IRONSTONE SOIL

General Description: *Ironstone gravelly sandy loam to sandy clay loam over a yellow clayey subsoil grading to deeply weathered kaolinized weathering rock*

Landform: Undulating low hills.

Substrate: Deeply weathered kaolinized sandstone (Kanmantoo Group).

Vegetation: Stringybark, yacca and banksia closed forest.

Type Site:

Site No.:	CK007	1:50,000 mapsheet:	6226-1 (Snug Cove)
Hundred:	Gosse	Easting:	674000
Section:	37	Northing:	6040350
Sampling date:	24/2/94	Annual rainfall:	785 mm average

Upper slope of 5%. Soft surface with no stone.

Soil Description:

Depth (cm)	*Description*
0-9	Dark brown soft fine sandy loam with moderate granular structure, 2-10% ironstone gravel (6-20 mm), and 2-10% quartz gravel (6-20 mm). Clear change to:
9-28	Yellowish brown friable massive light sandy clay loam with 20-50% ironstone gravel (6-20 mm). Clear change to:
28-70	Olive yellow very hard silty medium clay with moderate coarse prismatic structure. Gradual change to:
70-137	Pale yellow, olive yellow and red very hard silty medium clay with weak coarse prismatic structure and 2-10% quartz gravel (20-60 mm). Gradual change to:
137-180	White, red and olive yellow firm massive silty light medium clay with minor quartz gravel (20-60 mm).

Classification: Ferric, Mesotrophic, Yellow Chromosol; medium, slightly gravelly, loamy / clayey, very deep

Summary of Properties

Drainage: Imperfectly drained, due to the low permeability clay subsoil at relatively shallow depth. The soil may remain wet for several weeks following heavy or prolonged rainfall.

Fertility: Natural fertility is low, as indicated by the exchangeable cation data. Surface fertility relies on organic carbon being maintained above 2%. Ironstone gravel ties up phosphorus, concentrations of which are low at the sampling site. Potassium and zinc levels are marginal.

pH: Acidic at the surface, strongly acidic at depth.

Rooting depth: Approximately 70 cm in pit, but few roots below 28 cm.

Barriers to root growth:

Physical: The tight clay subsoil restricts uniform root growth. Waterlogging exacerbates the problem.

Chemical: Possible acidity induced toxicities (eg aluminium), and low trace element levels at depth limit root growth.

Waterholding capacity: 90 mm in rootzone, but some is effectively unavailable due to low subsoil root density.

Seedling emergence: Good, provided surface organic matter is maintained.

Workability: Good to fair - ironstone is abrasive.

Erosion Potential:

Water: Moderate.

Wind: Low.

Laboratory Data

Depth cm	pH H_2O	pH $CaC1_2$	CO_3 %	EC1:5 dS/m	ECe dS/m	Org.C %	Avail. P mg/kg	Avail. K mg/kg	SO_4 mg/kg	Boron mg/kg	Trace Elements mg/kg (DTPA)				CEC cmol (+)/kg	Exchangeable Cations cmol(+)/kg				ESP
											Cu	Fe	Mn	Zn		Ca	Mg	Na	K	
Paddock	5.5	4.8	0	0.09	0.44	5.2	16	100	-	0.6	0.2	274	2.1	0.3	9.7	4.75	1.12	0.30	0.27	3.1
0-9	5.4	4.7	0	0.14	0.70	5.8	16	133	-	0.6	0.5	360	2	0.6	10.1	4.87	1.49	0.20	0.39	2.0
9-28	5.7	4.8	0	0.02	0.11	1.2	5	38	-	0.4	0.2	55	0.2	0.2	3.8	1.06	0.35	0.17	0.10	4.5
28-70	5.8	5.4	0	0.05	0.16	0.4	<4	49	-	0.9	<0.1	4	0.1	0.1	4.7	1.36	2.05	0.24	0.16	5.1
70-137	5.2	4.4	0	0.04	0.15	0.1	<4	87	-	0.7	<0.1	1	0.1	0.1	3.8	0.67	1.20	0.21	0.24	5.5
137-180	4.9	4.3	0	0.04	0.13	0.0	<4	44	-	0.5	<0.1	1	<0.1	0.1	2.4	0.57	0.70	0.16	0.12	6.7

Note: Paddock sample bulked from 20 cores (0-10 cm) taken around the pit.
CEC (cation exchange capacity) is a measure of the soil's capacity to store and release major nutrient elements.
ESP (exchangeable sodium percentage) is derived by dividing the exchangeable sodium value by the CEC

Further information: DEWNR Soil and Land Program