



Centre for Land and Water

Winter Lectures 2010

Six informative lunchtime lectures in the
Green Shed: Fridays at 12 noon

Lecture 2

**Nitrogen Testing and Sample
Preservation**

Peter Lorentz



Winter Lectures 2010

REGISTRATIONS REQUIRED

Phone: 06 650-4532 or Email greenshed@claw.net.nz

Small charge to cover expenses: \$25 inc GST per lecture
(\$100 inc GST for a Series Registration*)

You will receive a light lunch (if you register on time), a lecture and an invitation to stay and discuss the topic in more depth should you wish.

ACKNOWLEDGEMENTS:

The Centre for Land and Water thanks the Winter Lecturers who have generously given their time:



PAGEBLOOMER



NOTES:

- * We may cancel or vary presentations if speakers become unavailable or if registrations fail to meet minimum numbers.
- * If a speaker becomes unavailable, we may arrange a suitable replacement to cover the same or a similar topic.
- * Holders of a Series registration will be refunded for any cancelled lectures at \$20 inc GST per cancellation, up to \$100 inc GST total.



The effect of storage conditions on the accuracy of deep mineral nitrogen content of soil.

Peter Lorentz¹, Andrea Pearson², Michael White¹, Carla Pell¹ and David Saville³

ARL, Waitangi Road, Awatoto, Napier 4140, NZ

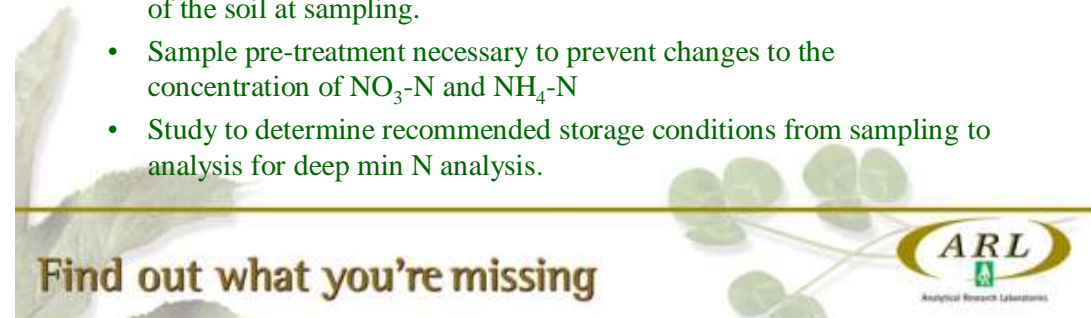
FAR Foundation for Arable Research, Lincoln 7640, Canterbury, NZ

Saville Statistical Consulting Limited, Lincoln 7640, Canterbury NZ



Deep Soil Mineral Nitrogen Test (DMN)

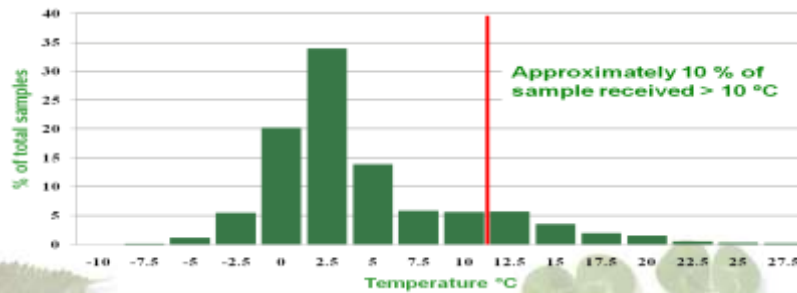
- Cereal crops derive soil nitrogen much deeper than the standard 15 cm core depth
- Samples taken from 0-30 , 30-60 and 0-60 cm
- Determines readily available nitrogen source at sampling.
- Calculations for models and budgets take this value into account.
- Target N rates for optimum crop production and environmentally safe practice
- Important deep mineral N test accurately reflects the mineral N content of the soil at sampling.
- Sample pre-treatment necessary to prevent changes to the concentration of $\text{NO}_3\text{-N}$ and $\text{NH}_4\text{-N}$
- Study to determine recommended storage conditions from sampling to analysis for deep min N analysis.



Commercial Service

- After sampling, is the submission protocol being followed ?
- Does the current sample pretreatment advice prevent changes to the DMN
- What is best lab practice from sample receipt to analysis ?

Temperature of samples on receipt



Find out what you're missing

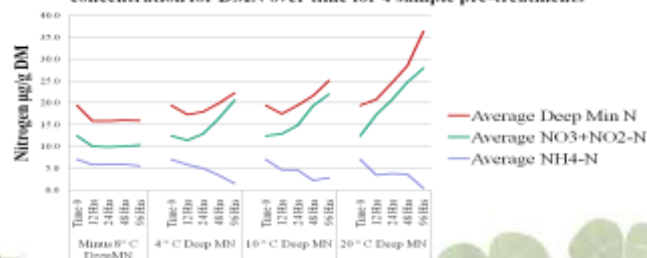


Trial Work

- Determined baseline $\text{NO}_3\text{-N}$ and $\text{NH}_4\text{-N}$ content of 3 different soils extracted immediately after sampling
- 4 pre-treatment times of 12, 24, 48 and 96 hours
- 4 pre-treatment temperatures of freezing (-8°C), 4, 10 and 20°C
- Study undertaken to determine changes in DMN for frozen samples allowed to thaw at ambient temperature for 0, 1, 2, 4, and 6 hours

Significant Trends

Low & High Samples-Changes in the average soil concentration for DMN over time for 4 sample pre-treatments

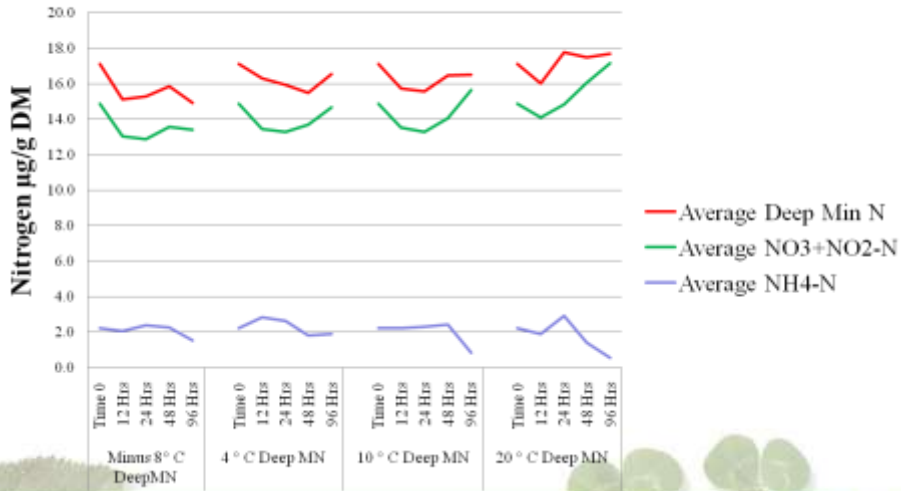


Find out what you're missing



Little change to Medium Sample DMN

Medium Sample-Changes in the average soil concentration for DMN over time for 4 sample pre-treatments

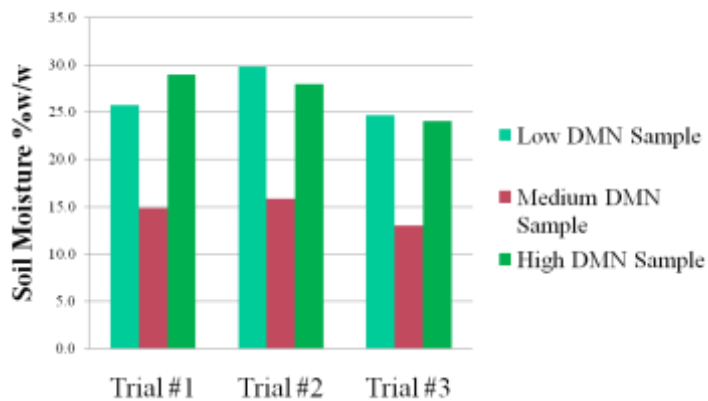


Find out what you're missing



Soil Moisture for Trial Samples

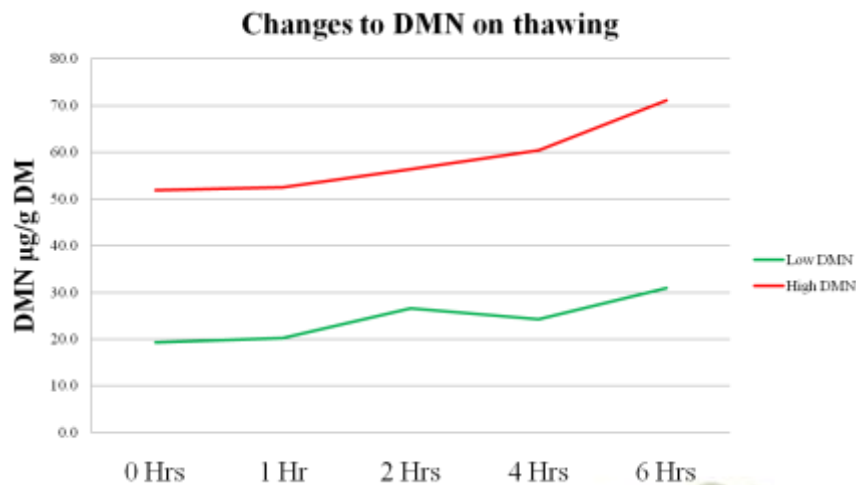
Moisture content of soil used in the Trials



Find out what you're missing



Increase in DMN on thawing in the lab



Find out what you're missing



Conclusions

Accuracy of DMN analysis critically compromised by poor samples storage conditions and time delays.

Moist samples showed large and significant ($p < 0.001$) increases in DMN with increasing storage temperature and storage time, and significant ($p < 0.001$) decreases in $\text{NH}_4\text{-N}$

Significant ($p < 0.001$) increase in DMN with increasing thawing time, mainly due to increasing $\text{NH}_4\text{-N}$

Confirms that immediate chilling and subsequent freezing is relatively reliable pre-treatment for soil samples submitted for DMN determination.

Results stress need for samplers to be aware of the implications of not adhering to protocol resulting in poor nitrogen modeling.

Changes to lab processes to minimise thawing time

Acknowledgements

We wish to thank:

- **Foundation for Arable Research for their help and contribution to the study.**
- **Ravensdown for their commitment and support for non revenue work.**
- **Help from ARL staff members particularly Sue Hope and Judith Drysdale**

Find out what you're missing





Centre for Land and Water

WELCOME

Welcome to the Centre for Land and Water, a venue supporting sustainable agriculture through training, research and consultancy.

The Centre provides professional offices, meeting and seminar facilities and land for research and training.

We currently have rental offices available. Terms by agreement - phone, fax, copy and print facilities available on-site.

The Green Shed seminar venue is available for training, meetings or for general event hire. Contact us: Phone: 06 650-4532 or Email greenshed@claw.net.nz

The Centre is located on a 4 ha site with easy access and plentiful parking. Entry is from Ruahapia Road, accessed from Karamu Road (SH2) at Waipatu or Pakowhai Road at Chesterhope. It is 4 km (8 minutes) from the Hastings CBD, 17 km (20 minutes) from Napier CBD and 18 km (20 minutes) from Hawke's Bay Airport.

COMING SOON

CLAW Short Seminars:

Communications: Preparing a media release

Communications: Writing popular articles

Communications: Writing technical reports and manuals

Communications: Preparing and delivering public presentations

Irrigation: System calibration theory and practice

Irrigation: How much water do I really need?

CLAW Short Courses

NZQA Certified Irrigation Evaluator

The Micro Cropping Farm for Research and Technology Transfer

Contact us to become involved in this exciting new initiative



Centre for Land and Water

WINTER LECTURES 2010

1. NIWA Virtual Climate Station Network: Friday 16 July

Speaker: Andrew Tait, NIWA

The Virtual Climate Station Network provides daily climate estimates at 5km intervals across N.Z. Andrew will explain how the data is estimated, and how the network can be accessed.

2. Nitrogen Testing and Sample Preservation: Friday 23 July

Speaker: Peter Lorentz, Analytical Research Laboratories

Peter will explain the different soil nitrogen tests, outline correct soil nitrogen sampling methods, and describe the steps needed to make sure the samples you take in the field get to the lab in good condition for analysis.

3. Soil pH - Crop Response & Soil Mapping Options: Friday 30 July

Speaker: Stephen Trolove, Plant and Food Research

Stephen will discuss crop responses to pH, including critical pH ranges for key Hawke's Bay crops, and will describe a process for farmers to determine whether the expense of a detailed soil pH survey may be warranted.

4. Vehicle Tracking and Fleet Management: Friday 6 August

Speaker: John Brew, Astrata

Astrata designs systems combining GPS, wireless communications and GIS to monitor machinery or other assets. John will talk about applications for agriculture, asset management, fleet & personnel tracking and health & safety.

5. Fuel Use Mapping and Bio-Fuel update: Friday 13 August

Speakers: Dan Bloomer, LandWISE and Tomo Reed, EECA

Dan will explain how to capture engine data and create maps of fuel consumption by tractors and present 'proof of concept' results from fuel mapping. Tomo will up-date us on bio-fuels and how to make bio-fuel available in Hawke's Bay.

6. Surfactants; types, actions and combinations: Friday 20 August

Speakers: Gordon Harris, Zelan, and David Manktelow, AR&T

Gordon and David will outline the types of surfactants available, how they work, and will give guidance for growers contemplating multiple product mixes as part of their spray programme.