

August 2017, Wee Waa NSW

Both paddocks were planted with durum wheat in the first week of June. Both grew chickpea crops in the previous year and wheat the year before that.

The non-TM treated area received 100kg/ha Urea pre-seeding. The TM treated area received its first TM application 8 weeks prior to planting and the wheat seed was treated with TM Germination.

Since seeding both areas have received 35mls rain.

Soil and plants from both areas were examined by Dr Maarten Stapper and Agronomist Keiran Knight.

The Soil

The first obvious difference was in the structural appearance and the colour of the soil between the treated and untreated areas. The soil in the non-treated area was very dry and dominated by very firm, coarse clods with few finer aggregates which indicates poor soil structure and porosity. The soil from the TM treated area consisted of friable fine aggregates with sub-angular and sub-rounded aggregates meaning that it has good soil structure which is greatly important as it regulates soil aeration, soil temperature, infiltration and the movement and storage of water, nutrient supply, root penetration and development. It was also noted that the soil from the TM area of the paddock was cooler and moister when handled which is a result of the benefits of good structure with the active soil biology. The soil in the TM area of the paddock was a shade darker than the soil from the non-treated area of the paddock which is an indication that the TM treated soil was higher in organic matter because in general, the darker the colour, the greater the amount of organic matter and humus in the soil (Shepherd 2009).



Soil and plants from non-treated area on left, soil and plants from TM area on right

The Plants

When comparing the wheat plants from both the treated and non-treated areas there were notable differences. The root systems of the TM treated area plants were much denser and better developed, with considerably more finer feeder roots. Crops with deep roots and high root density can access and utilise a greater proportion of the soil for water and nutrients compared to crops with a shallow, less developed root systems, as seen. Crops with a dense root system are less reliant on high application rates of fertiliser and nitrogen to generate growth. (Shepherd 2009) This would explain why the TM treated crop, which had not received any fertiliser or nitrogen application was evidently more robust than the crop in the non-treated area (see photos) despite having a pre-plant urea application. The fact that the soil in the non-treated area is of poor structure and porosity is further restricting the root system from penetrating the hard clay pan to access moisture and nutrients.

The plants in the TM treated area were larger and a visibly darker shade of green than the plants in the non-treated area, indicating a better nitrogen status. Both TM and non TM sampled plants had similar tillering with one node visible at the start of stem elongation. It will be interesting to observe between the treatments how many of the six tillers will survive and make heads this month. When looking at the two areas of the paddock the TM area had a much more consistent and even stand of plants right across the paddock, indicating a potential yield increase.



Five-year TM treated area



Non-treated TM area 100kg/ha Urea