

Action on the Ground (AOTG) projects 143 – *Improved soil, fertiliser and irrigation management for SEQ ginger production* and **218** *Improved fertiliser and soil management in south east Queensland intensive horticulture*. The projects concluded in September 2015, and were led by Zane Nicholls with valued assistance from Sam Price (HF&S) and with collaboration from industry partners Australian Pineapples, Queensland Strawberry Growers' Association and the Australian Ginger Industry Association.

The projects provided industry firsts for documenting nitrous oxide (N₂O) emission generation in ginger, pineapple and strawberry production systems from granular fertilisers, and measurement of total organic and labile soil carbon stocks in ginger. The key project deliverables were to promote plant health, yield and nutrient efficiency benefits of controlled release nitrogen (CRN) fertiliser use in the respective industries, and develop mixed fallow cover-crop options that build labile carbon and total organic soil carbon stocks in ginger under two land management scenarios.

The key findings were:

143 Ginger – a replicated N₂O trial comparing conventional practice (pre-plant fertiliser and overhead fertigation) against a one-off nine month CRN produced a 34% reduction in emissions in favour of CRN. Yield increases averaged 18% in favour of CRN. Total organic soil carbon stocks increased by 3.9 t/ha and 0.8t/ha under the two land management scenarios. A direct outcome from the project has seen 60% of the industry adopting CRN for the 2015 season. The project covered 18 ha of production area engaging 5 farm sites. Successful DAF research on greenhouse gas emission reduction techniques provides new standards in commercial ginger production where controlled release nitrogen fertiliser is now the new current practice. The improved nutrient delivery program increases yield and reduces background environmental impacts.

218 Pineapples - fertiliser trials comparing pre-plant and side-dress fertiliser phases for conventional (CV) practice against a 50% four month CRN fertiliser applied at 70% of the CV rate to deliver a cost-per-hectare equivalency between treatments produced encouraging results. On-farm demonstration trials indicated a 2.5% increase in yield for CV practice treatments, while the replicated N₂O emissions trial realised a 14% reduction in emissions in favour of CRN. A sub-surface fertiliser spreader was developed to improve fertiliser use efficiencies. The project covered 19.3 ha of production area involving 10 individual farm sites.

218 Strawberry - an N₂O emission trial comparing conventional practice with a one-off eight month 100% CRN fertiliser realised an 8.9% reduction in favour of CRN. Strawberry yield was essentially equal between treatments in 2013, while in 2014 production with CRN was 2.3% lower than CV practice. The project covered 7.1 ha of production area engaging one farm site.

The project outcomes provide evidence of improved fertiliser efficiency and the results suggest that controlled release fertiliser can be an economically viable alternative to current conventional nutrient management practices in ginger, pineapple and strawberry, and importantly provides environmental benefits in terms of reduced nitrous oxide emissions and less nutrient leaching.

All - A common outcome generated from all N₂O emissions studies was consistent and sometimes very high N₂O emissions after rainfall from the inter-row space regardless of the nutrient program, despite inter-rows comprising only 20-26% of the production area. The inter-rows produced in some instances 50% of the total emissions captured. However, these results are consistent with other

studies where a relatively high bulk density associated with soils under intensive management show an increase in N₂O emissions when the soil saturates quickly.



Caption - Zane Nicholls discussing AOTG project outcomes to multi-industry farmers from the Burnett Mary River region 30th April 2015.

Zane Nicholls

Development Horticulturist

Department of Agriculture and Fisheries

T 07 5381 1391 M 0412 032 965

E Zane.Nicholls@daf.qld.gov.au

GPO Box 5083 SCMC, Nambour QLD 4560