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PROGRAM SCIENCE PUBLICATIONS AND CONFERENCE LIST

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Please contact the MPfN Science Coordinator:

Marguerite White: mwhite@icdprojectservices.com.au

Visit www.crdc.com.au/more-profit-nitrogen

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Australian Government
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CRDC
COTTON RESEARCH AND DEVELOPMENT CORPORATION

Dairy Australia

sra
Sugar Research Australia

Hort Innovation

COTTON

RRDP1712- Enhancing nutrient use efficiency in cotton

Lead Partner: NSW Department of Primary Industries

Partners: Cotton Research and Development Corporation, CSIRO, The University of Melbourne and The University of Queensland

Project Leader: Dr. Graeme Schwenke

Journal Papers- published

Bai M, Suter H, Macdonald B, Schwenke G (2021) Ammonia, methane and nitrous oxide emissions from furrow irrigated cotton crops from two nitrogen fertilisers and application methods. *Agricultural and Forest Meteorology* **303**, 108375. https://doi.org/10.1016/j.agrformet.2021.108375

Macdonald BCT, Latimer JO, Schwenke GD, Nachimuthu G, Baird JC (2018) The current status of nitrogen fertiliser use efficiency and future research directions for the Australian cotton industry. *Journal of Cotton Research* **1**(1), 15. https://doi.org/10.1186/s42397-018-0015-9

Journal Papers- in review

Latimer JO, Macdonald BTC, Schwenke GD, Nachimuthu G, Baird J (2021) Alternate furrow flood irrigation removes significant nitrogen from the field through lateral leaching. *Soil and Tillage Research*. (in revision)

Macdonald BCT, Schwenke GD, McPherson A, Mercer C, Baird J, Nachimuthu G (2021) Soil water deficit effects on soil inorganic nitrogen in alternate-furrow flood irrigated Australian cotton production systems. *Soil Research* (Accepted).

Macdonald BCT, Schwenke GD, Nachimuthu G, Baird J, McPherson A, Mercer (2021) Furrow irrigated transgenic cotton response to nitrogen fertiliser timing. *Crop and Pasture Research*. (in review)

Nachimuthu G, Schwenke GD, Mercer C, Bischof C, Hulme P, Bell M (2021) A short review of phosphorus nutrition in irrigated cotton farming systems of Australia. *Journal of Cotton Research*. (in review)

Journal Papers- in preparation

Schwenke GD, Nachimuthu G, Baird J, Macdonald BTC, McPherson A, Mercer C () Reducing export of nitrogen in irrigation runoff during irrigated cotton production.

Baird J, Macdonald BTC, Schwenke GD, Nachimuthu G, McPherson A, Mercer C () Improved nutrient and water efficiency with optimised management strategies in Australian cotton systems.

Nachimuthu G, Schwenke GD, Baird J, Macdonald BTC, McPherson A, Mercer C () Effect of tillage and crop rotations on phosphorus stratification in cotton farming systems of Australia.

Nachimuthu G, Schwenke GD, Baird J, Macdonald BTC, McPherson A, Mercer C () Phosphorus balance in irrigation network of cotton fields in Australia.

Nachimuthu G, Schwenke GD, Baird J, Macdonald BTC, McPherson A, Mercer C, Hundt, A and Sargent B (2022). Effect of N management options on fertiliser P use efficiency.

Baird J, Macdonald BTC, Schwenke GD, Nachimuthu G, McPherson A, Mercer C () Optimising nitrogen fertiliser application timing to improve N recovery in high yielding Australian cotton systems.

Baird J, Macdonald BTC, Schwenke GD, Nachimuthu G, McPherson A, Mercer C () Uptake and translocation of fertiliser-sourced N in a modern cotton cultivar as influenced by N fertiliser application timing.

Baird J, Macdonald BTC, Schwenke GD, Nachimuthu G, McPherson A, Mercer C () The lateral and vertical leaching of fertiliser N in a flood/furrow irrigation cotton system: a field ^{15}N study.

Conferences

Baird J, Schwenke G, Nachimuthu G, Macdonald B (2021) Quantifying the lateral leaching of nitrogen fertiliser in an irrigated cotton field using a 15^N isotope tracer. Paper submitted for oral presentation at the Soil Science Australia and the New Zealand Society of Soil Science Joint Conference, 27 June–2 July 2021, Cairns.

Macdonald B, Schwenke G, Mercer C, McPherson A, Baird J, Nachimuthu G (2021) Irrigation deficits impact nitrogen mineralisation in vertosols used for cotton production. Paper submitted for oral presentation at the Soil Science Australia and the New Zealand Society of Soil Science Joint Conference, 27 June–2 July 2021, Cairns.

Nachimuthu G, Schwenke G, Mercer C, Baird J, Watkins M, McPherson A, Hundt A, Hulugalle N (2021) Dissolved phosphorus movement and balance within cotton fields. Paper submitted for oral presentation at the Soil Science Australia and the New Zealand Society of Soil Science Joint Conference, 27 June–2 July 2021, Cairns.

Schwenke G, Macdonald B, Nachimuthu G, Baird J (2021) Does excess nitrogen fertiliser affect in-crop nitrogen mineralisation in irrigated cotton soils? Paper submitted for oral presentation at the Soil Science Australia and the New Zealand Society of Soil Science Joint Conference, 27 June–2 July 2021, Cairns.

Mercer C, Nachimuthu G, Schwenke G, Guppy C, Flavel R (2021) Cotton root responses to phosphorus and nitrogen fertiliser and irrigation management. Paper submitted for oral presentation at the Soil Science Australia and the New Zealand Society of Soil Science Joint Conference, 27 June–2 July 2021, Cairns.

Baird J, Schwenke G, Nachimuthu G, Macdonald B (2020) Optimising nitrogen and irrigation management in Australian cotton – plant growth response. Paper accepted for oral presentation at INI2020: 8th Global Nitrogen Conference, Berlin, Germany, 30 May – 4 June 2021.

Schwenke G, Nachimuthu G, Baird J, Macdonald B (2020) Reducing N runoff during irrigated cotton production. Presented at virtual INI2020: 8th Global Nitrogen Conference, Berlin, Germany, 30 May – 4 June 2021.

Hedayati M, Brock PM, Nachimuthu G, Schwenke GD (2019) Farm-level strategies to reduce the life cycle greenhouse gas emissions of cotton production: An Australian perspective. Proceedings of the 10th Australian LCA Conference, Cronulla (Sydney), 4–6 March 2019.

Schwenke G, Nachimuthu G, Baird J, Macdonald B, Mercer C, McPherson A, Hundt A (2019) Strategies for reducing N runoff from furrow-irrigated cotton cropping. Proceedings of 2019 Australian Cotton Research Conference, UNE, Armidale, NSW (Australian Association of Cotton Scientists). p. 100.

Baird J, Schwenke G, Nachimuthu G, Macdonald B (2019) Physiological response of cotton to nitrogen and irrigation management strategies. Proceedings of 2019 Australian Cotton Research Conference, UNE, Armidale, NSW (Australian Association of Cotton Scientists). p. 25.

Mercer C, Nachimuthu G, Schwenke G, Baird J, McPherson A, Hundt A, Bell M, Guppy C, Flavel R (2019) What is driving the sporadic cotton-lint yield response to phosphorus fertiliser? Proceedings of 2019 Australian Cotton Research Conference, UNE, Armidale, NSW (Australian Association of Cotton Scientists). p. 80.

Nachimuthu G, Schwenke G, Bell M (2018) Can soil structure alter the cotton fertiliser P response? (2018) Australian Cotton Conference, Gold Coast.

Baird J. (2018) Evaluating nitrogen. 2018 Australian Cotton Conference. Gold Coast

Macdonald B, Schwenke GD, Mercer C, McPherson A, Baird J, Nachimuthu G (2018) Soil nitrogen mineralisation and deficit irrigation in cotton production systems. Oral presentation at the National Soil Science Conference, Canberra. pp 35–36.

Schwenke GD, Mercer C, McPherson A, Baird J, Nachimuthu G, Macdonald B (2018) N fertiliser management can reduce N runoff from furrow-irrigated cotton. Oral presentation at the National Soil Science Conference, Canberra. pp 32–33.

Schwenke G, Grace P (2018) What can growers do to improve fertiliser nitrogen use efficiency (NUE)? Proceedings of 2018 Cotton nutrition tour, “Optimising irrigation and nitrogen tour”, held at Griffith, Warren, Moree, Burren Junction, Boggabilla, and Brookstead from 6–14 February 2018. (p. 7-8) (Cottoninfo; CRDC).

Schwenke G, Baird J, Nachimuthu G, Macdonald B, Mercer C (2017) The effects of different N application strategies on N runoff and NUE in northern irrigated cotton systems. Australian Cotton Research Conference. 5–7 September 2017. CSIRO Discovery Centre, Canberra. Oral Paper S34.

Baird J, Schwenke G, Nachimuthu G, Macdonald B (2017) Optimising nitrogen use efficiency through irrigation management in an Australian cotton system. Australian Cotton Research Conference. 5–7 September 2017. CSIRO Discovery Centre, Canberra. Oral Paper S33.

RRDP1713- Optimising nitrogen and water interactions in cotton

Lead Partner: University of Southern Queensland (Centre for Engineering in Agriculture)

Partners: Cotton Research and Development Corporation

Project Leader: Dr. Diogenes Antille *(now of CSIRO)*

Journal Papers- in preparation and review

Pittaway, P. A., Antille, D. L., Melland, A. R., Marchuk, S., Grant, I. ()Urea-derived ammonium displaces organic matter from soil mineral complexes. *Journal of Plant Nutrition and Soil Science* (In review).

Conferences

Pittaway, P., Antille, D. L., Melland, A. R. (2017). Fertiliser N in root exclusion tubes monitored over a cotton growing season. Proc. of the Australian Cotton Research Conference 'SciCott2017: Cotton science delivering impact'. 5-7 Sept. 2017, pp. 43. CSIRO Discovery Centre, Canberra, ACT, Australia: The Association of Australian Cotton Scientists.

DAIRY

RRDP1714- Increasing nitrogen use efficiency in dairy pastures

Lead Partner: Queensland University of Technology

Partners: Dairy Australia & NSW Department of Primary Industries

Project Leader: Ass. Prof. David Rowlings

Journal Papers- published

Friedl, J., Scheer, C., Rowlings, D.W., McIntosh, H.V., Strazzabosco, A., Warner, D.I., Grace, P.R., (2016). Denitrification losses from an intensively managed sub-tropical pasture – Impact of soil moisture on the partitioning of N_2 and N_2O emissions. *Soil Biology and Biochemistry* **92**, 58-66. https://doi.org/10.1016/j.soilbio.2015.09.016

Friedl, J., Scheer, C., Rowlings, D.W., Mumford, M.T., Grace, P.R., (2017). The nitrification inhibitor DMPP (3,4-dimethylpyrazole phosphate) reduces N_2 emissions from intensively managed pastures in subtropical Australia. *Soil Biology and Biochemistry* **108**, 55-64. https://doi.org/10.1016/j.soilbio.2017.01.016

Friedl, J., De Rosa, D., Rowlings, D.W., Grace, P.R., Müller, C., Scheer, C., (2018). Dissimilatory nitrate reduction to ammonium (DNRA), not denitrification dominates nitrate reduction in subtropical pasture soils upon rewetting. *Soil Biology and Biochemistry* **125**, 340-349. https://doi.org/10.1016/j.soilbio.2018.07.024

Mumford, M.T. Rowlings, D.W. Scheer, C. De Rosa, D. Grace, P.R. (2019). Effect of irrigation scheduling on nitrous oxide emissions in intensively managed pastures. *Agriculture, Ecosystems & Environment* **272**, 126-134, https://doi.org/10.1016/j.agee.2018.11.011

De Rosa, D., Rowlings, D.W., Fulkerson, B., Scheer, C., Friedl, J., Labadz, M., Grace, P.R., (2020). Field-scale management and environmental drivers of N_2O emissions from pasture-based dairy systems. *Nutrient Cycling in Agroecosystems* **117**, 299-315. https://doi.org/10.1007/s10705-020-10069-7

Friedl, J., Scheer, C., Rowlings, D.W., Deltedesco, E., Gorfer, M., De Rosa, D., Grace, P.R., Müller C., and Keiblinger, K.M. (2020). Effect of the nitrification inhibitor 3,4-dimethylpyrazole phosphate (DMPP) on N-turnover, the N_2O reductase-gene nosZ and N_2O:N_2 partitioning from agricultural soils., *Scientific Reports* **10** (1), 1-11. https://doi.org/10.1038/s41598-020-59249-z

Laura M. Cardenas, Tim J. Clough, Johannes Friedl and Benjamin Wolf. Nitrous oxide emissions from ruminant urine: science and mitigation for intensively managed perennial pastures, (2020). *Current Opinions in Environmental Sustainability* **47**, 61-71. https://doi.org/10.1016/j.cosust.2020.07.001

Johannes Friedl, Laura M. Cardenas, Timothy Clough, Michael Dannenmann, Chunsheng Hu and Clemens Scheer, (2020). Measuring denitrification and the N_2:N_2O emission ratio from agricultural systems. *Current Opinions in Environmental Sustainability* **47**, 61-71. https://doi.org/10.1016/j.cosust.2020.08.006

Rousset, C., Clough, T.J., Grace, P.R., Rowlings, D.W., Scheer, C., (2020). Soil type, bulk density and drainage effects on relative gas diffusivity and N_2O emissions. *Soil Research* **58**, 726-736. https://doi.org/10.1071/SR20161

Bilotto F., Harrison M.T., De Antoni Migliorati M., Christie K.M., Rowlings D., Grace P., Smith A., Rawnsley R.P., Thorburn P., Eckard R.J. (2021) Modelling soil nitrogen with APSIM, DairyMod and DayCent: can seasonal N mineralisation trends be leveraged to enhance pasture growth? *Science of the Total Environment.* https://doi.org/10.1016/j.scitotenv.2021.145031

De Rosa, D., Basso, B., Fasiolo, M., Friedl, J., Fulkerson, B., Grace, P.R., Rowlings, D.W., (2021). Predicting pasture biomass using a statistical model and machine learning algorithm implemented with remotely sensed imagery. *Computers and Electronics in Agriculture* **180**, 105880. https://doi.org/10.1016/j.compag.2020.105880

Friedl, J., De Rosa, D., Rowlings, D.W., Grace, P.R., Müller, C., Scheer, C., (accepted April 2021). Sources of nitrous oxide from intensively managed pasture soils. *Environmental Research Letters.*

Conferences

Rowlings, D., Johannes Friedl, Peter Grace (2020) N_2O losses from urine patches following application of DMPP coated urea in dairy pastures. 8th International Nitrogen Initiative Conference, 4-8 May 2020, Berlin, Germany (Abstract accepted for oral presentation).

Rowlings, D., Johannes Friedl, Sarah Carrick, Peter Grace (2020) N_2O losses from urine patches following application of DMPP coated urea in dairy pastures. Joint Soil Science Australia and New Zealand Society of Soil Science Conference, 27 June -2 July 2021, Cairns, Australia

Rowlings, D., Johannes Friedl, Daniele De Rosa, Sarah Carrick, Peter Grace (2020) DMPP coated urea increases pasture yields after long-term (3 years) application in a subtropical dairy pasture. Joint Soil Science Australia and New Zealand Society of Soil Science Conference, 27 June -2 July 2021, Cairns, Australia

Friedl, J., De Rosa, D., Rowlings, D.W., Grace, P.R., Müller, C., Scheer, C. (2019) Nitrate reduction in subtropical pasture soils – the role of dissimilatory nitrate reduction to ammonium (DNRA) and denitrification upon rewetting, EGU General Assembly Conference Abstracts.

Friedl, J., Clemens Scheer, David Rowlings (2019) Measuring denitrification and the N_2:N_2O emission ratio from agricultural systems. Proceedings of the workshop on "Climate change, reactive nitrogen, food security and sustainable agriculture" 15-16 April, 2019 Garmisch-Partenkirchen, Germany

Friedl, J., Scheer, C., Rowlings, D.W., McIntosh, H.V., Strazzabosco, A., Warner, D.I., Grace, P.R., (2016) Short-term effect of the nitrification inhibitor DMPP on N-turnover and denitrification losses from two agricultural soils in subtropical Australia, EGU General Assembly Conference Abstracts, p. 1833.

Thesis

Mumford, M., (2021) Quantifying denitrification losses from intensively managed pastures and evaluating the mitigation potential of irrigation and fertiliser management. PhD thesis, Queensland University of Technology https://eprints.qut.edu.au/208421/

RRDP1715- Improving dairy farm nitrogen efficiency using advanced technologies

Lead Partner: The University of Melbourne

Partners: Dairy Australia

Project Leader: Ass. Prof. Helen Suter

Journal Papers- published

Patel, MK, Ryu, D, Western, AW, Suter, H, Young, IM (2021) Which multispectral indices robustly measure canopy nitrogen across seasons: Lessons from an irrigated pasture crop. *Computers Electronics in Agriculture* **182** 106000. doi:10.1016/j.compag.2021.106000

Journal Papers- in preparation and review

Belyaeva, O, Ward, G, Wijesinghle, T, Chen, D, Suter, H () Nitrogen use efficiency in Australian temperate ryegrass pastures is driven by season and N rate, *Paper in preparation.*

Belyaeva, O, Ward, G, Wijesinghle, T, Chen, D, Edis, R, Suter, H () Efficiency of conventual and inhibited urea applied to rain-feed pasture in the temperate high rainfall region of Australia, *Paper in preparation.*

Pandey, A., Belyaeva, O, Suter, H () High nitrate loading under high soil moisture conditions enhances nitrous oxide rather than dinitrogen emissions *Paper in preparatio*n.

Patel, M.K., Jose, P., Ryu, D., Western, A.W., Fitzgerald, G., Perry, E.M., McBratney, A.B. and Suter, H. () Machine and deep learning for canopy nitrogen concentration and aboveground biomass estimation from hyperspectral data in ryegrass and barley across seasons *Paper in preparation.*

Patel, M.K., Ryu, D., Western, A.W., Fitzgerald, G., Perry, E.M., Suter, H. and Young, I.M. (2021) A new multispectral canopy nitrogen concentration index for ryegrass and barley applicable across growing seasons. *In review in ISPRS Journal of Photogrammetry and Remote Sensing, Elsevier*

Conferences

Arjun Pandey, Oxana Belyaeva, Dona Thushari Wijesinghe , Deli Chen & Helen Suter (2020) The influence of soil moisture on N_2 and N_2O emissions from an intensive dairy pasture, Joint Soil Science Australia and New Zealand Society of Soil Science Conference, 27 June -2 July 2021, Cairns, Australia

Suter, H.C., Belyaeva, O., Ward, G., Chen. D. (2020) Valuing soil organic matter for effective nutrient management in high input dairy pastures, Joint Soil Science Australia and New Zealand Society of Soil Science Conference, 27 June -2 July 2021, Cairns, Australia

Helen Suter, Oxana Belyaeva, Graeme Ward and Deli Chen (2020) Fate of ^{15}N-nitrogen fertiliser applied in high rainfall zone dairy pastures of south-western Victoria, Presented at virtual INI2020: 8th Global Nitrogen Conference, Berlin, Germany, 30 May – 4 June 2021.

Patel, M.K., Ryu, D., Western, A.W., Fitzgerald, G., Perry, E.M., Suter, H., & Young, I. (2020).Mapping Canopy Nitrogen Concentration across Ryegrass and Barley Crop using Random Forest Regression[B037-0012], presented at 2020 Fall Meeting, AGU, San Francisco, California, USA, 01-17 Dec.

Belyaeva O, Suter H, Ward G, Chen D (2019) Field calibration of the capacitance soil moisture probes for Brown Sodosol. *19th Australian Agronomy conference: Cells to satellites,* August 2019, Wagga-Wagga, Australia.

Patel, M, Ryu, D, Western, AW, Suter, H, Young, I (2019) Understanding the Seasonal and Growth-Stage Dependence of Remotely Sensed Vegetation Canopy Nitrogen Indices over Pasture. In 'AGU Fall Meeting Abstracts'. pp. B53A-01. Available

Ryu, D, Patel, M, Western, AW, Suter, H, Young, I (2019) Hyperspectral Remote Sensing of Canopy Nitrogen Concentration in Ryegrass using a Partial Least Square Regression Model. In 'AGU Fall Meeting Abstracts'. Available

Suter, H., Belyaeva, O., Ward, G. (2019) utilising soil nitrogen to enhance nutrient use efficiency in temperate dairy pastures, ASA, CSSA and SSSA Annual Meeting (Nov. 10-13) in San Antonio, TX

Tord Ranheim Sveen, Deli Chen and Helen Suter (2019) nitrogen mineralisation related to light-fraction and hot-water extractable carbon in pasture and cropping soils, *Soil Organic Matter in a Stressed World,* 7th International Symposium on Soil Organic Matter, Adelaide, SA 6-11 Oct.

Belyaeva O, Ward G, Chen D, Suter H (2018) Impact of urease and nitrification inhibitors on ryegrass productivity in the high rainfall zone of southern Australia. *21st World Congress of Soil Science* (WCSS), Rio-De-Janeiro, Brazil, August 2018

Belyaeva and Graeme Ward (2018) Predicting nitrogen supply from mineralization in temperate dairy pastures, *National Soil Science Conference,* Canberra, 18-23 November

Patel M, Ryu D, Western AW, Suter H, Young I (2018) Planar Domain based Remote Sensing of Canopy-Level Nitrogen in Ryegrass and Phenological Effect. *3rd UAS4RS Conference*, Melbourne, Australia, December 2018

Suter, H., Belyaeva, O., Ward, G., and Li, Y. (2018) Nitrogen supply from soil mineralisation in dairy pastures, presentation at the Fertiliser Australia Conference, Canberra, 10-11 Oct, 2018 https://fertilizer.org.au/Publications/Conference-Proceedings-2018

RRDP1716- Quantifying the whole farm systems impact of nitrogen best practice on dairy farms

Lead Partner: The University of Melbourne

Partners: Dairy Australia and University of Tasmania-Tasmanian Institute of Agriculture

Project Leader: Prof. Richard Eckard

Journal Papers- published

Bilotto, F, Harrison, MT, Migliorati, MDA, Christie, KM, Rowlings, DW, Grace, PR, Smith, AP, Rawnsley, RP, Thorburn, PJ, Eckard, RJ (2021) Can seasonal soil N mineralisation trends be leveraged to enhance pasture growth? *Science of The Total Environment* **772**, 145031. https://doi.org/10.1016/j.scitotenv.2021.145031

Christie, K. M., Smith, A. P., Rawnsley, R. P., Harrison, M. T., & Eckard, R. J. (2018). Simulated seasonal responses of grazed dairy pastures to nitrogen fertiliser in SE Australia: Pasture production. *Agricultural Systems* **166**, 36-47. doi: https://doi.org/10.1016/j.agsy.2018.07.010

Christie, KM, Smith, AP, Rawnsley, RP, Harrison, MT, Eckard, RJ (2020) Simulated seasonal responses of grazed dairy pastures to nitrogen fertiliser in SE Australia: N loss and recovery. *Agricultural Systems* **182**, 102847. https://doi.org/10.1016/j.agsy.2020.102847

Rawnsley R. P., Smith A. P., Christie K. M., Harrison M. T., Eckard R. J. (2019) Current and future direction of nitrogen fertiliser use in Australian grazing systems. *Crop and Pasture Science* **70**, 1034-1043. https://doi.org/10.1071/CP18566

Smith, AP, Beale, P, Fulkerson, BJ, Eckard, RJ (2019) Managing the nitrogen status of subtropical dairy pastures for production, efficiency and profit. *Agricultural Systems* **176**, 102677. https://doi.org/10.1016/j.agsy.2019.102677

Smith, A. P., Christie, K. M., Rawnsley, R. P., & Eckard, R. J. (2018). Fertiliser strategies for improving nitrogen use efficiency in grazed dairy pastures. *Agricultural Systems*, **165**, 274-282. doi: https://doi.org/10.1016/j.agsy.2018.06.017

Smith, AP, Johnson, IR, Schwenke, G, Lam, SK, Suter, HC, Eckard, RJ (2020) Predicting ammonia volatilization from fertilized pastures used for grazing. *Agricultural and Forest Meteorology* **287**, 107952. https://doi.org/10.1016/j.agrformet.2020.107952

Smith A. P., Christie K.M., Harrison M.T., Eckard R.J. (2021) Ammonia volatilisation from grazed, pasture based dairy farming systems. *Agricultural Systems* **190**, 103119. https://doi.org/10.1016/j.agsy.2021.103119

Journal Papers- in preparation and review

Marsden K.A., Ward G., Martin B., Jones D.L., Gleeson D., Suter H.C., He J., Eckard R.J., Chadwick D.R. (2020) Nitrous oxide emissions and N cycling functional gene abundance in dairy pasture soils with contrasting degrees of impact by livestock. *Paper in preparation.*

Marsden K.A., Ward G., Jones D.L., Suter H.C., He J., Eckard R.J., Chadwick D.R. (2020) Targeting farm scale features for nitrification inhibitor application: an effective N_2O mitigation strategy? *Paper in preparation.*

MSc Thesis

de Looff E. (2019) A model to predict the effect of excess dietary nitrogen on milk production and its implications for reducing nitrogen inputs on pasture-based dairy farms. March 5, 2019. Supervisors: C. van Middelaar, R. Eckard, A. Smith. MSc Thesis], Animal Production Systems group, Wageningen University. APS-80436

Conferences

Christie, K., Rawnsley, R., Eckard R. (2018) Modelling nitrogen fertiliser by irrigation interaction for southern Australian dairy farms. *Australasian Dairy Science Symposium*, November 2018, Palmerston North, New Zealand.

Marsden K.A., dos Santos C.A, Friedl J., Rowlings D., Suter H.C., Eckard R.J., Chadwick D.R. (2019). Targeting farm scale features for nitrification inhibitor application: an effective N_2O mitigation strategy? Proceedings of the 2019 Greenhouse Gas and Animal Agriculture conference, August 2019, Igazu, Brazil.

Harrison M., De Antoni M., Eckard R. (2019) Soil nitrogen: can pasture yields be increased by capitalising on seasonal trends in mineralisation and immobilisation? 19th Australian Agronomy Conference, 25-29 August 2019. Wagga Wagga. http://agronomyaustraliaproceedings.org/images/sampledata/2019/2019ASA_Harrison_Matthew_316.pdf

Christie, K.M., Rawnsley, R.P., Smith, A.P., Eckard, R.J. (2017) Simulated seasonal nitrogen fertiliser responses for diverse dairy regions of Australia. In: Syme, G., Hatton MacDonald, D., Fulton, B. and Piantadosi, J. (eds) MODSIM2017, 22nd International Congress on Modelling and Simulation. Modelling and Simulation Society of Australia and New Zealand, December 2017, p 60. ISBN: 978-0-9872143-7-9. https://www.mssanz.org.au/modsim2017/documents/MODSIM2017_book_abstracts.pdf

Harrison M.T., Rawnsley R.P., Eckard R.J. (2018) Modelling nitrogen mineralisation in pasture-based systems: a comparison of three agro-ecosystem models. Australasian Dairy Science Symposium, November 2018, Palmerston North, New Zealand. https://static.sched.com/hosted_files/adss2018/82/87691.pdf

Harrison, M.T., Christie, K.M., Smith, A.P., Rawnsley R.P., Eckard, R.J. (2018). Modelling nitrogen mineralisation in pasture-based systems: a comparison of three agro-ecosystem models. *Report prepared for the More Profit from Nitrogen, Project Leadership Group.*

Smith, A.P., Christie, K.C., Rawnsley, R.P., Eckard R.J. (2018) Fertiliser strategies to improve NUE in grazed dairy pastures. 20th N Workshop and Side event, June 25-27, 2018, Rennes, France. https://workshop.inrae.fr/nitrogenworkshop2018/content/download/4995/57403/version/1/file/20th+Nitrogen+Workshop_2018_Final+Proceedings.pdf

Smith, A.P., White, M. (2018) More profit from nitrogen in Australian agriculture. 20th N Workshop and Side event, June 25-27, 2018, Rennes, France. https://workshop.inrae.fr/nitrogenworkshop2018/content/download/4995/57403/version/1/file/20th+Nitrogen+Workshop_2018_Final+Proceedings.pdf

SUGAR

RRDP1717- Improved nitrogen use efficiency through accounting for deep soil and mineralisable N supply & deployment of EEFs to better match crop N demand

Lead Partner: NSW Department of Primary Industries

Partners: Sugar Research Australia, Sunshine Sugar and Southern Cross University

Project Leader: Dr. Lukas Van Zwieten

Journal Papers- in preparation and review

Van Zwieten L, Rose T, Rust J, Rose M, Morris S, Beattie R (2021) Potentially mineralizable N in NSW sugarcane farming systems contribute between 125-500 units N for crop production across the growing season. Soil Research (internal review).

Rust J and Van Zwieten L (2021) A calibration between sugarcane leaf N content and GNDVI: Understanding the optimal assessment period. (in preparation).

Van Zwieten L, Rust J, Morris S, Rose M, Verburg K, Beattie R, Rose T (2021) No benefit from controlled release N fertilisers across 4 sugarcane field trials- the role of seasonal climate forecasting. Soil Research (in preparation).

Conferences

Lukas Van Zwieten, Josh Rust, Terry Rose, Mick Rose, Stephen Morris, Marguerite White, Rick Beattie, Kirsten Verburg (2020) Controlled Release N versus Potentially Mineralisable N: The Showdown. Soil Science Australia and the New Zealand Society of Soil Science Joint Conference, 27 June – 2 July 2021, Cairns.

Van Zwieten L, Rose T, Rust J, Rose M, Allen D, Driver F, Beattie R (2018) Improving nitrogen use efficiency in subtropical sugarcane through better utilisation of soil N and EENFs. Proceedings of the National Soils Conference Canberra, ACT, Australia, 18-23 November 2018, pp74-75.

RRDP1718- Smart blending of enhanced efficiency fertilisers to maximise sugarcane profitability

Lead Partner: Queensland Department of Environment and Science

Partners: Sugar Research Australia, HCPSL, Farmacist, T.R.A.P Services and QDAF

Project Leader: Dr. Weijin Wang

Journal Papers- in preparation and review

Sharareh Akbariana, Chengyuan Xu, Weijin Wang, Stephen Ginns and Samsung Lim (2021) An investigation on the best-fit models for sugarcane biomass estimation: a case study in Australia. Information Processing in Agriculture (Manuscript ID: IPA-D-21-00130).

Sharareh Akbariana, Chengyuan Xu, Weijin Wang, Stephen Ginns and Samsung Lim (2021) Optimization of sugarcane yield prediction at the row level: a comparative study on machine learning models. Computers and electronics in agriculture (Manuscript ID: COMPAG-D-21-01815).

Sharareh Akbariana, Chengyuan Xu, Weijin Wang, Stephen Ginns and Samsung Lim (2021) Evaluation of various nitrogen fertilizer treatments' impacts on sugarcane biomass using unmanned aerial vehicle-based multispectral images (in internal review).

Conferences

Wang, W., Di Bella, L., Rixon, C., Reeves, S., Ginns, S., Sluggett, R., Royle, A., Heenan, M. (2020) Selecting controlled-release urea for sugarcane based on fertiliser nitrogen release and crop nitrogen uptake dynamics. Soil Science Australia and the New Zealand Society of Soil Science Joint Conference, 27 June – 2 July 2021, Cairns.

W. Wang, C. Rixon, S. Reeves, R. Liu and M. Heenan (2019) Potential benefits of enhanced-efficiency fertilisers in the Wet Tropics, Proceedings of the 41st Australian Society of Sugar Cane Technologists 41:230.

RRDP1719- New technologies & managements: transforming NUE in cane production

Lead Partner: Queensland Department of Agriculture and Fisheries

Partners: Sugar Research Australia, The University of Queensland and AgResearch NZ

Project Leader: Dr. Matthew Redding

Journal Papers- published

Chin, A., Schmidt, S., Buckley, S., Pirie, R., Redding, M., Laycock, B., Luckman, P., Batstone, D.J., Robinson, N., Brackin, R., 2018. Sorbents can tailor nitrogen release from organic wastes to match the uptake capacity of crops. *The Science of the total environment* **645**, 1474–1483.

Levett, I., Birkett, G., Davies, N., Bell, A., Langford, A., Laycock, B., Lant, P., Pratt, S., 2016. Techno-economic assessment of poly-3-hydroxybutyrate (PHB) production from methane-The case for thermophilic bioprocessing. *Journal of Environmental Chemical Engineering* **4**, 3724–3733. https://doi.org/10.1016/j.jece.2016.07.033

Levett, I., Donose, B.C., Laycock, B., Pratt, S., 2021. High-resolution micro-computed tomography reveals cracking in a hydrophobic composite; a new mechanism for mobilisation in controlled release applications. *Biosystems Engineering* **203**, 44–54. https://doi.org/10.1016/j.biosystemseng.2020.12.001

Levett, I., Liao, M., Pratt, C., Redding, M., Laycock, B., Pratt, S., 2020a. Designing for effective controlled release in agricultural products: new insights into the complex nature of the polymer-active agent relationship and implications for use. *Journal of the Science of Food and Agriculture* **100**, 4723–4733. https://doi.org/10.1002/jsfa.10531

Levett, I., Pratt, S., Donose, B.C., Brackin, R., Pratt, C., Redding, M., Laycock, B., 2019a. Understanding the mobilization of a nitrification inhibitor from novel slow-release pellets, fabricated through extrusion processing with PHBV biopolymer. *Journal of Agricultural and Food Chemistry* **67**, 2449–2458. https://doi.org/10.1021/acs.jafc.8b05709

PhD Thesis

Levett, C (2021) Understanding the mechanisms that control the release of a soluble crystalline agrichemical extruded with biopolymers. The University of Queensland. *Submitted for assessment June 2021.*

Conferences

Redding, M.R., Lobsey, C., Hunter, B., Phillips, I. (2020) New techniques to increase the throughput of fertiliser product screening: machine vision and microdialysis. Soil Science Australia and the New Zealand Society of Soil Science Joint Conference, 27 June – 2 July 2021, Cairns.

Redding, M.R., Bailey, T. (2018) Inhibitors and sorbents to mitigate nitrogen runoff losses generated via rainfall simulation. National Soil Science Conference, Canberra 2018.

Redding, M.R. Phillips, I., Brackin, R., Bailey, T. (2018) Demonstrated benefits of waste-derived fertiliser formulations. NextGen Fertiliser Workshop, Heron Island, November 2018. University of Queensland.

Redding, M.R., Pratt, C., Hill, J., Bailey, T., Lewis, R., Duncan, T., Kearton, T., Devereux, J., Pott, Laycock, B., Pratt, S., Levett, I., Schmidt, S., Brackin, R. (2017) Paths to the next generation of fertilisers. Fertilizer 2017. Fertiliser Australia's annual conference.

Redding, M.R. (2016) Pathways to the next generation fertilisers. NextGen Fertiliser Workshop, Heron Island, November 2016. University of Queensland.

HORTICULTURE

RRDP1720- Optimising nutrient management for improved productivity and fruit quality in mangoes

Lead Partner: Northern Territory Government Department of Industry Tourism and Trade

Partners: Hort Innovation, Queensland University of Technology & Australian Mango Industry Association

Project Leader: Dr. Costancio (Tony) Asis & Dr. Joanne Tilbrook

Journal Papers- published

Pandeya H, Friedl J, De Rosa D, Asis C, Tilbrook J, Scheer C, Bristow M, Grace P, Rowlings D (2020) Combined effect of nitrogen fertiliser and leaf litter carbon drive nitrous oxide emissions in tropical soils. *Nutrient Cycling in Agroecosystems* **118**, 207-222. https://doi.org/10.1007/s10705-020-10094-6

Rahman M, Robson A, Bristow M (2018) Exploring the potential of high resolution WorldView-3 imagery for estimating yield of mango. *Remote Sensing* 10, 1866. https://doi.org/10.3390/rs10121866

Sarkhosh A, Shahkoomahally S, Asis C, McConchie C (2021) Influence of rootstocks on scion leaf mineral content in mango tree (Mangifera indica L.). *Horticulture, Environment, and Biotechnology*. https://doi.org/10.1007/s13580-021-00355-w

Journal Papers- in preparation and review

Pandeya H, Friedl J, Mitchell E, De Rosa D, Asis C, Tilbrook J, Scheer C, Bristow M, Grace P, Rowlings D (2021) Leaf litter decomposition dynamics in tropical soils: the effect of N fertilisation and precipitation. *Submitted for peer review May 2021.*

PhD Thesis

Pandeya H (2021) Carbon and nitrogen flux dynamics in highly weathered tropical soils: interaction effect of leaf litter and fertiliser. Queensland University of Technology. *Submitted for assessment May 2021.*

MSc Thesis

Clonan, M (2017) Site-specific variation of nitrogen availability across four soil types found on Top End mango farms. Master of Environmental Management, Charles Sturt University.

Yadav, D (2019) Effect of different scions on macronutrient resorption of mango Kensington Pride rootstock. Master of Environmental Management, Charles Darwin University.

Honours Thesis

Vickery, B (2019) The limit to soil organic carbon sequestration in tropical soils. Honours thesis QUT, completed.

Conferences

Asis C, Alexander T, Sarkhosh A, Umar M, McConchie C (2020) Optimising foliar nitrogen uptake of mango: effect of adjuvant, leaf position and time of potassium nitrate spray. *Acta Horticulturae* 1299, 269-274. https://doi.org/10.17660/ActaHortic.2020.1299.40

Anson D. (2019) Optimising nutrients in mango systems of the NT. 12th Australian Mango Conference, AMIA, Darwin, Northern Territory.

Asis C, Meschiari L, McConchie C (2019) Ionome balance analysis of mango fruit from orchard with and without resin canal discolouration. *Acta Horticulturae* 1244, 221-228. https://doi.org/10.17660/ActaHortic.2019.1244.33

McConchie C. (2019) Advances in mango production: 2019. 12th Australian Mango Conference, AMIA, Darwin, Northern Territory.

Rahman M, Robson A, Salgadoe S, Walsh K, Bristow M (2019) Exploring the Potential of High Resolution Satellite Imagery for Yield Prediction of Avocado and Mango Crops. *Proceedings* 36, 154. https://doi.org/10.3390/proceedings2019036154

Pandeya H, Friedl J, Asis C, Scheer C, Grace P, Rowlings D (2019) The interaction between nitrogen fertiliser and leaf litter application drives nitrous oxide emission from tropical mango orchards. *AGU Fall meeting*, San Francisco USA.

Bristow M, Asis C, Niscioli A, Robson A, Rowlings D. (2017) Precision farming in mango to manage nitrogen nutrition. XII International Mango Symposium, China.

Bristow M, Asis C, Tilbrook J, Rowlings D, Robson A. (2017) More profit from nitrogen: understanding the role of N in mango production. 11th Australian Mango Conference, AMIA, Bowen, Queensland.

RRDP1721- Optimising nutrient management for improved productivity and fruit quality in cherries

Lead Partner: University of Tasmania- Tasmanian Institute of Agriculture

Partners: Hort Innovation & Cherry Growers Australia

Project Leader: Dr. Nigel Swarts

Journal Papers- published

Quin, P., Swarts, N., Oliver, G., Paterson, S., Friedl, J., & Rowlings, D. (2021) Nitrous oxide emissions from applied nitrate fertiliser in commercial cherry orchards. *Soil Research* **59**, 60-67. https://doi.org/10.1071/SR19333, ISSN 1838-675X (2021)

Journal Papers- in preparation and review

Quin, P., Swarts, N., Dietz, C. and Close, D. () Uptake and Distribution of Fertigated Nitrogen in southern Tasmanian Cherry Orchards (in prep).

Holzel N., Swarts N., Quin P., Close D., Bound S. () Comparison of conventional and alternative nitrogen sources on cherry fruit quality in commercial cherry orcharding, HortScience (in prep).

Conferences

P.R. Quin, N.D. Swarts, C. Dietz and D.C. Close (2020), Nitrogen use efficiency in a deciduous tree cropping system, 8th International Nitrogen Initiative Conference, 4-8 May 2020, Berlin Germany (Abstract accepted for oral presentation).

Holzel, N and Nichols, DS and Swarts, ND and Kent, K. (2019) Less is More: The Influence of Nitrogen Fertiliser Application on Anthocyanins in Sweet Cherries, Proceedings of the 43rd Annual Scientific Meeting of the Nutrition Society of Australia, 2-5 December 2019, Newcastle, New South Wales.

Quin, P., Swarts, N., Oliver, G., Paterson, S., with collaborators Friedl, J., Rowlings, D. and Clements, J. (2018). Nitrogen Use in Commercial Cherry Orchards. National Soils Conference, 18-23 November 2018, Canberra. http://www.soilscienceaustralia.org.au/wp-content/uploads/2019/10/Proceedings-Natl.-Soil-Sci-Conf-Canberra-18-23-Nov-2018-FINAL_reduced-size-1.pdf

CROSS-SECTOR

RRDP1901- Nitrogen use efficiency indicators for the Australian cotton, grains, sugar, dairy and horticulture industries

Lead Partner: CSIRO

Partners: The University of Queensland and the projects of the MPfN Program

Project Leader: Dr. Diogenes Antille (CSIRO) & Dr. Phillip Moody (UQ)

Journal Papers– published

Antille, D. L., Moody, P. W. (2021). Nitrogen use efficiency indicators for the Australian grains, cotton, sugar, dairy, and horticulture industries. *Environmental and Sustainability Indicators* **10**, Article number: 100099. https://doi.org/10.1016/j.indic.2020.100099.

Conferences

Antille, D. L., Moody, P. W. (2021). Nitrogen use efficiency indicators for the Australian cotton, grains, sugar, dairy and horticulture industries. Soil Science Australia and the New Zealand Society of Soil Science Joint Conference, 27 June – 2 July 2021, Cairns.

Other publications

Antille, D. L., Moody, P. W. (2021). Nitrogen use efficiency indicators for the Australian cotton industry. The Australian Cottongrower 42(1): 52-54, (February-March 2021).

RRDP1711- Science Coordinator

Conferences

White, M., Williams, A., Lescun, C., Samson, F. and de Kock, B. (2020) More Profit from Nitrogen: A research collaboration between Australian agricultural industries to improve farm productivity and profitability through increased Nitrogen Use Efficiency (submitted to secure MPfN Program special sessions). Soil Science Australia and the New Zealand Society of Soil Science Joint Conference, 27 June – 2 July 2021, Cairns.

White, M., Williams, A., Phelps, C., Driver, F. and de Kock, B. (2019) More Profit from Nitrogen: delivering cross-sector collaboration in NUE research. 19th Australian Agronomy Conference, 25-29 August 2019, Wagga Wagga, Australia.

White, M. and Rowlings., D. (2019) Water Right, Nitrogen Right: optimising irrigation and nitrogen use efficiency for more profitable home-grown feed. 2019 Dairy Research Foundation Symposium, July 10-11 2019, Bega, Australia.

White, M., Williams, A., Phelps, C., Driver, F. and de Kock, B. (2019) More Profit from Nitrogen: A research collaboration between Australian agricultural industries to demonstrate profit and yield improvements from NUE strategies in the context of unregulated N use, 8th International Nitrogen Initiative Conference, 4-8 May 2020, Berlin Germany (Abstract accepted for oral presentation).

White, M., Williams, A., Phelps, C., Driver, F., de Kock, B. (2018) More Profit from Nitrogen: enhancing the nitrogen use efficiency of intensive cropping and pasture systems collaboratively (poster). National Soils Science Conference, October 18-21 2018, Canberra, Australia.

Smith, A.P., White, M. (2018) More profit from nitrogen in Australian agriculture (poster). 20th N Workshop and Side event, June 25-27, 2018, Rennes, France.