22. Clay and hay increases yields on SE sands

Authors: Melissa Fraser[1], Nigel Wilhelm[2], David Davenport[1]

Research Team: Peter Telfer[2], Brett Masters[1], Claire Dennerley[1]

[1]PIRSA Rural Solutions SA; [2]South Australian Research & Development Institute

Funded By: GRDC Sandy Soils CSP00203

Project Title: Increasing production on sandy soils in low and medium rainfall areas of the Southern Region.

KEY MESSAGES

- Positive crop production responses still remain at Cadgee five years after amelioration treatments were applied.
- Application of clay improved establishment and flowering biomass, regardless of incorporation depth (shallow, 10 cm and spaded, 30 cm), compared to the control and the spaded lucerne treatments (Fig. 1).
- Grain yield response to clay application increased with the depth of incorporation, and were doubled in the spaded clay + Luc treatment compared to the control, adding 1.58 t/ha in 2018.
- Over the long term, this treatment has produced an additional 95 % grain (4.5 t/ha) since 2014 (four years grain data; Fig. 2).
- Changes in soil chemical, hydrological and physical characteristics as a result of spading and lucerne and clay addition were the focus of 2019 soil measurements at the site.
- A full report detailing temporal trends and long term soil fertility changes will be released soon.

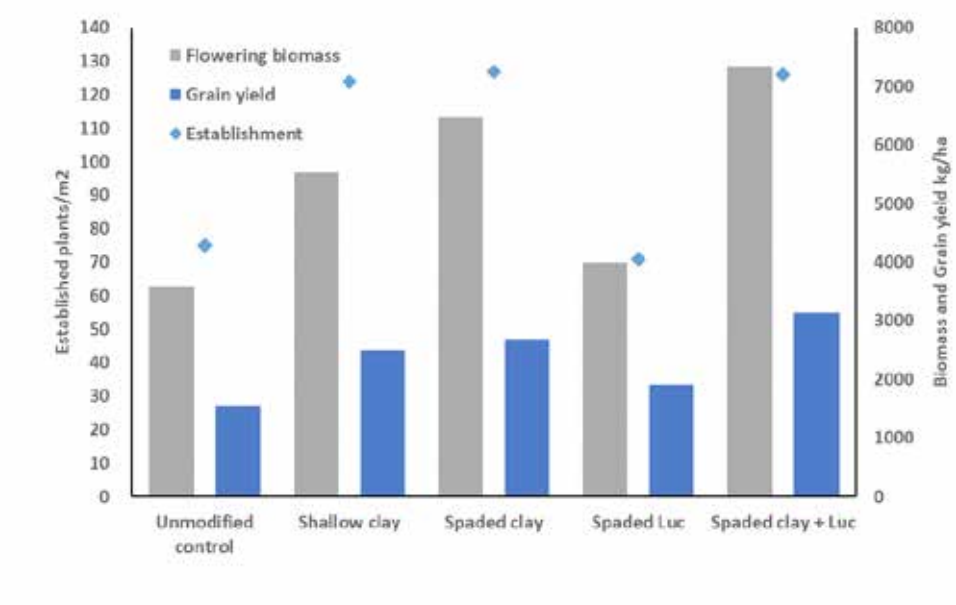

Figure 1: Crop measures for key treatments at Cadgee in 2018.

Why was the trial undertaken?

The objective of this trial was to assess changes in crop productivity as a result of overcoming the chemical, physical and biological constraints of a sandy soil at Cadgee.

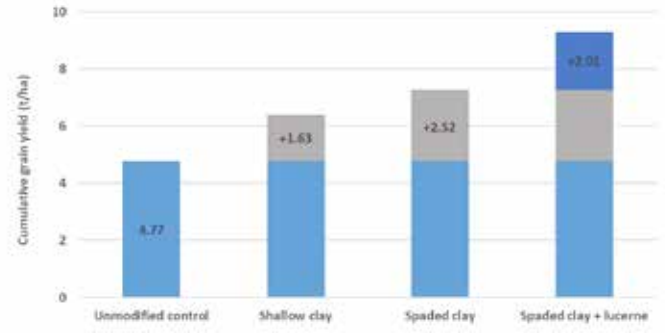

Figure 2: Total grain produced (2014/2015/2017/2018). Bars show the baseline control (blue), gains from the application of clay (grey), and additional gains from the 2014 incorporation of Lucerne hay (dark blue).

How was the trial undertaken?

Soil amendments including clay, lucerne hay and fertiliser were incorporated into the top 30 cm of the sand either alone or in combination to assess their impact on crop production and soil fertility. Amendments were applied in 2014 and incorporated using a spader; they have not been reapplied. Long term crop productivity gains were best attained when clay was applied, adding ~1.6 t/ha over a 5 year period when incorporated in the top 10 cm and ~2.5 t/ha when mixed to 30 cm (Fig. 2). An additional 2 t/ha was gained when lucerne was added to the spaded clay treatment (95% increase above the control).

ACKNOWLEDGEMENTS

- We acknowledge the assistance and contribution of Karatta Pastoral, the co-operators at the site. CSP00203 Sandy Soils is a collaboration between CSIRO, University of South Australia, SA state government through Primary Industries and Regions SA, Mallee Sustainable Farming Inc, AgGrow Agronomy and Trengove Consulting.