

# Sandy Soil Amelioration & Mitigation Practices – Impacts Monia Gap, NSW

**Authors:** Rachael Whitworth<sup>1</sup>, Barry Haskins<sup>1</sup>

<sup>1</sup>Ag Grow Agronomy and Research

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

## Key Messages

- Despite having a lower plant population and poorer establishment, spaded treatments caught up to the district practice control treatment.
- There was no yield effect of spading alone; no impact of Rip60 in combination with spading; no effect of spading single ameliorants - chicken manure or gypsum;
- There was a 0.5 t/ha gain in yield from spading chicken manure plus gypsum in combination.



## Background

The site chosen for this validation trial was characterised in 2016/2017 as part of the initial trial selection site for the current sandy soil project at David Heath's at Yenda.

The site is a deep red sand with surface acidity, typical of around 30% of the regions sands which has low OC and low CEC. It has roots typically to about 15-20 cm before a hard silty layer is met. Yield on sand hills is typically significantly lower than other areas of the paddock and well below their potential and often finish the season with unused soil moisture (even in drought years).

Issues previously identified on sandy soils through trial work, include soil acidity, nutrition and root penetration. These constraints to production form the focus of this validation trial, with the aim of the trial to evaluate the use of deep cultivation approaches on sand hills to improve crop uniformity and performance and to further evaluate the impact of gypsum and manure on crop performance, in addition to cultivation alone.

## About the trial

The trial was established in April 2019 at Jager Farming "Kurrajong Park" in Monia Gap NSW, 120 Km N of Griffith NSW.

The trial consisted of six treatments, including a control (district practice). The treatments were:

1. Control (district practice)
2. Ripped (60-70cm) and spaded
3. Spaded
4. Spading plus 1.5 t/ha gypsum
5. Spading plus 2.5 t/ha manure
6. Spading plus 1.5 t/ha gypsum and 2.5 t/ha manure



The amendments (1.5 t/ha Gypsum and 2.5 t/ha lime) were applied on 8<sup>th</sup> April, 2019, with the spading and deep ripping treatments applied on 9<sup>th</sup> April, 2019. The trial site was sown with a Borgault double shoot seeder on 21<sup>st</sup> April, 2019 with Suntop wheat at 50kg/ha. The trial was replicated 3 times, with plot sizes 12m by 2m (24m<sup>2</sup>), with appropriate pest, disease and weed control undertaken on the each throughout the season.

The key soil properties of the site are shown in table 1. Soil data suggests acidity is only mild, with Mg and Na levels elevated in comparison to Ca below 20cm.



**Table 1.** Site characteristics – key soil properties of the Monia Gap site

Depth (cm)	Total OC (%)	EC (µS/cm)	pH (CaCl <sub>2</sub> )	Colwell P (ppm)	Ca (mg/kg)	Mg (mg/kg)	Na (mg/kg)
0-10	2.61	16.9	6.0	15.00	346.3	71.9	8
10-12	2.21	12.7	5.7	-	-	-	-
12-16	2.86	13.3	6.3	-	620.1	89.1	8
16-40	1.17	36.8	7.2	-	771.9	143.4	25.3
40-60	1.12	67.6	7.6	-	1026.9	290.5	71.9
60-80	0.84	102.9	7.7	-	934.7	366.6	48.4
80-100	0.79	134.4	7.9	-	2388.5	711.9	313.6

The 2019 season was characterised by a continuation of the 2018 drought, with the greatest climatic effect upon the region being that of drought. Good rain in April and May provided a strong start to the cropping season, however below average rainfall was recorded for all other months, table 2. Annual rainfall of the area is usually 380mm, with 190mm GSR.

**Table 2.** 2019 Rainfall and Growing Season Rainfall (GSR) for the Monia Gap site.

MONTH	Rainfall (mm)
January	0
February	0
March	18
April	27.5
May	45
June	27
July	14
August	11.5
September	7
October	0
November	23
December	0
<b>TOTAL</b>	<b>173</b>
<b>GSR</b>	<b>132</b>



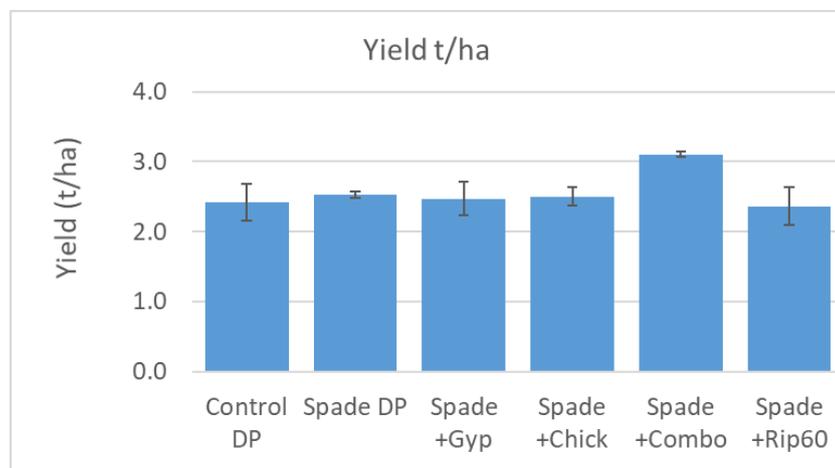
The plant growth impacts that were assessed in 2019 were establishment, NDVI and grain yield and grain quality. Grain yield results are presented below.

## Results & Discussion

The trial was harvested on 18<sup>th</sup> November, 2019. Due to the third replicate being lost to farmer harvest, wheat yields are based on 2 replicates +/- standard deviation.

The average wheat yield of the trial was 2.56 t/ha. Yields ranged from 2.37 t/ha for the ripped (60-70cm) and spaded treatment to 3.11 t/ha for the spading plus 1.5 t/ha gypsum and 2.5 t/ha manure combination, figure 1.

**Figure 1.** 2019 Wheat yields (t/ha) of Monia Gap validation trial.



Spading plus 2.5 t/ha manure and 1.5 t/ha gypsum was the highest yielding treatment in the trial, yielding 3.11 t/ha, compared to 2.42 t/ha for the district practice control; 2.50 t/ha for the spaded and manure alone treatment and 2.47 t/ha for the spaded and gypsum alone treatment.

## Implications for commercial practice

The trial has initiated further demonstrations in the area, with growers conducting their own ripping test strips on both sands and heavy clays to try and improve crop uniformity and performance.

The use of ameliorants, manure and gypsum, in conjunction with cultivation has shown to have a positive impact on crop performance. Continued yield monitoring of the validation trial will be undertaken in 2020 and 2021 to gauge the longevity of the effect of the treatments over multiple seasons.

## Acknowledgements

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