

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: **Scrubby Hill**

Overview

Scrubby Hill soils occupy about 800 ha in hill country east of the Maitara River from south of Wyndham to the Tokanui district. They are formed into deep loess above about 100m altitude. Soils are imperfectly drained, with a deep potential rooting depth and high plant available water, but are strongly leached, with podzolised properties. Present use is extensive pastoral grazing with sheep and beef cattle. Climate is cool temperate with exposure to southerly winds. Regular rain occurs throughout the year and soils rarely dry out.

Soil classification

NZ Soil Classification (NZSC):

Mottled-placic Acid Brown; stoneless; clayey over silty.

Previous NZ Genetic Classification:

Strongly leached yellow-brown earth.

Classification explanation

The NZSC of the Scrubby Hill soil is consistent with the previous classification. Scrubby Hill soils are strongly leached, with low base saturation, strong acidity (pH of <5.0), and podzolised properties (evidence of iron/organic matter accumulation in the upper subsoil). The soils are imperfectly drained and often have thin iron pans (placic pans) in the upper subsoils. They are typically stone free and have silty clay topsoils grading to silt loam in the subsoil.

Soil phases and variants

Identified units in the Scrubby Hill soils are:

- Scrubby Hill rolling deep (ShR1): has no gravel within 90cm depth; occurs on slopes of 7–15°
- Scrubby Hill undulating deep (ShU1): has no gravel within 90cm depth; occurs on slopes of 0–7°
- Scrubby Hill hilly deep (ShH1): has no gravel within 90cm depth; occurs on slopes of 15–25°

The soil properties described in this Technical Data Sheet are based on the most common phase, Scrubby Hill rolling deep (ShR1). 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., Scrubby Hill hilly deep (ShH1).

Associated soils

Some soils that commonly occur in association with Scrubby Hill soils are:

- Fortification: strongly leached moderately deep soil onto bedrock between 45 and 90cm depth
- Pukerau: strongly leached shallow soil onto bedrock within 45cm depth
- Haldane: moderately to strongly leached imperfectly drained soil formed in deep loess; does not have podzolised properties
- Otarua: moderately to strongly leached well drained soil formed in deep loess; does not have podzolised properties

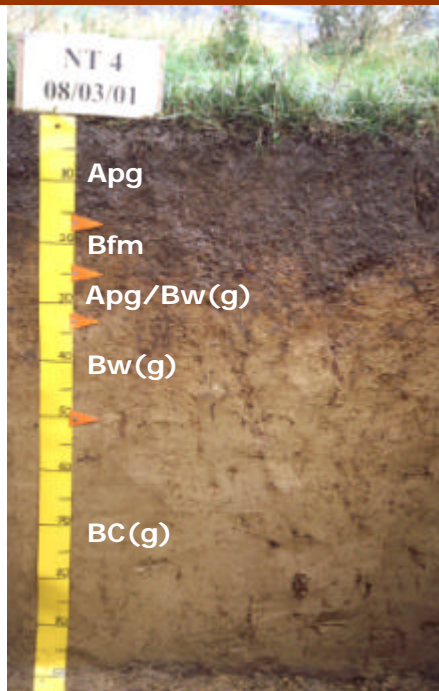
Similar soils

Some soils that have similar properties to Scrubby Hill soils are:

- Waipapa: near source loess; has loamy silt textures and occurs adjacent to the Mataura River south of Fortrose
- Ashers: very strongly leached podzolised soil formed in deep loess on the Southland plains
- Waihoaka: very strongly leached podzolised soil formed in deep loess on Bluff peninsula and slopes flanking the Logwood Range

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.

| Scrubby Hill profile | Horizon | Depth (cm) | Description |
|--|-----------|------------|---|
|  | Apg | 0–17 | Brownish black silty clay; common dark reddish brown mottles; few wormcasts; weak soil strength; strongly developed very fine to fine polyhedral structure; abundant roots. |
| | Bfm | 17–25 | Brownish black discontinuous placic pan; hard soil strength; massive structure; pan is wavy and fragmented; few roots between pan fragments. |
| | Apg/Bw(g) | 25–33 | Bright yellowish brown silt loam; few dull yellow-orange mottles; common dark reddish brown coats of iron/organic matter; many wormcasts; slightly firm soil strength; strongly developed very fine to medium polyhedral structure; many roots. |
| | Bw(g) | 33–50 | Bright yellowish brown silt loam; few light yellow and few brown mottles; few dark reddish brown coatings of iron/organic matter; few wormcasts; slightly firm soil strength; moderately developed moderate polyhedral structure; common roots. |
| | Bw(g) | 50–90+ | Dull yellow-orange silt loam; few light yellow and bright yellowish brown mottles; firm soil strength; massive structure; few roots. |
| | BC(g) | | |

Key profile features

Scrubby Hill topsoils are about 15–35cm deep with a strongly developed structure. Subsoil structure is moderately developed, grading to structureless in the lower subsoil. The upper subsoil has thin iron pans and coatings of translocated iron/organic matter that reflect the strongly leached nature of this soil.

Typical physical properties

Note: values in *Italics> are estimates*

| Horizon | Depth (cm) | Bulk density | Permeability | Texture | Gravel content |
|-----------|------------|-----------------|-----------------|------------|------------------------|
| Apg | 0–17 | Moderate | <i>Moderate</i> | Silty clay | Very slightly gravelly |
| Bfm | 17–25 | — | — | — | — |
| Apg/Bw(g) | 25–33 | Moderate | <i>Moderate</i> | Silt loam | Gravel free |
| Bw(g) | 33–50 | Moderate – High | <i>Moderate</i> | Silt loam | Gravel free |
| BC(g) | 50–90+ | Moderate – High | <i>Slow</i> | Silt loam | Gravel free |

Profile drainage: Imperfect

Plant readily available water: *High*

Potential rooting depth: Deep

Rooting restriction: Subsoil acidity and thin iron pans may be limiting (where they are continuous and not fragmented)

Key physical properties

Scrubby Hill soils have a deep rooting depth and high plant available water, although the subsoil acidity and aluminium toxicity may be limiting (particularly on less developed sites). The thin iron pans may also restrict roots where they are continuous. Soils are imperfectly drained, with slowly permeable subsoils that may cause short-term waterlogging after heavy rain. Textures are silty clays in the topsoil, grading to silt loams in the subsoil, with a topsoil clay content of 35–40%. No stones or gravels occur in these soils.

Typical chemical properties

| Horizon | Depth (cm) | pH | P retention | CEC | BS | Ca | Mg | K | Na |
|-----------|------------|----------|-------------|----------|----------|----------|----------|----------|-----|
| Apg | 0–17 | Moderate | High | High | Moderate | High | Moderate | Low | Low |
| Bfm | 17–25 | — | — | — | — | — | — | — | — |
| Apg/Bw(g) | 25–33 | Low | High | High | Very low | Low | Low | Low | Low |
| Bw(g) | 33–50 | Low | High | Moderate | Very low | Very low | Very low | Very low | Low |
| BC(g) | 50–90+ | Low | High | Moderate | Very low | Very low | Very low | Very low | Low |

Key chemical properties

Topsoil organic matter levels are about 16%, P-retention 60–80% and topsoil pH moderate (mid 5s), grading to low (<5.0) in the subsoil. Cation exchange values are high, and base saturation values moderate in the topsoil, but low in the subsoil. Topsoil available calcium values are high, magnesium values moderate and potassium values low. Available cations in the subsoil are low to very low. Soil reserve phosphorus levels are low. 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 | minimal | These soils have a minimal vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the high organic matter, clay content, and P-retention. |
| Nutrient leaching | slight | These soils have a slight vulnerability to leaching to groundwater. This rating reflects the imperfect drainage, slow permeability and high water-holding capacity. |
| Topsoil erodibility by water | slight | Due to the high 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. |
| 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 | moderate | These soils have a moderate vulnerability to waterlogging during wet periods. This rating reflects the imperfect drainage and slow permeability. |

General landuse versatility ratings for Scrubby Hill 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.

ShR1 (Scrubby Hill rolling deep)

| Versatility evaluation for soil ShR1 | | |
|--------------------------------------|--------------------|---|
| Landuse | Versatility rating | Main limitation |
| Non-arable horticulture | Moderate | Inadequate aeration during wet periods; vulnerability to sustained waterlogging |
| Arable | Limited | Rolling slopes |
| Intensive pasture | Limited | Subsoil acidity |
| Forestry | Moderate | Vulnerability to sustained waterlogging. |

ShU1 (Scrubby Hill undulating deep)

| Versatility evaluation for soil ShU1 | | |
|--------------------------------------|--------------------|--|
| Landuse | Versatility rating | Main limitation |
| Non-arable horticulture | Moderate | Inadequate aeration during wet periods; vulnerability to sustained waterlogging |
| Arable | Moderate | Inadequate aeration during wet periods; vulnerability to sustained waterlogging. |
| Intensive pasture | Limited | Subsoil acidity. |
| Forestry | Moderate | Vulnerability to sustained waterlogging. |

ShH1 (Scrubby Hill hilly deep)

| Versatility evaluation for soil ShH1 | | |
|--------------------------------------|--------------------|--|
| Landuse | Versatility rating | Main limitation |
| Non-arable horticulture | Unsuitable | Hilly slopes |
| Arable | Unsuitable | Hilly slopes |
| Intensive pasture | Limited | Subsoil acidity; hilly slopes |
| Forestry | Moderate | Hilly slopes; 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 use should be minimised during these periods.

Soil profiles available for Scrubby Hill soils

| Soil symbol | Profile ID | Topoclimate map sheet | Profile description available | Physical data available | Chemical data available | Profile photo available |
|-------------|------------|-----------------------|-------------------------------|-------------------------|-------------------------|-------------------------|
| NT4 | ShU1 | 30 | ✓ | ✓ | ✓ | ✓ |
| MWT21a | ShR1 | 28b | ✓ | ✓ | | |

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

Copyright © 2002, Crops for Southland

This Technical Data Sheet may be reproduced in whole or in part and in any form for educational or non-profit purposes without special permission from the copyright holder, provided acknowledgement of the source is made. Crops for Southland and Environment Southland would appreciate receiving a copy of any publication that uses this Technical Data Sheet as a source.

No use of this Technical Data Sheet may be made for resale or for any other commercial purpose whatsoever without prior permission in writing from Crops for Southland.

Crops for Southland
PO Box 1306, Invercargill. New Zealand



www.cropssouthland.co.nz