

POOR PRODUCING SANDY AREAS

In low rainfall cropping areas of SA

Figure 1: Poor producing sand spread near Lowbank.

Low rainfall cropping soils across South Australia have large areas of sandy soils which can be present as sand spreads or dunes.

Since the introduction of stubble retention and no-till many of these areas are regularly cropped and the better loamy sands are some of the most productive areas on these farms, particularly in drier seasons.

Unfortunately, there are often poor producing areas amongst these where yields maybe as low as 30% of the better areas. These are possibly areas where significant erosion has occurred historically.

As part of the Agricultural Bureau SA project funded through the Future Drought Fund (FDF) several of these sites were compared with

adjacent better areas from a soil fertility perspective.

This fact sheet highlights the differences between these poorer and better areas of loamy sand common in the northern mallee.

While it is difficult to get back to full production some strategies are suggested to improve their production.

Fertility characteristics

Poor and good area of loamy sand - Northern Mallee

As part of the FDF Agricultural Bureau project investigations were made using a soil testing approach at four paired sites with the Wunkar and Lowbank branches.

Deep testing to around 80 cm was undertaken and soil nutrients and subsoil constraints measured.

KEY POINTS

- Poor producing sandy patches were found to be low in organic carbon and several nutrients when compared with better producing areas close by.
- Use of paired soil testing sites highlighted fertility issues with these patches.
- Remedies are suggested from removal from cropping, zoning and extra amendments.

Soil chemistry characteristics observed of poorer areas versus good areas of loamy sand are shown in Table 1, which highlights very low levels of organic carbon, nitrogen, sulphur and copper in part linked to low organic matter.

Phosphorus levels were quite variable and possibly linked to recent history of fertiliser application and use by plants.

Strategies for improvement

Applicable to reddish loamy sands - Northern Mallee

- **Soil test comparison with adjacent better areas** - This will provide comparative information and identify nutrients which are at low levels.
- **Increased fertiliser/zoning** – by zoning these areas additional fertiliser can be applied to overcome limitations and improve growth.
- **Add organic waste products**- by adding organic wastes or other organic matter sources it may be possible to increase the organic carbon content of these areas. One farmer at Lowbank has been applying chicken manure regularly and has increased his nitrogen, phosphorus, potassium and sulphur levels substantially over untreated areas.
- **Keep cover** – unfortunately these areas are often the weakest part of the paddock and can limit grazing if they become bared off.
- **Remove from cropping** – one option is to avoid cropping these areas and let them establish to native grasses or veldt grass. This is suited to small badly affected areas which are difficult to reclaim and overcomes the loss of inputs if consistently yielding poorly.
- **Sandy soils modification techniques** – the whiter sands in southern mallee have used a range of soil modification strategies to improve production of poor sandy areas including deep ripping, clay spreading and spading in organic matter - generally these practices have not been tried in northern mallee due to risk of erosion, however consideration of low rates of clay for example could be used to strengthen the soil on these weaker sandy areas.

Table 1- Fertility measurements of poor versus good loamy sand Northern Mallee Autumn 2022

Fertility Indicator	Poor areas (4 sites)	Adjacent better areas (4 sites)	Comment
Organic carbon (%)	0.1-0.3	0.3-0.6	Loamier areas generally greater than 0.6 up to over 1%
Deep nitrogen to 60 cm (kg/ha)	Mostly <25	Mostly 25-80	Loamier soils higher. Need 40 kg/ha to grow 1 tonne/ha wheat crop.
Phosphorus DGT (µg/L)	Quite variable	Quite variable	Expect reflects fertiliser applied and not used in recent years
Deep sulphur to 40 cm (kg/ha)	10-25	25-40	10 kg/ha adequate unless growing canola or large yields
DTPA copper (mg/kg)	0.08- 0.13	0.015- 0.17	Rough guide Soil copper greater than 0.15 to 0.2. Need to confirm trace element deficiency with plant tests



Poor sandhill - Skeleton weed, low Nitrogen /Organic Carbon - marginal potassium, copper and sulphur



Better sandy area, nutrients at adequate levels, yielding three times the above

Figure 2: Poor sandhill adjacent to better sand at Wunkar

Other Information

Fraser, M. (2020) *Sandy soil constraints in south east South Australia: a guide to their diagnosis and treatment*. PIRSA Rural Solutions

Hughes B, Davenport D. and Dohle L. (2013) *Standard soil test and guidelines for interpretation of soil test results*. PIRSA Rural Solutions.

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