



IPNI REGIONAL REVIEW

Australia/New Zealand Program

Key Issues & Needs

- **Maintaining on-farm productivity and profitability** with variable weather patterns, using scientific evidence to maximize the benefits of crop nutrients.
- **Demonstrating the long-term effects** of crop nutrient management on soil health and crop productivity.
- **Restore and enhance confidence** in the science that supports nutrient management decisions for agriculture.
- **Communication among growers, agronomists and researchers** about national and international opportunities to enhance nutrient performance through the adoption of 4R Nutrient Stewardship.

TACTICAL PLAN highlights & priorities

4R Stewardship

Provide regionally relevant examples of 4R Nutrient Stewardship for fertilizer used in the grain, sugar, and dairy industries.

Develop 4R nutrient guides for N, P, and K for wheat, canola, and pulses within the main agroecological zones.

Nutrient Education

Adapt IPNI information series and the latest science for local use, providing relevant regional examples.

Provide technical support to fertilizer industry stewardship initiatives such as FertCare®.

Support and promote the local, regional, and national discussions on topics relevant to developing 4R Nutrient Stewardship.

Improved Fertilizer Recommendations

Engage with influential national research programs to improve nutrient management guidelines.

Participate in industry meetings to promote interpretation and understanding of soil test results.

Participate in key projects collating field crop yield data to interrogate soil test critical values through an on-line database.

Enhancing Sustainability

Collect and publish crop nutrient concentrations as a guide to estimate nutrient use efficiency.

Publish data from long-term fertilizer experiments to estimate changes in soil carbon and nutrient levels.



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examples of IMPLEMENTING THE TACTICAL GOALS

Significant Partnerships:

- The IPNI-ANZ program is on the steering committee of the Grains Research and Development Corporation project: *More Profit from Crop Nutrition*. This initiative funds 25 individual research projects in the grains sector from all states.
- IPNI works closely with agricultural groups such as Dairy Australia and Sugar Research Australia on their important nutrient-related issues.
- The IPNI regional program provides regular technical and training support for Fertilizer Australia.

Educational Activities:

- Frequent presentations are made at meetings for growers and farm advisers. The presentations are posted on the GRDC and IPNI-ANZ websites for use by other groups and for publication in their industry magazines.
- IPNI-ANZ was instrumental in organizing the 7th International Nitrogen Conference in Melbourne, Australia in 2016. There were 384 delegates from 44 countries, and over 200 refereed papers presented.

Engagement in Industry:

- IPNI supported member companies operating in Australia with field experiment design and analysis, as well as specialized training programs for their clients and staff.
- Fertilizer Australia and IPNI have collaborated to develop training and extension materials to support the industry stewardship program Fertcare®.
- Dr. Norton holds an adjunct Associate Professor position with The University of Melbourne, which provides excellent opportunities for academic collaboration.

Research Leading to Impact:

- Nutritional information to support the rapidly developing area of canola production was published as the "4R Nutrient Management Guide for Canola."

Grower and adviser confidence in soil testing has been enhanced through the *Better Fertilizer Decisions for Crops* database, which houses data from over 6,000 fertilizer experiments that can be interrogated for soil test critical values by crop, nutrient and soil type.

Sustainable nutrient management practices have been demonstrated and published using data from a 19-year N x P experiment undertaken with grain crops in the Victorian Wimmera region.

Changes in Nutrient Practices:

Research supported by IPNI-ANZ has encouraged growers to manage N fertilizer based on potential wheat yields and emerging weather conditions. Most growers now defer N application until stem elongation or later, adjusting rates in recognition of changing yield potentials. As a consequence, N use efficiency can be dramatically increased.

There is renewed interest in K nutrition, particularly as the southern grains industry expands into regions with low-K soils with crops with a high K demand.

Data on grain nutrient concentrations have been collated to show how crop nutrient removal can guide fertilizer replacement applications (especially for P and Zn).

Leadership in Plant Nutrition Issues:

Dr. Norton serves on the Regional Cropping Solutions Network, providing guidance for grains industry research. He also serves on the Australian Soil and Plant Analysis Council Fertcare® technical committee as the current Secretary of the Australian Society of Agronomy.

Between 2012 and 2016, collaborations with industry and science researchers have enabled Dr. Norton to publish 45 refereed scientific journal and conference papers, as well as another 94 technical reports, articles in industry publications and information bulletins.

IPNI is a nationally recognized leader, viewed as providing reliable, unbiased and scientifically supported information on nutrient management.

EXAMPLES OF IPNI IMPACT

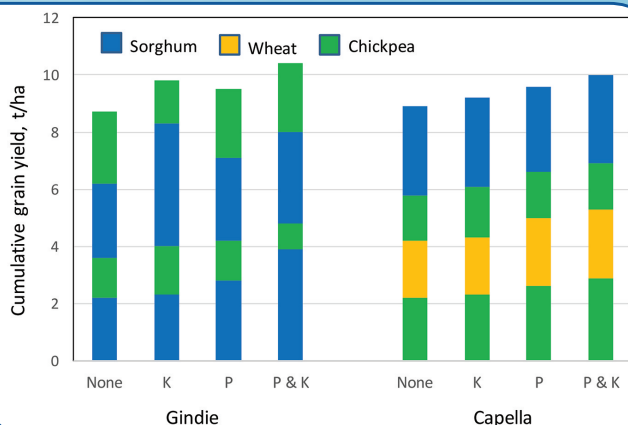
Deep Placement of Fertilizer Boosts Yields in Dry Soils

In the drought-prone summer-dominant rainfall regions of central and southern Queensland, crop yields are largely driven by the amount of stored water in the soil. Because the topsoil (0 to 10 cm) is typically dry during the winter cropping phase (wheat or chickpea), the plant roots cannot exploit nutrients that are present in the dry part of the soil profile. As a result, crop yields are low, soil tests based on topsoil analysis are unreliable, and responses to nutrient applications are unpredictable.

In 2011, a one-time application of P and K (alone or together) was drilled 20-cm deep into the soil at two

locations. Since that time, the fields have been cropped by the growers using their normal practices, with no additional deep nutrients applied. Where deep nutrients were added, the total yield increase of the first four crops over the control were 11% and 3% to K alone, and 8% and 9% to P alone at two sites. However, when both P and K were supplied together, yields increased by 20% and 11%.

The deep co-placement of P and K improves crop uptake of nutrients and yield more than when either nutrient is supplied alone or at seeding, showing improved root access to the deep-placed nutrients.



▶ Deep placement of both P and K result in greater grain yields than either one alone, with the benefit still persisting several years after application. Placing nutrients at a 20-cm depth allows roots to continually extract nutrients even after the topsoil has dried.



IPNI
INTERNATIONAL
PLANT NUTRITION
INSTITUTE

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