**

### Overview

Lyoncross soils occupy about 3,300 ha on high to intermediate terraces of the lower Waiau Valley. They are formed in loess derived from tuffaceous greywacke and Fiordland complex rocks. Lyoncross soils moderately well drained, with deep rooting depth, high water-holding capacity and silt loam textures. Present use is pastoral farming with sheep and beef cattle. Climate is cool temperate with regular rain. Soils seldom dry out.

### Soil classification

**NZ Soil Classification (NZSC):**

Typic Orthic Brown; stoneless; silty

**Previous NZ Genetic Classification:**

Strongly leached yellow-brown earth

### Classification explanation

The NZSC of the Lyoncross soils is consistent with the previous classification. Lyoncross are well-drained soils with yellow-brown subsoils, and rarely suffer from drought. The subsoil is well structured to 90cm depth, providing good rooting volume. The soils have P-retention of 35–50%, are typically stone free and have silt loam textures to 90cm deep.

### Soil phases and variants

Identified units in the Lyoncross soils are:

- Lyoncross rolling deep (LrR1): has no gravel within 90cm depth; occurs on slopes of 7–15°
- Lyoncross undulating deep (LrU1): has no gravel within 90cm depth; occurs on slopes of 0–7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Lyoncross rolling deep (LrR1). 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., Lyoncross undulating deep (LrU1).

### Associated soils

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

- Mangapiri: poorly drained soil formed in fine colluvium from siltstone and mudstone; may also include moderately well drained stony soils from weathered tuffaceous greywacke gravels
- Wairaki: moderately well drained stony soils on high terraces; from thin loess overlaying weathered tuffaceous greywacke gravels
- Aparima: deep, imperfectly drained Brown soils with a fragipan; formed in loess
- Sobig: poorly drained soils with heavy silt textures and gravels within 45cm depth.

## Similar soils

Some soils that have similar properties to Lyoncross soils are:

- Waikiwi: found on high terraces of the Southland plain; typically has a structureless and compact lower subsoil
- Orawia: formed from loess and partly calcareous siltstones and sandstone; has silty clay texture
- Waimatuku: found on high terraces of the Southland Plain, between the Oreti and Aparima rivers; typically has a compact, weakly developed fragipan in the lower subsoil

## 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.

Lyoncross profile	Horizon	Depth (cm)	Description
	Ah	0–35	Greyish yellow-brown silt loam; few worm casts; weak soil strength; strongly developed medium to coarse polyhedral breaking to very fine polyhedral structure; abundant roots
	Bw	35–55	Dull yellowish brown silt loam; very few dull yellow mottles; few worm casts; weak soil strength; moderately developed medium to coarse polyhedral structure; many roots
	BCt(g)	55–90+	Dull yellowish brown silt loam; few greyish olive and bright brown mottles; very few worm casts; firm soil strength; moderately developed coarse to very coarse polyhedral structure; few roots

## Key profile features

Lyoncross soils have 22–35cm deep topsoils that have a strongly developed structure. Subsoil structure is moderately developed throughout, but the lower subsoil becomes compact and can limit root penetration.

## Typical physical properties

Note: values in *Italics* are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ah	0–35	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
Bw	35–55	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
BCt(g)	55–90+	High	<i>Slow</i>	Silt loam	Gravel free

**Profile drainage:** Moderately well

**Plant readily available water:** *Moderately high*

**Potential rooting depth:** Deep

**Rooting restriction:** High density in lower subsoil may be restrictive

## Key physical properties

Lyoncross soils have a deep rooting depth and moderately high plant available water. Rooting depth may be limited by the high density of the lower subsoil. The soils are moderately well aerated, but permeability becomes slow in the lower subsoil. Texture is silt loam, with topsoil clay content 20–30%, and the soils are stoneless.

## Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ah	0–35	Moderate	Moderate	Moderate	Low	Low	Moderate	Very low	Moderate
Bw	35–55	Moderate	Moderate	Moderate	Low	Very low	Moderate	Very low	Moderate
BCt(g)	55–90+	Moderate	Moderate	Moderate	Low	Very low	Moderate	Very low	Moderate

## Key chemical properties

Topsoil organic matter levels are 4.5–5.5%; P-retention 35–50% and pH moderate (high 5s). Cation exchange values are moderate and base saturation low. Available calcium and potassium levels are low, with magnesium levels moderate. Reserve phosphorus levels are low. Micronutrient levels are generally adequate although molybdenum responses in legumes and boron responses in brassicas 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
<b>Structural compaction</b>	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 moderately good drainage, P-retention and clay content.
<b>Nutrient leaching</b>	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the moderately good drainage, offset by the slow permeability.
<b>Topsoil erodibility by water</b>	slight	Due to the moderate organic matter and clay content, topsoil erodibility in these soils is slight. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
<b>Organic matter loss</b>	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).
<b>Waterlogging</b>	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the moderately good drainage, but slow permeability.

## General landuse versatility ratings for Lyoncross 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.

### LrR1 (Lyoncross rolling deep)

Versatility evaluation for soil LrR1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Restricted subsoil root penetrability; rolling slopes
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Vulnerability of topsoil to structural degradation by cultivation and compaction.
Forestry	Moderate	Restricted subsoil root penetrability; rolling slopes

**LrU1 (Lyoncross undulating deep)**

Versatility evaluation for soil LrU1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Restricted subsoil root penetrability; risk of short-term waterlogging after heavy rain
Arable	Moderate	Vulnerability to topsoil structural degradation by cultivation and compaction; risk of short-term waterlogging after heavy rain
Intensive pasture	Moderate	Vulnerability to topsoil structural degradation by cultivation and compaction; risk of short-term waterlogging after heavy rain
Forestry	Moderate	Restricted subsoil root penetrability; rolling slopes

**Management practices that may improve soil versatility**

- Careful management after heavy rain and wet periods will reduce the impact of short-term water logging. Intensive stocking, cultivation and heavy vehicular traffic use should be minimised during these periods.

**Soil profiles available for Lyoncross soils**

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
LrR1	EMT9	18	✓	✓	✓	✓
LrU1	EMT6	18	✓	✓	✓	✓
LrU1	167/15/10	18	✓			

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