Soil name: Clydevale

Overview

Clydevale soils occupy about 970 ha on downlands in the Clydevale district of south Otago. They also occur on a considerable area on the north side of the Clutha river that was outside the Topoclimate survey area. They are formed in near source wind deposited loess derived from schist rock. These soils are deep, silty, imperfectly drained soils with a fragipan in the subsoil. Present use is pastoral grazing with sheep and dairy and some cropping. Regular rain occurs in most years but soil can occasionally dry out in dry summers.

Clydevale profile

Physical properties

Clydevale soils have a moderately deep potential rooting depth that is severely restricted by the fragipan at 60–70cm depth. The soils are imperfectly drained, with slow permeability in the subsoil and limited aeration during wet periods. Textures are mainly light silt loams with loamy silt common in the subsoil. Topsoil clay content is 15–25% and decreases in lower horizons. The soil is stone free.

Fertility properties

Topsoil organic matter levels are 6–7%; P-retention values 20–30% and pH values moderate (high 5s). Subsoil pH values decrease to low–mid 5 range. Cation exchange values are moderate and base saturation high in the topsoil but both decrease in the subsoil. Available magnesium and potassium values are low. Reserves of phosphorus are low. Micro nutrient levels are generally adequate although boron responses in brassicas and molybdenum responses in legumes can be expected.

Associated and similar soils

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

- Pukeawa: shallow soil, with thin loess over greywacke bedrock
- Jacobstown: poorly drained soil formed in alluvium; on floodplains with high groundwater
- Pomahaka: recent soil formed into silty alluvium of the Clutha river

Some soils that have similar properties to Clydevale soils are:

- Otama: moderately well to imperfectly drained soil formed in near source loess; the fragipan is absent, and clay accumulation is evident in the subsoil
- Nokomai: well drained soil formed in near source loess; fragipan is absent and there is no evidence of clay accumulation
- Warepa: imperfectly drained equivalent of the Waikoikoi soil; formed in distal loess with silt loam textures
- Waikoikoi: poorly drained, with a fragipan

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 havea severe vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the imperfect drainage and low P-retention and low clay content.
Nutrient leaching	slight	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the slow permeability and moderately high water-holding capacity.
Topsoil erodibility by water	slight	Due to the organic matter 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	moderate	These soils have a moderate vulnerability to waterlogging during wet periods. This rating reflects the imperfect drainage and slow permeability of the subsoil fragipan.

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.

CvU1 (Clydevale undulating deep)

Versatility evaluation for soil CvU1		
Landuse	**Versatility rating**	**Main limitation**
Non-arable horticulture	Limited	Inadequate aeration during wet periods; restricted rooting depth
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	Moderate	Vulnerability of topsoil to structural degradation; restricted rooting depth

CvR1 (Clydevale rolling deep)

Versatility evaluation for soil CvR1		
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; rolling slopes
Intensive pasture	Limited	Risk of short-term waterlogging after heavy rain
Forestry	Moderate	Vulnerability of topsoil to structural degradation; restricted rooting depth

CvH1 (Clydevale hilly deep): the hilly phase is rated as unsuitable for non-arable horticulture and arable land uses, and has limited versatility for intensive pasture, due to the slope limitation. The rating for forestry remains the same as for the rolling phase.

Management practices that may improve soil versatility

- Careful management after heavy rain and wet conditions will reduce the impact of short-term waterlogging. Intensive stocking, cultivation and heavy vehicular traffic use should be minimised during these periods.
- Installation and maintenance of subsurface mole and tile drains will reduce the risk of short-term waterlogging.
- If compaction occurs, aeration at the correct depth and moisture condition can be of benefit.