Mature rhyolite ash soils

Soil types in this group

- Hobsonville clay loam – HV
- Otao silt loam – OL
- Otao mottled silt loam – OLm

This fact sheet uses NZ Soil Bureau map series soil type names and abbreviations.

Otao silt loam (OL) soil profile *Photo: Ian Hanmore*

Features of mature rhyolite ash soils

- These soils, formed on rhyolitic ash blown from central North Island volcanoes, are also known as yellow brown loams (OL, OLm) and brown granular loams (HV)
- They are part of the Waitemata soil suite
- Ash from eruptions washed downhill and was deposited on floodplains, where water mixed it with river alluvium from other sources
- These soils occur in complex mosaics with other soil types, including peat that has been created in basins and side valleys that have been blocked by floodplain deposits
- These soils vary in their degree of leaching and podzolisation

Structure and drainage management

Issues	Management tips
Subsoil drainage can be impeded, even on what appears to be well drained high ground	Avoid overstocking and heavy stock to prevent winter pugging and subsequent soil and pasture damage
Soil in hollows prone to winter waterlogging are gleyed	Maintaining good pasture covers helps build soil organic matter and improve soil structure
Where soils have formed under thick kauri stands, acid leaching has created an impenetrable clay-rich subsoil	Use of gravel/concrete or naturally hard areas as standoff pads can also conserve soil structure, allowing livestock to be removed from paddocks on very wet days
Topsoil structure can break down under cultivation	Cross-slope diversion drains, armoured or grassed waterways, sediment traps and cropping rotations can improve or maintain soil structure
Continuous cropping is likely to result in loss of soil structure and compaction	Rotate land use between grazing and cropping to reduce soil compaction

Erosion control

Erosion risks	Soil type	Specific problems	Possible solutions
Sheet erosion	All mature rhyolite ash soils	Where podzolisation and leaching are greater, there is increased risk of topsoil loss to waterways Areas prone to winter wetness are more at risk Frequent cropping with inadequate drainage measures in place increases the risk of sheet erosion	Restore and create wetlands in less productive low-lying areas to trap sediment Avoid seepage areas when cultivating these soils Manage pugging carefully, and consider options for removing stock from paddocks on very wet days to avoid increasing erosion risk by sealing soil surface
Rill erosion	All mature rhyolite ash soils	Where rill erosion exposes underlying rock and subsoils, this increases soil variability and complicates management Frequent cropping with inadequate drainage measures in place also leads to rill erosion	Plan drainage infrastructure to control down-slope flow of water, preferably before cropping
Gully erosion	All mature rhyolite ash soils	Concentrated water flow can cause gullies to extend upslope and expand as the side walls collapse	Retain vegetative cover in gullies Plant willows in a zig- zag pattern either side of the gully to reduce instability

Otao soils on Oromahoe terraces *Photo: Ian Hanmore*

Nutrient management

Soil type	Nutrient status	Management strategies
All mature rhyolite ash soils	Mature rhyolite soils are naturally infertile; the older the soil, the lower the supply of trace elements (copper, iron, etc) and macronutrients (nitrogen, phosphorous, potassium, etc) Less clay means nutrients are not bound and are therefore more available to plants	Micronutrient supplementation may be required to maintain stock health (e.g. bolus) Little and often application of fertiliser is ideal to avoid leaching and improve nutrient utilisation
All mature rhyolite ash soils	Organic matter levels are naturally high	Nutrients are generally available to plants, but N,P,K fertilisers will be required to maintain good pasture growth
All mature rhyolite ash soils	These soils generally have a lower than optimal pH	Lime is required to retain optimal pH. Regular soil testing will confirm whether previous lime applications have shifted pH

Drainage classes

Soil symbol	Full name	Drainage class
WAITEMATA SUITE Basement rock: rhyolitic ash, usually mixed with alluvium		
HV	Hobsonville clay loam	3⇌4 - Well to moderately well drained
OL	Otao silt loam	3⇌4 - Well to moderately well drained
OLm	Otao mottled silt loam	2⇌1 - Imperfectly to poorly drained

Northland soil factsheet series

- Northland's climate, topography, historic vegetation and mixed geology have combined to form a complex pattern of soils across the region. There are over 320 soil types in Northland. Other regions in New Zealand average only 20 soil types per region.
- The information in this fact sheet is based on a 1:50,000 mapping scale. Therefore, it is not specific to individual farms or properties. However, it may help you to understand general features and management options for recent alluvial soils.
- Knowing your soils' capabilities and limitations is the key to sustainable production in Northland. Northland Regional Council (NRC) land management advisors are available to work with landowners to provide free soil conservation advice, plans and maps specific to your property.
- Regular soil tests are recommended. If you are concerned about your soil structure or health, the Visual Soil Assessment test could be useful. Contact the land management advisors at Northland Regional Council for more information.
- Further background information about the processes that have formed these soils can be found here: **www.nrc.govt.nz/soilfactsheets**