Soil name: Popotunoa

Overview

Popotunoa soils occur in association with Charlton soils on infrequently flooded low terraces in the Clydevale district. They are formed into moderately deep to deep fine alluvium over gravel. Soils are well drained, with deep to moderately deep rooting depth, high plant available water, and have loamy silt textures. Present use is pastoral grazing with sheep and dairy cattle and some cropping. Climate is temperate with warm summers. Soils occasionally dry out.

Popotunoa profile

Physical properties

Popotunoa soils have a deep rooting depth (90–120 cm), with high plant available moisture. Aeration is moderate, but the lower subsoil is slowly permeable and is likely to cause short-term waterlogging after heavy rainfall. The soils have high bulk density throughout the profile. Textures are loamy silt, with a topsoil clay content of 15–18%. Deep soils are stoneless. Moderately deep soils have gravel below 45cm depth, restricting the rooting depth to moderately deep (60–90cm) and moderately high water availability.

Fertility properties

Topsoil organic matter levels are about 4–5%, P-retention 10–25% and pH moderate (high 5s). Topsoil cation exchange values are moderate, with base saturation high and moderate available calcium levels. Magnesium and potassium levels are low. Subsoil nutrient levels are low. Soil reserve phosphorus and sulphur levels are low. Micronutrient levels are generally adequate.

Associated and similar soils

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

- Charlton: imperfectly drained equivalent of the Popotunoa soil
- Jacobstown: poorly drained floodplain soil
- Mataura: well drained, deep or moderately deep recent soils found on the accumulating floodplain

Some soils that have similar properties to Popotunoa soils are:

- Ardlussa: shows greater weathering, with higher P-retention in subsoil of >30%.
- Winton: occurs on the floodplain and low terraces of the Oret River; has heavy silt loam textures

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

PnU1 (Popotunoa undulating deep)
PnU2 (Popotunoa undulating moderately deep)

Versatility evaluation for soil PnU1, PnU2		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Vulnerability to topsoil structural degradation by cultivation and compaction; potential flood risk
Arable	Limited	Vulnerability to topsoil erosion
Intensive pasture	Moderate	Vulnerability to topsoil structural degradation by cultivation and compaction; vulnerability to leaching to groundwater.
Forestry	Limited	Vulnerability to topsoil erosion; potential flood risk.

Management practices that may improve soil versatility

- Cultivation should be carefully managed to minimise structural degradation and topsoil erosion.
- Intensive stocking, cultivation and heavy vehicular traffic use should be minimised during these periods.
- Topsoil organic matter levels should be carefully maintained and enhanced
- Long-term flood protection.
- Management of nutrient applications so as to minimise leaching losses