

Limestone soils

Soil types in this group

- Arapohue clay - AU, AUH*
- Arapohue deep clay - AUd
- Dairy Flat clay - DF
- Konoti clay - KNr, KNrH*
- Konoti clay loam - KN, KNH*
- Maungaturoto clay - MO
- Motatau clay - MT, MTH*

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.



Arapohue clay soil profile

Features of limestone soils

- These soils were formed under broadleaf forest on different types of limestone
- They are part of the Arapohue, Konoti and Maungaturoto soil suites
- Limestone country in Northland is usually gently to strongly rolling
- These soils are relatively young, with a well-developed soil profile defined by limestone basement rock
- Limestone topsoils are weakly to strongly leached
- They are typically dark, with paler, flecked or mottled limestone clay beneath
- All these limestone soils are winter wet and prone to pugging and compaction

Structure and drainage management

Issues	Management tips
Silica minerals in limestone weather to montmorillonite, a clay that expands when wet, closing off internal drainage; it then cracks when it dries in summer	Maintain a dense sward of grass at all times to prevent cracking and to protect from soil structure breakdown
Arapohue soils are 45%-55% montmorillonite clay, and the entire soil profile may be only 30 cm deep, making these soils particularly vulnerable to drought and cracking Arapohue and Motatau soils are even shallower on steeper slopes	Rotational grazing systems will allow adequate pasture recovery between grazings and will help to protect soil structure necessary for future production
Winter waterlogging can occur in limestone soil types, even in good winters	Avoid overstocking to prevent soil compaction and pugging Consider temporary fencing to exclude stock from gully heads, steeper slopes and erosion prone areas to preserve soil structure

Erosion control

Erosion risks	Soil type	Specific problems	Possible solutions
Slip erosion, both shallow slipping and deep-seated earthflow	All limestone soils, especially cracked soils on steeper slopes and where montmorillonite clay forms a slip plane	Clay washed down through the soil profile creates a slip plane on basement rock During high intensity rain storms following dry weather, water flows down through cracks, lubricating the slip plane and removing support from adjoining slopes, which then slip	Open planting of unstable slopes with poplars or quick growing native trees can reduce erosion risk Plant willows in a zig-zag pattern along drainage channels to help prevent or control erosion Fencing of eroded channels will allow planted and self-seeded vegetation cover to establish
Gully erosion	Deeper Maungaturoto and Dairy Flat clay soils	Concentrated water flow causes gullies to extend upslope and expand as the side walls collapse	Plant willow poles in a zig-zag pattern along the gully Increase planting density of erosion control trees in gully heads
Sheet erosion	Konoti clay and clay loam soils	Pugging on older, more strongly leached Konoti suite soil types leads to loss of pasture and topsoil	Maintaining good pasture covers helps build soil organic matter and improve soil structure



Shallow Motatau clay soils on limestone, Mangamuka

Nutrient management

Soil type	Nutrient status	Management strategies
All limestone soils	These soils are generally fertile, with dark humus-filled topsoils	Less fertiliser may be needed than for other soil types; however, soil tests are required to determine localised variation in nutrient status, especially where there has been no input for a long time
All limestone soils	Limestone soils are generally of a higher pH than most other soil types in Northland, however added lime may still be required	Seek advice from your fertiliser consultant for nutrient requirements

Drainage classes

Soil symbol	Full name	Drainage class
ARAPOHUE SUITE Basement rock: argillaceous limestone Weakly to moderately leached		
AU, AUH	Arapohue clay	2⇒0 - Imperfectly drained to very poorly drained
AUd	Arapohue deep clay	2⇒0 - Imperfectly drained to very poorly drained
MT, MTH	Motatau clay	2⇒0 - Imperfectly drained to very poorly drained
MAUNGATUROTO SUITE Basement rock: limestone-mudstone complex Moderately to strongly leached		
MO	Maungaturoto clay	2⇒0 - Imperfectly drained to very poorly drained
DF	Dairy Flat clay	2⇒0 - Imperfectly drained to very poorly drained
KONOTI SUITE Basement rock: sandstone-mudstone limestone complex Moderately to strongly leached		
KN, KNH	Konoti clay loam	2⇒0 - Imperfectly drained to very poorly drained
KNr, KNrH	Konoti clay	2⇒0 - Imperfectly drained to very 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

Contact a land management advisor on
0800 002 004 or visit www.nrc.govt.nz/land