

PART C. VEGETABLE-GROWING LANDSCAPES

- Chapter C1 Sandhill soils**
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Chapter C1. Sandhill soils

PURPOSE OF THIS CHAPTER

To outline the characteristics of sandhill soils

CHAPTER CONTENTS

- appearance
- topography and vegetation
- land-use limitations and soil problems

ASSOCIATED CHAPTERS

- Part C

SOIL GROUPINGS

The five main groupings of soils used in Part C of this manual are:

- sandhill soils (sandy soils)
- red brown earths (soils with a sandy loam – loam topsoil)
- transitional red brown earths (soils with a shallow loam – clay loam topsoil)
- alluvial soils
- self-mulching clays.

Many vegetable-producing soils, such as the soils of the Riverina Plain, are formed upon sediments from ancient rivers that once dominated the area, along with clay materials carried into the area by wind. These ancient rivers are often referred to as ‘prior streams’.

As you move away from the prior stream towards the far flood plain:

- the surface loam horizon becomes thinner
- the surface soil becomes more clayey in texture
- the depth of the clay subsoil increases.

Vegetation may help in identifying the soil type, since soil types, vegetation and local topography are all related.

In reality, soil types usually change gradually with distance from the prior stream, not abruptly as could be inferred from below. This is the reason why it is sometimes difficult to place a soil into one of the types referred to in this section.

SANDHILL SOILS

- Sandhills occur close to prior streams, but prior streams may exist with no associated sandhills.
- Sandhill soils have a topsoil of loose sand greater than 15 cm deep.
- Deep sands have loose sand to a depth of 2 m or greater, with no obvious subsoil, or bleached layers.

- Shallow sands have a shallower topsoil overlying a clay subsoil. A bleached layer in the lower topsoil is usually present.

APPEARANCE

The variation of physical characteristics within the soil group 'sandhill soils' is large when compared with the other soil groups. The major criterion for inclusion in this soil group is a loose sandy topsoil not less than 15 cm deep.

Texture

The deep sands usually consist of loose sand to a depth of 2 m or more. In some areas numerous thin clay bands may be present in the deep sands. These clay bands are thought to originate from wind-blown clay materials. Bands of loam clay of varying thickness may develop in the soil due to leaching of clay materials out of the topsoil. The deep sand occurs in the more elevated areas of sandhill formations. No change in texture within the top 2 m is obvious in the deep sands. Towards the lower areas of sandhill formations, the depth of loose, sandy topsoil decreases and a relatively shallow clayey sand subsoil is present.

Colour

The colour of the sandy topsoil is generally brown to red brown, but shallow sands may be grey brown. The subsoils (where present) vary from red to yellow to grey. Yellow and grey are the most common colours in heavier, poorly drained subsoils.

PERCHED WATERTABLES

When subsoils are of low permeability, perched watertables may form above them. This is obvious when you are comparing soils from the higher elevated areas of a sandhill to the low areas around the fringe of the sandhill, since a bleached layer in the lower topsoils is more pronounced. Bleached layers are a sign of a perched watertable (usually caused by relatively impermeable subsoils) and are therefore more obvious where the subsoil is more clayey. The shallow sands will have a clay subsoil, overlain by a bleached layer of the lower topsoil.

TOPOGRAPHY AND ASSOCIATED VEGETATION

The presence of a clay subsoil can be related to the formation of the sandhill. Most sandhills formed when the wind blew sandy materials out of the prior-stream bed on to the surrounding soil, which was more clayey in texture. This previously exposed soil became the new subsoil. Where the sandhill is at its highest, the underlying clay may be at such a depth that it has no effect on plant growth in the soil above it.

Vegetation on sandhill soils is predominantly white cypress pine, with some grey box and yellow box towards the extremities of the sandhills.

LAND-USE LIMITATIONS AND SOIL PROBLEMS

Water management

- sandhills (especially deep sands) have a low water-holding capacity and poor nutrient retention

- sandhill soils are well drained, except where an impermeable clay or cemented layer is within the root zone.
- a bleached layer indicates periodic waterlogging caused by a perched watertable overlying an impermeable layer
- sandhills may be prone to erosion.

Sandhill soils contain very little clay and silt in their topsoils. In the deeper sandhill soils the topsoil extends beyond the root zone of most crop and pasture plants. Since the topsoils are predominately sand, of which a high proportion is coarse sand, the ability of the soils to store moisture for use of plants is very low. This means that particular attention must be paid to the irrigation frequency in an effort to keep plants supplied with water, without wasting water by allowing it to move out of the root zone. Therefore, frequent light irrigations are necessary.

Nutrient management

The nutrient supply also requires careful management. Nutrient storage in a soil is influenced mainly by finer particles such as clay and silt, along with organic matter. As all of these are in short supply in sandy soils (especially deep sands), nutrient shortfalls leading to decreased crop yield are likely. The ability of sandy soils to resist a change in pH, known as their buffering capacity, is low, so pH must be monitored carefully. Lime may need to be applied periodically, depending upon land management.

Some sandhill soils contain a loamy or clayey sand band (thin subsoil) in which clay and silt particles have accumulated. This zone will be advantageous to crop production if:

- the loamy/clayey band is reasonably permeable to water and air, and
- the loamy/clayey band is within the root zone of the crop.

This loamy or clayey band will increase the water-holding capacity and nutrient storage ability of the soil.

When a relatively impermeable clay subsoil is within the root zone, plant production may be impaired. This is mainly because perched watertables may form above the clay subsoil.

Soil erosion

Soil erosion is likely to be a major problem on sandhill soils, especially when cultivation leaves the soil bare, as in annual vegetable crop production such as potatoes. It is therefore important to maintain soil cover for as long as possible to reduce this risk.

