

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: **Mossburn**

Overview

Mossburn soils occupy about 5,700 ha on high terraces, fans and colluvial slopes flanking hill country in the Aparima and Oreti river valleys. They are formed into predominantly deep loess, sometimes mixed with colluvium from the adjacent hill country. They have silty textures and are poorly drained, with a dense fragipan at a depth of about 50cm which restricts water drainage. These soils respond well to mole and tile drainage, and are presently used for pastoral farming with sheep, deer and beef cattle. Climate is cool temperate with cold winters and regular rainfall. Soils seldom dry out.

Soil classification

NZ Soil Classification (NZSC):

Fragic Perched-gley Pallic; stoneless, silty

Previous NZ Genetic Classification:

Weakly to moderately gleyed yellow-grey earth

Classification explanation

The NZSC of the Mossburn soils is consistent with the previous classification. Mossburn soils are poorly drained, due to perching of water on a dense fragipan. The subsoil above the fragipan also typically has high density, which limits root growth. Mossburn soils also have silty textures and P-retention of <30% throughout the profile, and are typically stone free

Soil phases and variants

Identified units in the Mossburn soils are:

- Mossburn undulating deep (MqU1): has no gravel within 90cm depth; occurs on slopes of 0–7°
- Mossburn rolling deep (MqR1): has no gravel within 90cm depth; occurs on slopes of 7–15°
- Mossburn undulating moderately deep (MqU2): has gravel between 45 and 90cm depth; occurs on slopes of 0–7°
- Mossburn rolling moderately deep (MqR2): has gravel between 45 and 90cm depth; occurs on slopes of 7–15°
- Mossburn hilly moderately deep (MqH2): has gravel between 45 and 90cm depth; occurs on slopes of 15–25°

The soil properties described in this Technical Data Sheet are based on the most common phase, Mossburn undulating deep (MqU1). 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., Mossburn hilly moderately deep (MqH2).

Associated soils

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

- Tauringatura: well drained shallow soil formed on mixed greywacke and tuffaceous greywacke bedrock and colluvium of the Taringatura Hills
- Lintley: well drained shallow soil, formed from gravelly fan alluvium
- Makarewa: poorly drained gley soil, formed in floodplain alluvium

Similar soils

Some soils that have similar properties to Mossburn soils are:

- Pukemutu: has silty clay subsoil with a fragipan that occurs below 60cm depth.
- Waikoikoi: occurs on terraces and downlands in the Gore, northern Southland, west and south Otago areas; formed in loess, with no influence of colluvium.
- Hokonui: has clayey textures, and formed in mixed loess and alluvium on fans from the Hokonui Hills; has perch-gley properties but no fragipan
- Sobig: moderately deep to shallow soil, occurring on high terraces and fans; has perch-gley properties, but this is due to gravels being clay-bound

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.

Mossburn profile	Horizon	Depth (cm)	Description
	Apg	0–26	Greyish yellow-brown silt loam; few bright brown mottles; weak soil strength; moderately developed medium to coarse prismatic and fine to medium polyhedral structure; abundant roots
	Bg	26–45	Light yellow silt loam; common bright brown and few light grey mottles; common worm casts; weak soil strength; moderately developed very fine to medium polyhedral and coarse prismatic structure; abundant roots
	BCx(g)	45–90+	Yellowish brown silt loam; few light grey mottles and veins; few bright brown mottles and selvages; firm soil strength; massive structure; few roots

Key profile features

Mossburn soils have a 18–25cm deep topsoil that has moderately developed structure. Subsoil structure is moderate to weak in the upper subsoil, abruptly changing in the lower subsoil to the massive structure of the fragipan. Greyish colours are dominant in the upper subsoil, indicating the poor 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
Apg	0–26	Moderate – High	<i>Moderate</i>	Silt loam	Gravel free
Bg	26–45	Moderate – High	<i>Slow</i>	Silt loam	Gravel free
BCx(g)	45–90+	Moderate – High	<i>Slow</i>	Silt loam	Gravel free

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

Key physical properties

Mossburn soils have a slightly deep potential rooting depth that is severely restricted by the fragipan at 45–60cm depth. The soils are poorly drained, with slow permeability in the subsoil and limited aeration during sustained wet periods. Textures are typically silt loams, and topsoil clay content is typically 25–30%. Deep phases are stone free, but gravel occurs between 45 and 90cm in moderately deep phases.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Apg	0–26	Moderate	Moderate	Moderate	Low	Moderate	Low	Very low	Low
Bg	26–45	Low	Moderate	Moderate	Low	Low	Moderate	Very low	Low
BCx(g)	45–90+	Moderate	Moderate	Moderate	Moderate	Low	High	Very low	Low

Key chemical properties

Topsoil organic matter content is 5.0–6.5%; P-retention 25–35% and pH moderate (mid–high 5s). Cation exchange is moderate with base saturation low. Available calcium levels are moderate with magnesium and potassium levels low. Reserve phosphorus and sulphur levels are also low. Micro nutrient 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
Structural compaction	severe	These soils have a severe vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the poor drainage, low clay and P-retention in the topsoil that results in low structural stability.
Nutrient leaching	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the moderately high water-holding capacity and slow permeability of the fragipan, but leaching risk can be increased by lateral mole and tile drains.
Topsoil erodibility by water	moderate	Due to the moderate to low clay content, topsoil erodibility in these soils is moderate. 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	severe	These soils have a severe vulnerability to waterlogging during wet periods. This rating reflects the poor drainage and slow permeability of the subsoil.

General landuse versatility ratings for Mossburn 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.

MqU1 (Mossburn undulating deep)

MqU2 (Mossburn undulating moderately deep)

Versatility evaluation for soil MqU1, MqU2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; restricted rooting depth
Arable	Limited	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
Intensive pasture	Limited	Risk of short-term waterlogging after heavy rain
Forestry	Limited	Inadequate aeration during wet periods; restricted rooting depth

MqR1 (Mossburn rolling deep)**MqR2 (Mossburn rolling moderately deep)**

Versatility evaluation for soil MqR1, MqR2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; restricted rooting depth
Arable	Limited	Inadequate aeration during wet periods; rolling slopes.
Intensive pasture	Limited	Risk of short-term waterlogging after heavy rain
Forestry	Limited	Inadequate aeration during wet periods; restricted rooting depth

MqH2 (Mossburn hilly moderately deep)

Versatility evaluation for soil MqH2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Risk of short-term waterlogging after heavy rain; hilly slopes
Forestry	Limited	Inadequate aeration during wet periods; 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 use 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 moisture condition and depth can be of benefit.

Soil profiles available for Mossburn soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
MjU1	ONT6	25	✓	✓	✓	✓
MjU2	ZT10	43	✓	✓	✓	✓
MjR2	159/75/51	25	✓			
MjR1	159/75/5	43	✓			

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