

(b) *Immature Podsol Soils* are formed where profile development has been hindered by topography or texture. On flat country fairly young soils are also included. Among the hill soils those derived from mudstone are again the most fertile, and the common profile on steep slopes is—

6 in. silt loam, free, black ;
24 in. silty clay loam, yellow-brown, compact ;
On silty clay loam, yellowish-brown and creamy-grey, with mudstone fragments.

The slight degree of development in this type is reflected in the phosphate status, which is only fair. The rainfall is between 35 in and 50 in.

On rolling country two types come into this series. On one the profile is—

6 in. heavy loam to clay loam, black ;
9 in. clay, yellowish-brown ;
On clay, sticky, mottled yellowish-brown and grey.

This soil is a little more fertile than that on the steeper country, although this fertility is offset by poorer drainage conditions.

On flat country removed from the zone of deposition of river floods for an appreciable time leaching has started, and at Pukehou a small area derived mainly from mudstone silts belongs to this class. Between Pukehou and Waipawa argillite silts and gravels have built flats, the soils of which dry out badly and, like other argillite soils, are low in fertility, but are capable of being improved with top-dressing. The rainfall on this type is about 30 in.

(c) *Mildly Podsolized Soils* have developed sufficiently to enable the true podsol soil processes to be detected in the soil profile by field and chemical evidence. Not only have iron oxide and alumina moved downwards, but a leaching of silica from the topsoil can be recognized. Plant nutrients are also materially leached and removed so that the soils may be expected to respond to superphosphate.

Four types are recognized with mudstone as the parent rock. On one the profile is—

6 in. silt loam, fairly heavy, brownish-black ;
6 in. silty clay loam, creamy greyish-brown ;
On silty clay, creamy grey, mottled rusty-brown.

Leaching has been accentuated on this type by forest, and a thin grey layer is often recognizable. The rainfall is between 35 in. to 40 in., and the type has a fair phosphate and a high potash status.

Analyses indicate a good humus content, so that the forest probably accounts for the fertility of this mildly podsolized soil. When the rainfall rises above 40 in. a second type almost identical in the field with the first comes in, although it shows slightly more development and has a freer texture and a black topsoil. It is one of the poorest of the mudstone soils and is more leached than the forest type with a much lower base status.

On the Long Range Road east of Waipawa podsolization has proceeded still further on easier country not subject to slumping, and the natural fertility is very low, this type quickly reverting to scrub and such poor-fertility plants as *Leucopogon*, &c. However, a good response is obtained from top-dressing.

Mildly podsolized soils in the argillite series are formed where the rainfall is over 35 in. to 40 in. Apparently a higher rainfall is sufficient to convert the skeletal argillite soils into this class, possibly because this condition allows the slumping of large blocks of country. A typical profile in the Porangahau district is—

6 in. silt loam, black, free, powdery ;
6 in. clay loam, yellowish, brown ;
6 in. clay loam, mottled creamy-yellow and yellowish-brown ;
12 in. clay loam, creamy grey, or grey mottled with orange-brown ;
On heavy silt loam or sands, creamy grey.

This argillite soil is also low in phosphate.

A second type in the same district contains more lime in its parent rock and has a heavier texture resting on a sticky clay, so that the drainage is not very good. Probably because of the heavier texture and constant slumping the profile is not so leached, so that although the available phosphate is low, the base status is otherwise high and the soil type is the only one of the argillite series regarded as fair sheep country.

Soils derived from sandstone in this class have developed under a rainfall of, in general, over 40 in. and extend south of Ormondville to the boundary of the province. They also occur in the Maraetotara district west of Waimarama. Constant slumping under this rainfall has prevented the formation of well-developed profiles. A profile is—

6 in. sandy loam, free, black or brownish-black ;
6 in. heavy sandy loam, brown ;
6 in. heavy sandy loam, light brown ;
On heavy sandy loam to clay loam, mottled dull-grey and rusty-brown.

Infertile flat country in the Wilder Settlement district, eight miles west of Porangahau, is formed of argillite sands and silts, which are described in the last annual report. Under a rainfall of 35 in. to 40 in. these soils are mildly podsolized, compared with the immature podsol soils on similar parent rock under a rainfall of 30 in. In the Patangata district flats derived from mudstone alluvium come within this class. A profile is—

6 in. sandy loam, free, black ;
6 in. sandy loam, dull creamy-brown and cream ;
6 in. sandy clay loam, creamy-brown and creamy-grey ;
12 in. clay, pinky-grey and orange brown, sometimes bluish-grey and very sticky ;
On silty clay loam, dull grey to pale yellowish-brown.