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Australian soil club

Welcome

Welcome to the second issue of the Australian Soil Club newsletter. We apologise for the delay in sending this newsletter. This was a result of the restructuring of the Kondinin Group which will no longer be involved in the Australian Soil Club . Instead, the Club is now affiliated with The Kojonup Soils Centre in Western Australia . This new Centre will focus on research, education and extension aimed at improving the understanding and management of Australia's soils.

We would like to thank The Kondinin Group for their support and expertise in the production of our first edition of the Australian Soils Club newsletter.

For further information contact:
Professor Lyn Abbott
School of Earth and Geographical Sciences (Soil Science)
The University fo Western Australia
Crawley, WA 6009

Email: labbott@cyllene.uwa.edu.au

In this issue:

Mission Statement

To provide information about soil that is relevant to all land users.

Farm community involvement in acid soil management in the Murray Valley

The Murray Valley's Landcare groups and 600 farmers from NSW's Murray Valley have combined to create a picture of soil acidity across 1.1 million hectares of farming land.

The project, called the South West Slopes Community Acid Soils Program, has demonstrated the extent and severity of soil acidification throughout the area and raised its awareness as an environmental issue with farmers and government.

The project, which commenced in 1997, involved collecting samples from the 0 - 10 cm and 10 - 20 cm soil layers from over 5500 paddocks in an area ranging from Tumbarumba in the east to Urana in the west.

Sample analysis showed that the average surface soil $pH_{(Ca)}$ was 4.6 and declining. The 10 - 20 cm soil layers were equally if not more acid than the surface layers across most of the sampled area.

The program had three objectives:-

1. To inform farmers about their soil, acid soil management and acid tolerance of their crops as well as assist them to decide on individual liming programs.

2. To informthe Landcare groups about soil fertility in their area. This information has since been used in applications for further funding of Landcare projects.

3. To raise the importance and the awareness of soil acidification within the community and governments. As a result, the Murray and Murrumbidgee Catchment Management Board have included these results in their Soils Health Targets within their Catchment Plans to better manage acidic soils.

The soil pH, exchangeable aluminium and cation exchange capacity for both the 0 - 10 cm and 10 - 20 cm soil layers were mapped for the project area. Soil P and stocking rates were also mapped.

Soil types and their characteristics

The three most important factors for determining soil types are parent material, annual rainfall and topography. Other factors include climate, organic activity and time.

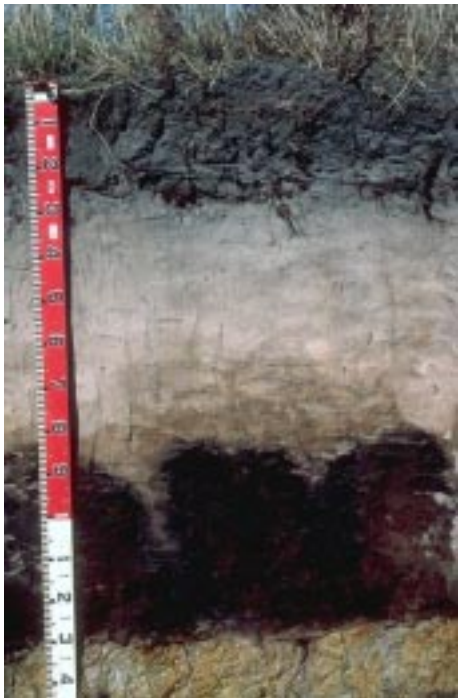
Ten of the common Australian soils with some of their characteristics are shown below.

Podosol

Parent material is extremely siliceous with rainfall over 700mm and sites either well-drained (mid and upper slopes) or poorly drained (footslopes and flats).

The B horizon of a Podosol is dominated by compounds of organic matter, Al and/or Fe (generally highly sandy and acidic).

Generally, podosols have very low agricultural potential with very low chemical fertility, structure and water-holding capacity. However ground-water contamination is a potentialproblem due to high permeability.



Pososol at Cranbourne, Victoria

Tenosol

Parent material of Tnosols is extremely or highly siliceous with rainfall from 0 to 1400mm on well-drained sites or 0 to 1100mm on poorly drained sites.

Tenosols have a weak soil profile which is typically very sandy with surface soils often very acidic.

Generally, tenosols have a very low agricultural potential with very low chemical fertility, poor structure and low water-holding capacity. However ground-water contamination can be a potential problem due to the high permeability of these soils.

Tenosols have strong texture contrast with strongly acid B horizon which may or may not be sodic. The surface soils are often acidic.

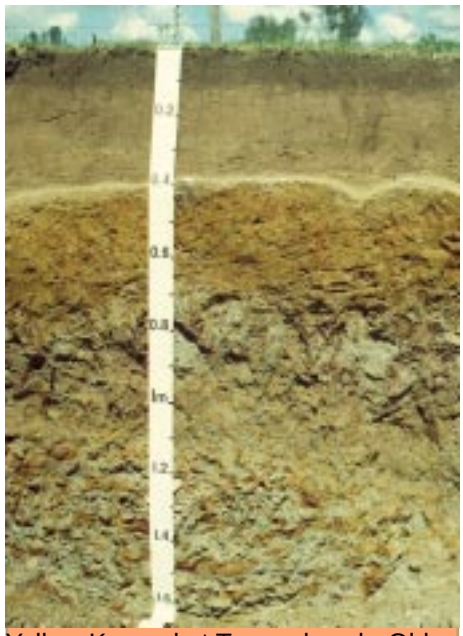
Tenosol at Three Springs, WA

Kurosol

Parent materials of Kurosols range from highly siliceous, siliceous to intermediate in composition, with rainfall from 50 to 1350mm in poorly drained sites or 750 to 1300mm on well-drained sites.

They have a strong texture contrast with strongly acid B horizon which may or may not be sodic.

The surface of Kurosol soils are often acidic. They generally have very low agricultural potential with high acidity (pH < 5.5) and low chemical fertility. Kurosols commonly have low water-holding capacity and are often sodic.



Yellow Kurosol at Toogoolawah, Qld.

Sodosol

Parent materials of Sodosols range from highly siliceous, siliceous to intermediate in composition. Sodosols are only found in poorly drained sites with rainfall between 50mm and 1100mm.

Sodosols show strong texture contrast with highly sodic B horizon but they are not highly acidic (pH > 5.5).

Generally, sodosols have very low agricultural potential with high sodicity leading to high erodability, poor structure and low permeability. These soils are have low to moderate chemical fertility and can be associated with soil salinity.

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Source of information:

This material is from the soils poster by Gray, J.M., Murphy, B.W. and Chapman, G.A. (2002), *Predicting Soil Distribution*, Joint DLWC and ASSSI Technical Poster, DLWC, Sydney.

Sodosol at West Gippsland, Vic.

Chromosol

The parent material of Chromosols ranges from highly siliceous, siliceous to intermediate in composition. These soils are found in imperfectly drained sites (yellow and grey chromosol) with rainfall between 250mm and 900mm. They are also found in well-drained sites (brown and red chromosol) with rainfall between 350mm and 1400mm.

Chromosols have strongly contrasting texture. They are not strongly acidic or sodic in the upper B horizon.

These soils have moderate agricultural potential with moderate chemical fertility and water-holding capacity. They can be susceptible to soil acidification and soil structure decline.

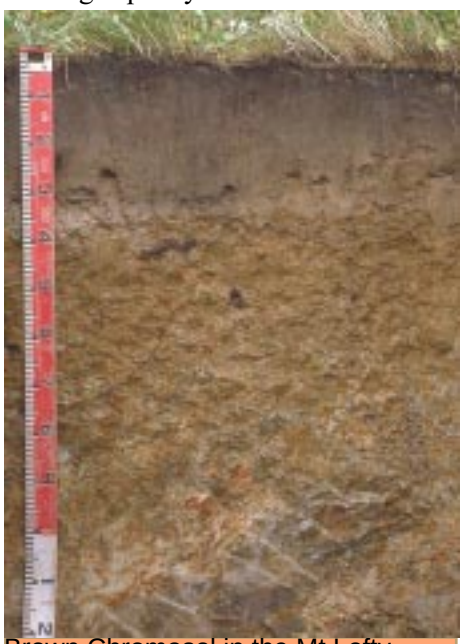
Kandosol

Parent material of Kandosols ranges from highly siliceous, siliceous to intermediate in composition.

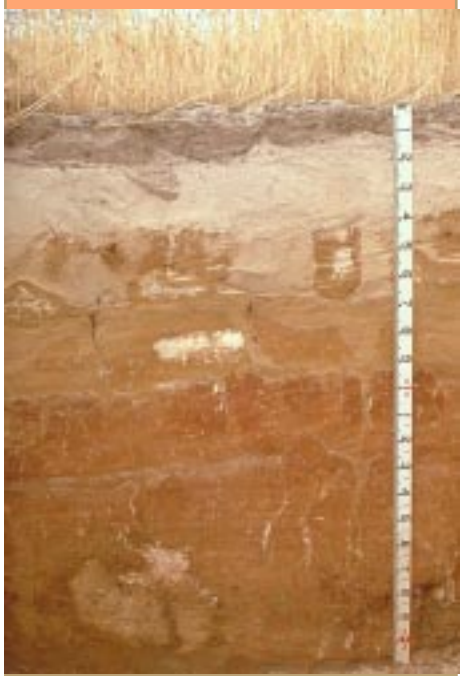
These soils are found in poorly drained sites (yellow and grey kandosol) with rainfall between 300mm and 1400mm and in well-drained sites (brown and red kandosol) with rainfall between 250mm and 1400mm.

Kandosols do not have a strong texture contrast. Thy are massive or weakly structured B horizon and are not calcareous.

Generally, Kandosols are low to moderate in agricultural potential with moderate chemical fertility and water-holding capacity.



Brown Chromosol in the Mt Lofty Ranges, SA.



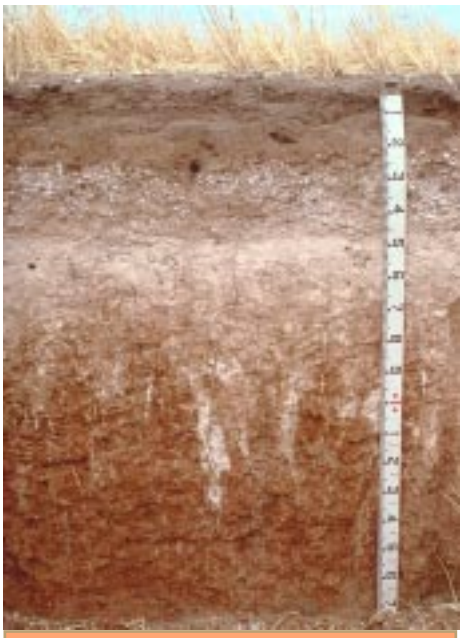
Brown Kandosol at Peebinga, SA

Calcarosol

Parent material ranges from highly siliceous, siliceous to intermediate in composition. Found in imperfectly drained sites with rainfall between 0mm and 400mm and in well-drained sites with rainfall between 250mm and 500mm.

Calcarosols are calcareous throughout and do not have a strong texture contrast.

Generally, they have low to moderate agricultural potential with low chemical fertility and water-holding capacity. They often have high salinity levels, alkalinity and boron toxicity.



Calcarosol at Pinnaroo, SA.

Dermosol

The parent material or dermosols ranges from siliceous, intermediate and mafic in composition. Found in imperfectly drained sites (yellow and grey dermosols) with rainfall between 550mm and 1350mm and in well-drained sites with rainfall between 450mm and 1200mm.

These soils do not have strong texture contrast. They have a well structured B2 horizon containing low levels of free iron.

Dermosol generally have high agricultural potential with good structure and moderate to high chemical fertility and water-holding capacity with few problems.

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Grey Dermosol in the Hunter Valley,

Red Ferrosol at Warragul, Vic

Black Vertosol at Wellington, NSW

Ferrosol

The parent material of ferrosols is intermediate or mafic in composition. These soils are only found in well-drained sites with rainfall between 700mm and 1450mm.

They do not have a strong texture contrast. Their B2 horizon has high free iron oxide (Fe >5%). Mostly, they are well structured.

Ferrosols have high agricultural potential because of their good structure and moderate to high chemical fertility and water-holding capacity. Their high rainfall equivalents (Krasnozems) may suffer from acidification and nutrient leaching. They also have potntial for structural decline.

Vertosol

The parent material of Vertosols ranges from intermediate, mafic and ultramafic in composition. These soils are found in imperfectly drained sites (black vertosol) with rainfall between 0mm and 1150mm and in well-drained sites (red vertosol) with rainfall between 0mm and 900mm.

Verticols have a uniform texture, clay-rich soils (>35%). They have the potential for strong cracking and slickensides.

These soils have high agricultural potential with high chemical fertility and water-holding capacity but they require significant amounts of rain before water is available to plants. Gypsum and/or lime may be required to improve their structure. Heavy plastic clays can be difficult to cultivate especially when they are wet. Shrink-swell phenomena also creates problems for foundations of buildings build on Verticols.

Terms used:

Parent material is the material that soil develops fromsuch as rock, or material that has been deposited by wind or water. The characteristics of the parent material are important in determining the physical and chemical properties of the soil.

Sodic soils are high in sodium, easily lose their structure when wet.

Mafic soils are rich in Mg and Fe, as well as in many other nutrients; generally dark and very hard.

Reference: Gray, J.M., Murphy, B.W. and Chapman, G.A. (2002), *Predicting Soil Distribution*, Joint DLWC and ASSSI Technical Poster, DLWC, Sydney.

Saving Soil: at your fingertips

If you would like to become a member of the Australian Soil Club, please send a cheque for $33 ($40 for overseas subscribers) to:

The Australian Soil Club
C/- Professor Lyn Abbott
School of Earth and
Geographical Sciences
(Soil Science)
The University of Western
Australia
35 Stirling Highway
Crawley WA 6009

Members will have access to information and research into the physical, chemical and biological aspects of soils.

A bi-monthly newsletter and information on how to access regional data and expertise is included in the membership.

A workshop/seminar is being planned for members of the Australian Soil Club in southern New South Wales.

Please send an email to Lyn Abbott to suggest a venue and to express your interest in attending.

Email: abbott@cyllene.uwa.edu.au