

## Association 5

### Soils Associated with Carboniferous Sediments

#### Geology

Lower Carboniferous, non-marine sedimentary deposits of approximately 290-360 m.y. of age. The geology is restricted to a small area of some 70 sq km near Mansfield. The area is part of the Mansfield Basin. The western boundary incorporates part of the Blue Range and is surrounded by Siluro-Devonian geology.

#### Lithology

The sedimentary material, which is often purple coloured, includes conglomerate, pebbly sandstones, siltstones and mudstones and less commonly quartzose and feldspathic sandstone. Within this geology, large areas of scree/fan and alluvial deposits exist which have resulted from the breakdown of the conglomerate. The township of Mansfield rests upon quaternary colluvial and alluvial outwash.

#### Soils

Profiles in the area are a deep, uniformly fine textured clay which have a mottled subsoil which in upland terrain have a hardsetting A<sub>2</sub> horizon. Soil depth is variable with some crest components exhibiting the remnant rock mantle and the steeply inclined hill units showing only very shallow, skeletal soils. The areas are often strongly influenced by the local Siluro-Devonian geologies and quaternary high level terrace deposits.

Surfaces are typically smooth and rock free (except for the isolated remnants mentioned above). The A<sub>1</sub> horizons are usually very shallow (less than 10 cm thick), dark reddish brown to dark brown apedal non-cracking earthy light clays. In the lower situations and within the loam texture and extend to 30-40 cm. In these situations, weak to moderate rough-faced crumb structure is common. Consistencies are typically within 5-10 cm of the surface, upland profiles quickly grade into an A<sub>2</sub> horizon. This material is usually 30-40 cm thick, very coherent, gravelly, unbleached, dark material to hardset, tight and hard to penetrate with a hand auger. The A<sub>2</sub> horizon is often absent in lowland situations.

With depth, subsoils are apedal, massive, reddish brown medium to heavy, very plastic clay and silty clay. The B horizon has many light yellowish brown, distinct mottles.

In some cuttings, the B material was highly apedal with hard, very fine to fine smooth-faced angular blocky peds which collapsed under gravity upon minor disturbance. On exposed faces in the hilly units, the full profile took on a purplish to weak red colouring.

Subsoil materials are generally highly dispersive and from field tests, slaked rapidly. In some areas, particularly on upland terrain, small ferro-manganiferous nodules are common at depth. Areas with this soil type have very poor subsurface hydraulic permeability which is reflected in the stability of the peds.

In some of the lowlying areas, particularly those to the north-west of Mansfield, deep subsoils were orange/grey mottled, brown, coarsely structured clay. Sand is common in the subsoils of swales and lower areas of the undulating terrain.

**Summary of Soil Features: Soils Associated with Carboniferous Sediments**

Classification		Texture		Structure		Permeability		Depth to Bedrock	Subsoil Slaking Tendency	Inclusions
PPF	USC	Surface	Subsoil	Surface	Subsoil	Surface	Subsoil			Gravel, Stone, Other
Mountainous Terrain Rare soil areas Uf 5 CL Uf 6 GC		Light clay	Medium clay	Apedal	Strong angular blocky	Good-fair	Poor-very poor	Variable generally <60 cm	Rapid	Variable upwards to 60% gravel and stone.
Mountain Slopes Uf 5 CL Uf 6 GC		Light clay (some areas loam)	Medium clay	Apedal to weak sub-angular blocky	Strong angular blocky	Good-fair	Poor-very poor	Variable generally <60 cm	Rapid	Variable upwards to 60% gravel and stone.
Gently Sloping Lower Terrain Uf 6 CL Gn 3.2 Minor Gn 3.9 GC		Clay loam to light clay (A <sub>2</sub> a silty light clay)	Medium clay	Weak crumb to massive (A <sub>2</sub> massive)	Strong angular blocky	Fair (A <sub>2</sub> very poor)	Very poor	Generally > 150 cm	Rapid	Some minor angular gravels in subsoil materials, minor ferromanganiferous nodules in subsoils, particularly in higher terrain.