Soil name: Otama

Overview

Otama soils occupy about 1700ha as isolated areas on terraces in the Mataura valley between Garston and Mataura Island and near Clydevale in the Clutha valley. They are formed into near-source wind-deposited loess, and in some locations they occur as dunes. Otama soils are well to imperfectly drained, have a deep rooting depth, high water holding capacity, and loamy silt textures. Present use is pastoral farming with sheep, dairy and beef cattle with some cropping. They have a cool temperate climate and receive regular rain over the year. Soils located further inland can be dry over the summer.

Otama profile

Physical properties

Otama soils have a deep rooting depth and high plant available water, although the firm lower subsoil may limit root growth. The soils are moderately well to imperfectly drained, with a compact subsoil which is slowly permeable and may cause short-term waterlogging after heavy rainfall. Texture is loamy silt throughout, although sandy loam may occur in some soils. The topsoil clay content is 20–25%.

Fertility properties

Topsoil organic matter levels are 4–6.5%; P-retention 15–34% and pH moderate (high 5s). Soil pH tends to increase with depth. Cation exchange is low and base saturation low to moderate. Available calcium, magnesium and potassiom are generally low. Reserve phosphorus levels are low. Micronutrient levels are generally adequate, although molybdenum responses in legumes and boron responses in brassicas can occur.

Associated and similar soils

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

- Clydevale: imperfectly drained soil formed in silty near-source loess with a subsoil fragipan
- Arthurton: imperfectly drained deep Brown soil; has intergrade properties between Pallic to Brown soils; has dominantly silt loam textures
- Oreti: shallow, stony soil of the intermediate terraces.

Some soils that have similar properties to Otama soils are:

- Nokomai: very similar, but does not have bands of accumulated clay in the subsoil
- Tuturau: formed in near-source loamy silt loess from the Mataura river, south of Gore; is a Brown soil because it occurs in a moister environment
- Crookston: well drained deep Brown soil; has intergrade properties between Pallic and Brown soils; has dominantly 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 clay, P-retention and organic matter content.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the good drainage, offset by the slow subsoil permeability and high water holding capacity.
Topsoil erodibility by water	severe	Due to the low organic matter and clay 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 and the slow 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.

OmR1 (Otama rolling deep)

Versatility evaluation for soil OmR1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Moderate	Vulnerability of topsoil to structural degradation by cultivation and compaction; rolling slopes
Arable	Limited	Vulnerability of topsoil to erosion by water; rolling slopes
Intensive pasture	Moderate	Vulnerability of topsoil to structural degradation by cultivation and compaction; restricted subsoil root penetrability
Forestry	Limited	Vulnerability of topsoil to erosion by water .

OmU1 (Otama undulating deep): as above, but slope is not an issue for arable and non-arable horticulture, though restricted subsoil root penetrability is a limitation for non-arable horticulture.

OmH1 (Otama hilly deep)

Versatility evaluation for soil OmH1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Unsuitable	Hilly slopes
Arable	Unsuitable	Hilly slopes
Intensive pasture	Limited	Hilly slopes
Forestry	Limited	Vulnerability of topsoil to erosion by water.

OmS1 (Otama steep deep): as for hilly phase above, but steep slopes are main limitation for all landuses and topsoil erosion by water, plus steep slopes, for forestry.

Management practices that may improve soil versatility

- Over-cultivation of dry soils may allow erosion by wind and water
- Management of nutrient applications so as to minimise leaching losses, such as avoiding very high rates of fertiliser addition in a single application and not applying very water-soluble fertilisers (i.e., nitrogen) when soils are excessively wet.
- Careful management after heavy rain and wet periods will reduce the impact of short-term water logging and structural compaction. Intensive stocking, cultivation and heavy vehicular traffic use should be minimised during these periods.