Soil name: Dipton

Overview

Dipton soils occupy about 5,000 ha on intermediate and high terraces in northern and western Southland. They are shallow soils formed in a thin layer of loess that overlies weathered greywacke and schist gravels. They are poorly drained shallow soils with stony subsoils. They have a clayey texture in the subsoil which retains moisture well and makes them less prone to summer droughts. Natural fertility is not high and soils respond to lime and phosphate. They are suited to pastoral farming and some cropping.

Soil classification

NZ Soil Classification (NZSC):	Argillic Perch-gley Pallic; rounded-stony; hard sandstone; silty
Previous NZ Genetic Classification:	Moderately leached yellow-grey earth

Classification explanation

The NZSC OF Dipton soils is consistent with previous classifications. Dipton soils have a firm clay-enriched subsoil that is slowly permeable and causes poor drainage and perching of water. Gravel typically occurs within 45cm depth, with heavy silt loam textures.

Soil phases and variants

Identified units in the Dipton soils are:

- Dipton undulating shallow (DpU3): contains gravel within 45cm depth and occurs on slopes of 0–7º

The soil properties described in this Technical Data Sheet are based on the most common phase, Dipton undulating shallow (DpU3). Values for other phases and variants can be taken as being similar.

Associated soils

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

- Kaweku: well drained, shallow soils on high terraces
- Waikoikoi: moderately deep to deep; poorly drained due to fragipan
- Oreti: well drained, shallow soils on intermediate terraces
- Glenure: moderately deep to deep; poorly drained; without a fragipan

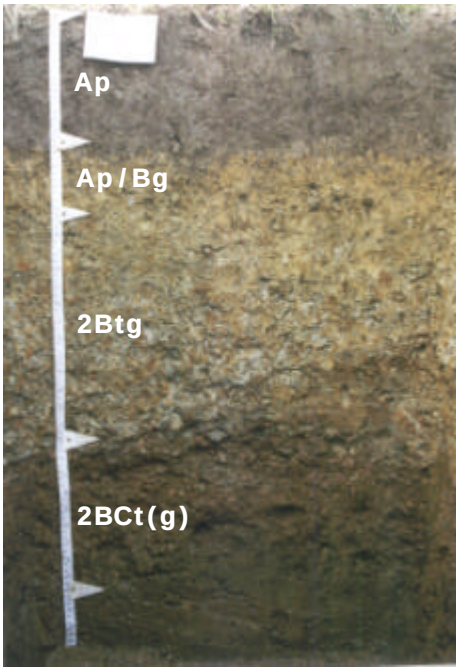
Similar soils

Some soils that have similar properties to Dipton soils are:

- Lumsden: on floodplains and low terraces; poorly drained due to high groundwater.
- Caroline: has a cemented iron pan in the subsoil
- Longridge: on fans
- Sobig: moderately deep soil on high terraces from 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.

Dipton profile	Horizon	Depth (cm)	Description
	Ap	0–20	Dark greyish brown slightly gravelly silt loam; weak soil strength; moderately developed medium blocky structure; abundant roots
	Ap/Bg	20–30	Olive yellow slightly gravelly silt loam; few pale yellow mottles; many worm casts; weak soil strength; moderately developed medium blocky structure; gravel slightly weathered; many roots
	2Btg	30–63	Greyish olive very gravelly silty clay; common pale yellow mottles; compact particle packing; weakly developed medium blocky structure; gravel moderately weathered; few roots
	2BCt(g)	63–90	Reddish yellow extremely gravelly clay loam; common yellow mottles; dense particle packing; massive structure; gravel moderately weathered; no roots

Key profile features

Dipton soils have a 15–25cm deep topsoil with a moderate to weak structure. The subsoil has moderate structure, grading to structureless below 50cm depth. Gravel occurs throughout the soil, and is typically moderately weathered. Clay has accumulated in the subsoil, resulting in clayey textures. The greyish olive subsoil colours reflect the poor drainage, due to water perching on a dense, clay enriched subsoil horizon.

Typical physical properties

Note: values in Italics are estimates

Horizon	Depth (cm)	Bulk density	Permeability	Texture	Gravel content
Ap	0–20	Moderate – High	*Moderate*	Silt loam	Slightly gravelly
Ap/Bg	20–30	Moderate – High	*Moderate*	Silt loam	Slightly gravelly
2Btg	30–63	–	*Slow*	Silty clay	Very gravelly
2BCt(g)	63–90	–	*Slow*	Clay loam	Extremely gravelly

Profile drainage: Poorly drained
Plant readily available water: *Moderately high*
Potential rooting depth: Moderately deep
Rooting restriction: Extremely gravelly subsoil

Key physical properties

Rooting depth is moderately deep and plant available water is moderately high, being limited by the gravelliness of the lower subsoil. Permeability is moderate, grading to slow in the dense lower subsoil. Textures grade from heavy silt loams in the topsoil to silty clay and clay loams in the subsoil. Topsoil clay content is 30–40%. Topsoils are commonly slightly gravelly, with very gravelly horizons occurring within 45cm depth.

Typical chemical properties

Horizon	Depth (cm)	pH	P retention	CEC	BS	Ca	Mg	K	Na
Ap	0–20	Moderate	Low	Moderate	Very high	Moderate	Low	Very low	Very low
Ap/Bg	20–30	Moderate	Low	Low	Moderate	Moderate	Very low	Very low	Low
2Btg	30–63	Moderate	Low	Low	Moderate	Moderate	High	Very low	Low
2BCt(g)	63–90	Moderate	Moderate	Low	Moderate	Low	Very high	Very low	Low

Additional chemical properties (as a profile average)
Reserve potassium values are low; reserve phosphorus are low-medium; sulphate sulphur values increase to high levels in the subsoil.

Key chemical properties

Topsoil organic matter levels are about 5%; P-retention values 25% in topsoil increasing to 50% in the subsoil; pH values medium but tending to decrease down the profile. Cation exchange values are medium with base saturation values high. Reserves of phosphorus and potassium are low, but there are high levels of sulphate sulphur in the subsoil. Magnesium levels are adequate. Nitrogen fertiliser is required if maximum crop or pasture growth is desired. Trace elements are adequate, although brassicas may respond to boron and legumes to molybdenum.

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 poor drainage and low topsoil P-retention.
Nutrient leaching	Slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the moderately high water-holding capacity and the slow subsoil permeability
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	Severe	These soils have a severe vulnerability to waterlogging during wet periods. This rating reflects poor drainage and slowly permeable subsoil.

General landuse versatility ratings for Dipton 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.

Dp U3 (Dipton undulating shallow)

Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
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; 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 should be minimised during these periods.
- Installation and maintenance of sub-surface mole and tile drains will reduce the risk of short-term waterlogging.

Soil profiles available for Dipton soils

Soil symbol	Profile ID	Topoclimate map sheet	Profile description available	Physical data available	Chemical data available	Profile photo available
DpU3	FT9	15	✓	✓	✓	✓
DpU3	FT14	15	✓	✓	✓	✓
DpU3	B10	12	✓	✓	✓	✓
DpU3	M3163	26	✓	✓	✓	✓
DpU3	159/75/17	43	✓			

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