Soil name: Papatotara

Overview

Papatotara soils occupy about 1900 ha on low and intermediate terraces in the lower Waiau valley. They are formed into alluvium from basic igneous and metamorphic rocks as well as from greywacke, derived from the Fiordland and Takitimu Mountains. These soils are well drained, with deep rooting depth and high plant available water. The soils typically have silt loam texture, but are characterised as having variable texture, reflecting their alluvial origin. They are highly productive soils currently used for sheep, dairy, beef and deer production and would be suited to intensive cropping. Climate is cool temperate with regular rain over the year.

Papatotara profile

Physical properties

Papatotara soils have a moderately deep rooting depth, and high plant available water, being limited by the subsoil gravels at 45–90cm depth. The deep phases will have no restrictions to root growth. The soils have good aeration and permeability throughout the profile. Textures are silt loams, but are variable and can include horizons of silty clays, clay loams, and loamy silts. Topsoil clay content is 30–40%.

Fertility properties

Topsoil organic matter levels are 7–13%, P-retention typically >85%, but does include soils with 60–80% P-retention. Soil pH is moderate (low to high 5s). Cation exchange values are high and base saturation low. Available calcium and magnesium levels are low with magnesium levels moderate. Reserve phosphorus levels are low. Micronutrient levels are generally adequate.

Associated and similar soils

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

- Glenelg: shallow soil forming into terrace gravels
- Braxton: moderately deep to deep poorly drained soil of the terraces
- Tuatapere : moderately deep to deep soils on the floodplain

Some soils that have similar properties to Papatotara soils are:

- Pourakino: intergrade between Brown and Allophanic soils, with P-retention of 70–85%; formed in consistently silty loess in the Pourakino river valley
- Princhester: intergrade between Brown and Allophanic soils, with P-retention of >85%; formed in basic volcanic and greywacke alluvium on fans in The Key area.
- Drummond: non-allophanic soil that has been significantly influenced by mafic volcanic parent material; occurs in the Aparima, and on intermediate terraces in the lower Waiau river valleys

Sustainable management indicators

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 good drainage, high P-retention, and moderate to high clay content.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the well drained nature of the soil that is off-set by the high water-holding capacity.
Topsoil erodibility by water	minimal	Due to the high organic matter and moderate to high clay content, topsoil erodibility in these soils is minimal. 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	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the good drainage and permeability.

General landuse versatility ratings

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

PpU2 (Papatotara undulating moderately deep)

Versatility evaluation for soil PpU2		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Restricted rooting depth
Arable	High	No major limitation
Intensive pasture	Moderate	Vulnerability to leaching to ground water
Forestry	Moderate	Restricted rooting depth

PpU1 (Papatotara undulating deep)

Versatility evaluation for soil PpU1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	High	No major limitation
Arable	High	No major limitation
Intensive pasture	Moderate	Vulnerability to leaching to ground water
Forestry	High	No major limitation

Management practices that may improve soil versatility

- Management of nutrient applications so as to minimise leaching losses