AUSTRALIAN NATIVE LANDSCAPES PTY LTD

Grower Guide # 101

Nitrohumus® compost for agriculture: wheat

Demonstrated benefits to wheat from use of compost

- Increased soil carbon and soil organic matter
- Improved soil structure
- Reduced runoff and erosion
- Increased nutrient retention
- Supplies macro nutrients and trace elements
- Increased water retention and soil moisture
- Reduced crop stress
- Increased crop yield
- Increased soil biology and reduced soilborne disease

www.anlscape.com.au/compost

Soil biology

- Composts supply both beneficial soil microorganisms and organic carbon
- Nitrohumus ® specification sheet quantifies the microbial activity and nutrient content from certified laboratory analysis
- GRDC research has shown that soil biological function in Australian dryland cropping soils is regulated by the amount of available carbon
- Carbon inputs have a major influence on soil biological activity, and lead to increased suppression of many soil borne fungal diseases
- This results from increased competition by soil microbes for soil carbon and predation and inhibition of pathogens

The benefit in tonnes of grain due to soil improvement has been comprehensively demonstrated due to increased soil organic carbon, soil moisture, soil structure and soil biology.

Phil Wallace
Technical Director, Enviros

Nitrohumus® compost quality

NSW Agriculture and Sydney Water collaborated on a 10 year comprehensive research program on the safe and beneficial use of biosolids on land. ANL partnered with these agencies for associated farm trials of Nitrohumus® biosolids compost.

This research program identified agronomic and soil fertility benefits of biosolids and directly informed the NSW EPA (1997) biosolids guidelines. ANL composts comply with all relevant requirements of the NSW EPA biosolids guidelines.

ANL worked directly with NSW Agriculture to develop biosecurity protocols for compost production, and was the first compost manufacturer in Australia achieve certification under the resulting CA-05 compliance agreement for the unrestricted movement of biosafe compost products throughout NSW.

All ANL composts are manufactured to the same rigorous QA methods to comply with production procedures in AS4454 and the biosecurity requirements specified in NSW Agriculture protocols, ensuring destruction of pathogens, weeds and weed seeds that may have been present in the raw materials.

ANL facilities operate under ISO9001 quality assurance procedures to manufacture a range of Australian Standard AS4454 certified composts, a range of NASAA certified composts, and a wide range of purpose specific composts designed to maximise benefit to particular applications.

Benefits of composts for agriculture

Composts deliver a range of verified physical, chemical and biological benefits for soils.

Soil carbon and soil structure

Composts contain organic carbon (organic matter) and humic compounds that assist soil aggregation and improve soil structure and porosity.

In heavy soils composts reduce bulk density, increase moisture infiltration and permeability, and reduce erosion and runoff.

In light soils composts improve moisture holding capacity, improve moisture retention and reduce nutrient leaching.

Organic carbon and soil moisture increases soil microbial activity, contributing to the aggregation of soil particles and the stability of those aggregates through the production of organic 'glues' and fungal hyphal networks.

Soil biology and disease suppression

CSIRO and GRDC research has shown that soil biological function in Australian dryland cropping soils is regulated by the amount of available carbon (C). This carbon is required by soil microbes as a source of energy.

Australian soils are low in biologically available carbon therefore carbon inputs have a major influence on soil

biological activity by supporting greater competition for soil resources, and predation and inhibition of pathogens. This leads to increased suppression of many soil borne fungal diseases.

GRDC trials maintain that effective soil suppression of disease has now been identified across a range of soils and environments, related to increased carbon inputs to the soil.

Soil moisture and water retention

Farm trials have shown average soil moisture increase of 8.9% at a 10t/ha compost application rate. These trials concluded that improvement in soil moisture was the major contributing factor for the improvements in crop growth and wheat yield.

Improved soil structure and moisture encourage increased plant root growth, increasing both hardiness and vigour.

GRDC research projects have shown that soil moisture at grain fill is central to maximising grain yield; and that moisture stress during grain fill makes crops more vulnerable to yield losses from soil borne disease, including crown rot.

Farm trials have concluded that improvement in soil moisture was central to increased wheat yield from compost use. Composts assist crops to make the most of available water.

Nutrient management and fertiliser contribution

The organic matter and humic compounds in composts increase the cation exchange capacity (CEC) of soils, enabling soils to retain nutrients longer, and reducing nutrient loss by leaching. This allows plants to more effectively utilize nutrients that are applied as fertiliser.

Composts can also enhance access of plant roots to soil-bound nutrients via two mechanisms.

Firstly, improved pH increases solubility of nutrients. Wheat farm trials of biosolids compost with neutral pH effected an average pH increase from 5.5 in the control block to 5.9 at the 10t/ha compost application rate due to the $CaCO_3$ content.

Secondly, humic compounds and various soil organisms can function as powerful cation-complexing agents that can directly dissolve minerals and precipitates or can chelate with cations to release minerals and nutrients into the soil ecosystem that were previously biologically unavailable.

Composts also contain nutrients N, P, K, S, Ca and Mg in particular, at varying levels. The majority of N is present in organic forms, and is released over time through mineralisation. ANL can advise on nutrient contribution from compost use.

Crop yield

The objective is sustained farm productivity and reduced risk of crop failure. ANL can advise on compost selection and application to best benefit to your soil and your crop.

Soil moisture and crop yield

- Each 1% increase in soil organic carbon has been calculated to add 144,000 litres per hectare of soil water holding capacity

GRDC research has shown that:

- Soil moisture at grain fill is key to maximising grain yield
- Moisture stress during grain fill makes crops more vulnerable to yield losses from crown rot
- Wheat farm compost trials have demonstrated significant increase in soil moisture
- These trials concluded that improvement in soil moisture was the major contributing factor for the improvements in crop growth and yield

There were no adverse effects on crop germination observed at any of the farm sites.

The major impact of the use of compost in this situation [winter wheat] has been via soil moisture improvements.

Steven David
Organic Farming Systems

ANL 30 tonne compost spreaders applying compost to farms in NSW, wheat (above), and pasture (below).

Increased wheat yields

- Farm trials using 1 Ha plots on 7 farms resulted in average wheat yield increase of 13% for 10 tonne/Ha compost application in addition to normal farm practice.
- One farm acheived a yield increase of 39% from compost use in addition to normal farming practice.
- There were no adverse effects on crop germination observed at any of the farm sites.

Making it work on your farm

Integration into farm management practices

ANL recommends that farmers consider how compost use will be integrated with existing farm management practices. Considerations for compost product selection and use are:

- Soil organic matter levels
- Other characteristics of your soils
- Objectives for soil health improvement
- Variation in soils and productivity across your farm
- Current soil management and fertiliser practices
- What are the key issues you want to address?

This information can assist ANL representatives to maximise the value you can achieve from compost use.

How to apply compost

ANL operates 30 tonne spreaders to apply quality composts. The compost can remain on the surface, or can be applied before seed bed cultivation to incorporate into the soil surface.

Contact your ANL representative for availability in your area.

References

The information contained in this publication is based on knowledge and understanding at the time of writing. Results for individual properties will vary as soil, climate, seasonal weather, varietal selection, application rates and timing, and cropping practices differ.

Because of advances in knowledge, users are reminded of the need to check information for accuracy and currency, and for relevance to their individual property and practices.

References for this publication and a listing of independent NSW Agriculture field and other farm trials using ANL composts are available via the ANL website below.

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