

TWINN SOIL C EFFECTS

High levels of Soil Organic Carbon (SOC) are a critical component to good quality soil. High SOC increases soil nutrient retention, increases reserves of mineralised nitrogen and increases water holding capacity. Soils with high SOC usually have a friable, well aerated structure that encourages good root mass and high growth rates. TwinN will act to increase soil carbon in three ways:

1. Use of TwinN enables a reduction in the amount of nitrogen fertiliser needed to maintain good yields. This means that the negative effects of nitrogen fertilisers on SOC (and general soil structure and health) are reduced. Less nitrogen fertiliser applied means reduced detrimental effects - simple as that.
2. Use of TwinN has been shown to increase root mass and larger roots are a very effective way to increase SOC. Roots remain in the soil and directly increase SOC, unlike surface trash which is converted to SOC less efficiently, although it is still valuable.
3. TwinN will help develop a thriving soil microflora and the growth and activities of these microorganisms contributes directly to accumulation of SOC - as well as helping grow healthy crops.

Many factors decrease SOC, including excessive tillage, but two recent publications have pointed to other causes. The studies focused on the effects of low, intermediate and high levels of nitrogen fertiliser on SOC and associated nitrogen reserves in soils from the Morrow plots in Illinois, USA. These plots are a great resource as they have been maintained as research plots under continuous nitrogen fertiliser and crop systems for 40-50 years.

The traditional belief has been that use of synthetic nitrogen increases SOC by increasing biomass which can then be incorporated into SOC. It seems this is correct when comparing low fertility soils after adding low levels of nitrogen fertiliser - SOC can rise over time because biomass is raised from very low levels. But in normal soils under 'normal' to high nitrogen fertiliser applications, the opposite occurs. In 2007, a landmark publication by Khan et al., from the University of Illinois (J. Environ. Qual. 36:18211832), titled 'The Myth of Nitrogen Fertilization for Soil Carbon Sequestration', showed clearly that SOC levels in these long term plots was decreased as more nitrogen fertiliser was applied. A follow-up publication in December 2009 titled 'Synthetic Nitrogen Fertilizers Deplete Soil Nitrogen: A Global Dilemma for Sustainable Cereal Production' (Mulvaney et al., J. Environ. Qual. 38:22952314) examined soil nitrogen levels in the same plots and reported that the soil nitrogen levels were also depleted in these plots - and more so at higher long term nitrogen fertiliser rates.

These well respected publications are useful to confirm what many farmers know anyway - too much nitrogen fertiliser burns off your soil carbon.



SUPER LOW CARBON FOOTPRINT

TwinN accounts for 7.2 Kg CO₂-e per 5 ha ie. 1.44 Kg CO₂-e per 1 ha

- Delivered to farm gate
- Applied longest international transport route

Assessed by Carbon Associates

CORPORATE RESPONSIBILITY

Mapleton Agri Biotec have purchased carbon offsets equivalent of 128% of the carbon footprint of TwinN.

COMPARISON TO UREA

- Urea accounts for 4.0 Kg CO₂-e per Kg urea applied to the crop per hectare
- Add 2.0Kg CO₂-e per 1 ha for application of TwinN to the crop giving total carbon footprint of TwinN applied to the crop of 3.44 Kg CO₂-e per hectare

Assessed using the RFA Bio Calculator

If the application of TwinN enables a reduction of 70 Kg urea per hectare, there will be a saving in carbon footprint exceeding 275 Kg CO₂-e per 1 hectare.

Enough Urea to treat 1000ha applied@~70kh/ha:



280Kg CO₂-e/ha
70 tonnes sent by road train

Enough TwinN to treat 1000ha applied at 1 vial/5ha:



3.44Kg CO₂-e/ha
200 vials sent by post

Product packaging in European countries now display prominent Carbon Footprint labelling. There will be pressure on exported Australian products to adopt this trend. TwinN can help farmers stay ahead of these challenges.