

# Old semi-volcanic soils

## Soil types in this group

- Aranga clay – AR
- Awarua clay - AW
- Cornwallis clay – CW, CWH\*
- Hihi clay – HI
- Hihi gravelly clay – HIg
- Rangioru red brown clay – RUr, RUrH\*
- Rangioru clay – RU, RUH\*

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

\*The H denotes the hill variant of this soil type, which occurs on slopes over 20° and has a shallower profile



*Rangioru clay (RU, RUH) soil profile*

## Features of old semi-volcanic soils

- These old semi-volcanic soils are a complex group formed on lava, breccia, scoria and ash
- They were created from loose volcanic rubble deposited by rivers on alluvial fans and terraces
- They are part of the Huia, Katui and Te Kie suites
- These old soils are weathered, and all are strongly to very strongly leached
- Topsoils are generally shallow, very friable and free draining
- Subsoils are heavy clay with high aluminium and iron concentrations which limit plant root depth penetration due to toxicity
- While topsoils are free-draining, the sticky kaolin clay subsoils impede drainage
- Shallow topsoils and limited root depth reduce drought resilience of pastures

## Structure and drainage management

Issues	Management tips
Shallow, very friable (crumbly) topsoils are drought prone	Avoid overgrazing of pasture and maintain a dense pasture cover to help build soil organic matter, improve soil structure and retain moisture in the soil
Friable topsoils sit overtop heavy, low-pH clay, rich in iron/aluminium that can be at toxic levels, discouraging root penetration (even pines) at low pH	Raising pH will reduce fixation effects of iron/aluminium, and reduce the toxicity, allowing plant roots to better penetrate into subsoil
Pugging, compaction and soil surface crusting in summer reduces water filtration and oxidation within soils. Nutrients become less available to plant roots	Careful winter grazing management to minimise pugging is important on these soils

## Erosion control

Erosion risks	Soil type	Specific problems	Possible solutions
Sheet & rill erosion	All old semi-volcanic soils	Where soils have been exposed or cultivated, rills can develop on slopes during high rainfall, eroding topsoil  Exposed subsoils are very hard to re-grass or revegetate	Maintain dense pasture cover to prevent surface erosion  Early control of erosion on these soils to prevent loss of productive topsoil is critical
Gully erosion	All old semi-volcanic soils	High-intensity rainstorms can cause gullies to develop or worsen	Avoid constructing drains or tracks in areas which are prone to gullying  Plant willows in a zig-zag pattern along gullies for stabilisation
Streambank erosion	All old semi-volcanic soils	Collapsing stream banks release large amounts of fine sediment (including colloidal clay) to water	Fence streams to prevent stock access and get advice on planting options



Rangiuru soils, Taurikura

## Nutrient management

Soil type	Nutrient status	Management strategies
All old semi-volcanic soils	Naturally low fertility and very high phosphate fixation (binding to soil) which reduces plant - available phosphate	After optimal soil fertility is achieved, which could require large capital application, apply fertiliser on a little and often basis to provide regular inputs
All old semi-volcanic soils	These soils are deficient in micronutrients due to very high aluminium/iron coupled with advanced leaching	Seek advice from your fertiliser consultant and vet for micronutrient requirements
All old semi-volcanic soils	Weathering/leaching has made these soils very acidic. Low pH also increases phosphate fixation	Regular and generous additions of lime will be required to raise pH, reducing plant-toxic loads of iron/aluminium and helping phosphate bound to soil particles become more available to plants

## Drainage classes

Soil symbol	Full name	Drainage class
<b>HUIA SUITE</b> Basement rock: Tangihua volcanics Rubbly volcanic material from Whangaroa, Whangarei Heads, Dome Valley, Waitakeres		
CW, CWH	Cornwallis clay	2⇒1 - Imperfectly to poorly drained
HI	Hihi clay	2⇒1 - Imperfectly to poorly drained
Hlg	Hihi gravelly clay	2⇒1 - Imperfectly to poorly drained
<b>KATUI SUITE</b> Basement rock: Tangihua volcanics Andesite lava flows on inland slopes of volcanoes that once extended seaward from Mangonui Bluff onto the Waipoua–Tutamoe Plateaus		
AR	Aranga clay	4⇒1 - Well to poorly drained
<b>TE KIE SUITE</b> Basement rock: Tangihua volcanics		
RUr, RUrH	Rangiuru red brown clay	4⇒3 - Well to moderately drained
RU, RUH	Rangiuru clay	4⇒3 - Well to moderately drained
AW	Awarua clay	4⇒1 - Well 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](http://www.nrc.govt.nz/soilfactsheets)

Contact a land management advisor on  
0800 002 004 or visit [www.nrc.govt.nz/land](http://www.nrc.govt.nz/land)