Soil name: Ardlussa

Overview

Ardlussa soils occupy about 6700ha on the slowly accumulating floodplains and low terraces of the major rivers in northern Southland and west Otago. They are formed into moderately deep to deep fine alluvium over gravel. These soils are generally well drained, with good rooting depth. Ardlussa soils are suitable for a wide range of farming activities. Climate is temperate with occasional dry periods during some summers.

Soil classification

NZ Soil Classification (NZSC):	Pallic Orthic Brown; with stones; silty over skeletal
Previous NZ Genetic Classification:	Recent soil

Classification explanation

Ardlussa soils were previously classified as Recent soils, but were reclassified as Brown soils due to the presence of a weathered and well structured B horizon. Subsoils have no major rooting barrier, and typically have a gravelly layer below 45cmdepth.

Soil phases and variants

Identified units in the Ardlussa soils are:

- Ardlussa undulating moderately deep (AdU2): has gravel between 45-90cm deep and slopes of 0-7°
- Ardlussa undulating moderately deep, imperfectly drained variant (AdU2vi): has imperfect drainage, gravel between 45-90cm depth, and slopes of 0-7°
- Ardlussa undulating deep (AdU1): has no gravel within 90cm depth and slopes of 0-7°
- Ardlussa undulating deep, imperfectly drained variant (AdU1vi): has imperfect drainage, no gravel within 90cm depth, and slopes of 0-7°

The soil properties described in this Technical Data Sheet are based on the most common phase, Ardlussa undulating moderately deep (AdU2). Values for other phases and variants can be taken as being similar.

Associated soils

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

- Mataura: well drained, deep or moderately deep recent soils found on the accumulating floodplain
- Gore: well drained stony soils found on similar landforms as the Ardlussa soils
- Jacobstown: poorly drained due to high groundwater. Silty textures.
- Fleming: poorly drained due to water perching on fragipan

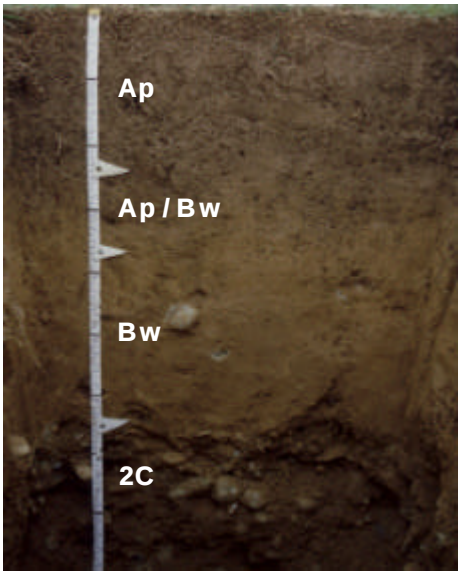
Similar soils

Some soils that have similar properties to Ardlussa soils are:

- Winton: occurs on low terraces and floodplains in the lower Oreti Valley, south of Dipton; forming into alluvium, but have clayey textures and P-retention of less than 30%.
- Charlton: imperfectly drained soils of the Mataura Valley, south of Gore. Equivalent soil to the Ardlussa, imperfectly drained variant.
- Crookston: occurs on intermediate to high terraces. Although they have similar NZSC, Crookston soils are formed on windblown loess of greater than 45cm depth.

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.

Ardlussa profile	Horizon	Depth (cm)	Description
	Ap	0-24	Greyish yellow-brown silt loam; weak soil strength; strongly developed fine polyhedral structure; abundant roots
	Ap/Bw	24-36	Dull yellowish brown silt loam; many worm casts; weak soil strength; strongly developed fine to medium blocky stucture; abundant roots
	Bw	36-65	Dull yellowish brown slightly gravelly silt loam; few worm casts; slightly firm soil strength; moderately developed medium to coarse polyhedral structure; many roots
	2C	65-90	Greyish yellow-brown very gravelly sandy loam; compact particle packing; massive structure; gravel rounded and slightly weathered; few roots

Key profile features

Ardlussa soils have well developed topsoils 20–25cm thick, and moderate to stong structure. Subsoils also have moderate to strong structure, that results in good root distribution. The yellow-brown colours of the subsoil reflect the weathered B horizon that is typical of these soils. Ardlussa soils commonly have gravelly layers between 45-90cm depth.

Typical physical properties

Note: values in Italics are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0-24	Moderate	*Moderate*	Silt loam	Gravel free
Ap/Bw	24-36	Moderate – High	*Moderate*	Silt loam	Gravel free
Bw	36-65	High	*Moderate*	Silt loam	Very slightly gravelly
2C	65-90	N/A	*Rapid*	Sandy loam	Very gravelly

Profile drainage: Well

Plant readily available water: *Moderately high*

Potential rooting depth: Moderately deep

Rooting restriction: Root growth may be restricted by high density and gravelly subsoil

Key physical properties

These soils have a moderately deep potential rooting depth, limited by gravel and high density in the subsoil. Ardlussa soils have moderately high available water and are well drained, with few aeration limitations except in the imperfectly drained variant, which can be wet in winter. Textures are generally light silt loams, with clay content of 15-25% in the topsoil. The deep phase will have deep rooting depth and high plant readily available water.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0-24	Moderate	Moderate	Moderate	Moderate	Moderate	Low	Very low	Very low
Ap/Bw	24-36	Moderate	Moderate	Moderate	Low	Low	Very low	Very low	Very low
Bw	36-65	Moderate	Moderate	Moderate	Low	Very low	Very low	Very low	Very low
2C	65-90	Moderate	Low	Very low	Very low	Very low	Very low	Very low	Very low

Key chemical properties

Topsoil organic matter levels are 4-7%; P-retention values 25-45%; pH values mostly above 5.5; moderate to low cation exchange capacity and base saturation values, which decrease down the profile. Natural reserves of phosphorus, potassium, sulphur, and magnesium are low to moderate. Micro-nutrient 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	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 good drainage, but low clay and P-retention in the topsoil that results in low structural stability. The imperfectly drained variant will have severe vulnerability
Nutrient leaching	Moderate	These soils have a moderate vulnerability to leaching to ground water. The vulnerability is due to the moderate permeability and moderately high water holding capacity.
Topsoil erodibility by water	Slight	Due to the low 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 slight vulnerability to waterlogging during wet periods. This rating reflects the good drainage and moderate permeability. The imperfectly drained variant will have moderate vulnerability to waterlogging.

General landuse versatility ratings for Ardlussa soils

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

AdU2 (Ardlussa undulating moderately deep)
AdU1 (Ardlussa undulating deep)
AdU1vi (Ardlussa undulating deep, imperfectly drained variant)

Versatility evaluation for soil AdU2, AdU1, AdU1vi		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Subsoil root penetrability for deep rooting crops
Arable	Moderate	Vulnerability to soil structure degradation and risk of flooding
Intensive pasture	Moderate	Vulnerability to soil structure degradation and risk of flooding
Forestry	Low	Risk of flooding

AdU2vi (Ardlussa undulating moderately deep, imperfectly drained variant): as above, except that main limitations for arable and non-arable horticulture are inadequate aeration for sustained periods and vulnerability of topsoil to structural degradation by cultivation and compaction.

Management practices that may improve soil versatility

- Cultivation and intensive stocking or vehicular traffic should be minimised during wet periods.

Soil profiles available for Ardlussa soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
Adu1	H1	3	✓	✓	✓	✓
AdU1	ET18	28a	✓	✓	✓	✓
AdU1	TT2	23	✓	✓	✓	✓
AdU1	ZT7	43	✓	✓	✓	✓
AdU2	FT5	15	✓	✓	✓	✓
AdU2	H4	3	✓	✓	✓	✓
ADu2	MWT2	28b	✓	✓	✓	✓
AdU2	VT2	2	✓	✓	✓	✓
AdU2	VT2	2	✓	✓	✓	✓
AdU2	VT8	2	✓	✓	✓	✓
AdU2	XT1	13	✓	✓	✓	✓
AdU2vi	TT9	23	✓	✓	✓	✓

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