



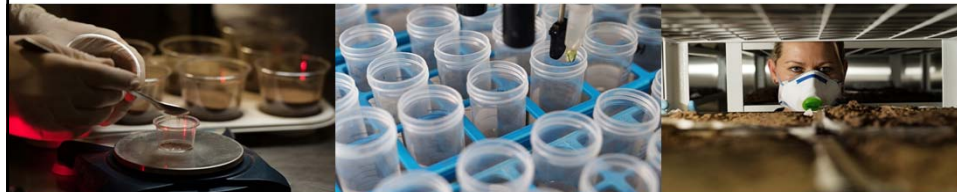
Citrus R&D Roadshow 2017

NSW GOVERNMENT | Department of Primary Industries

APAL 

Our analysis. Your advantage.

 Soil  Plants  Water



A banner image for the Citrus R&D Roadshow 2017. It features a top section with a close-up of ripe oranges on a tree. Below this is a white rectangular area containing the event title, the NSW Government and Department of Primary Industries logos, the APAL logo with the tagline 'Our analysis. Your advantage.', and three colored triangles representing 'Soil' (yellow), 'Plants' (green), and 'Water' (dark green). The bottom section of the banner shows three small images: a person in a lab coat using a pipette, a tray of small clear plastic cups containing soil or plant samples, and a person wearing a face mask working in a laboratory setting.

APAL, An introduction Australian Precision Ag Lab

- New ownership, January 2014
- Independent laboratory based in Adelaide and Perth
- Deliver Quality, flexibility & Innovation
- Provide support beyond the data



Understanding the LAB process

What happens to your samples?



The screenshot shows the Farm2Lab mobile app interface. At the top, it displays the location: "Paddock 4, Point C" with coordinates "-33.744643, 138.697497". Below this, there's a red warning icon and the text "Water prep required", followed by a yellow button labeled "View instructions". The "REQUIRED SAMPLES" section is divided into "Soil" and "Topsoil" categories. Under "Topsoil", there are three depth ranges: "10-30", "30-70", and "70-100", each with a blue "SCAN" button. To the right, a "SAMPLE LIST" shows a list of sampling points (Paddock 21, Point A through E; Paddock 2, Point A through B; Paddock 4, Point A through D; Paddock 12, Point A through C; Paddock 8, Point A through B) with checkboxes indicating their status. Below the list is a map showing the sampling points on a field. A red dot indicates the current location, and a black arrow points to a "200m" distance marker. At the bottom left, it says "NEXT SAMPLING POINT: Paddock 4, Point D (-33.744613, 138.6962625)" and "150m away". To the right of the app screenshot is a photo of a person's hand holding a clear plastic sample bag with a barcode and a QR code, which is being scanned by a handheld device.

Farm2Lab

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Understanding the LAB process

Sample drying- Soils



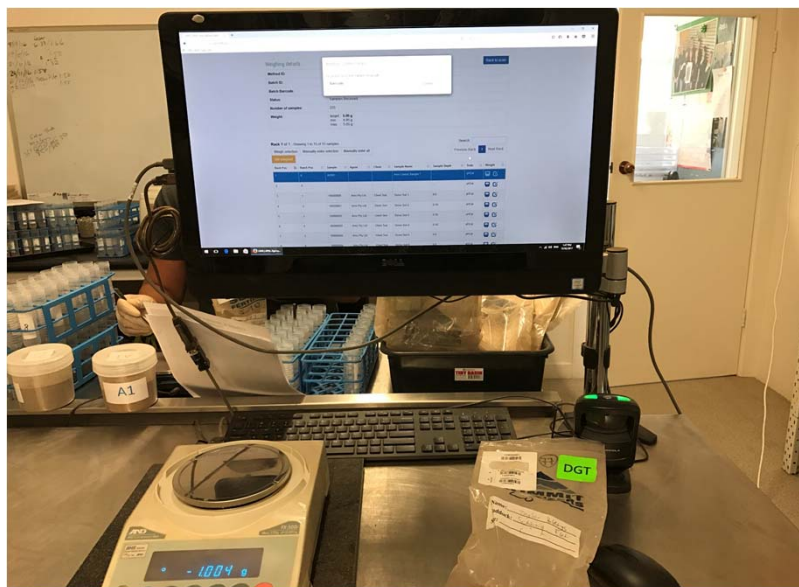
Sample Preparation- Grinding



Sample Preparation – Grinding



Sample Weighing



The importance of soil sampling procedures!!!

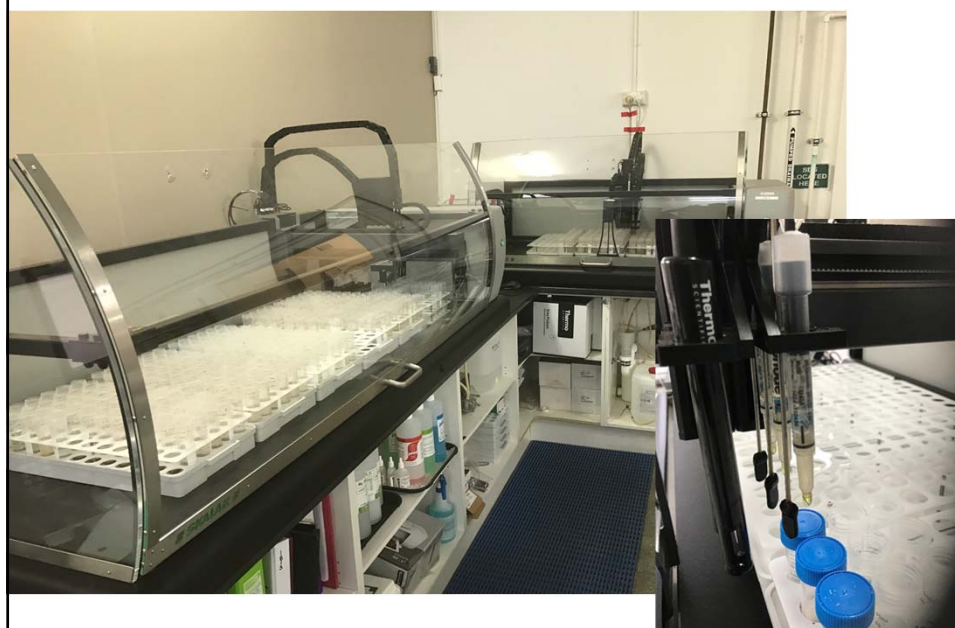
Colwell P



Sample Extraction



Equipment – pH/EC



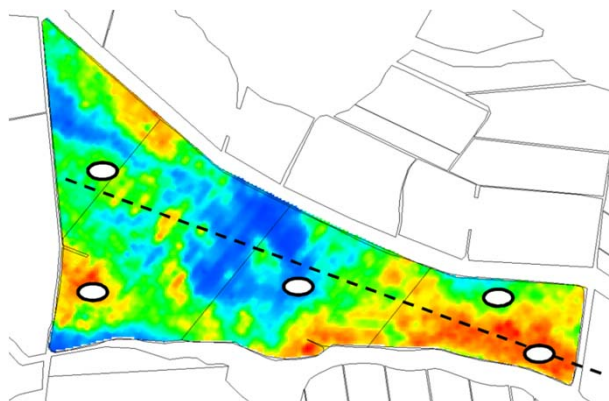
Nitrogen – Phosphorus



Soil Sampling

Soil Variability, how are we addressing?

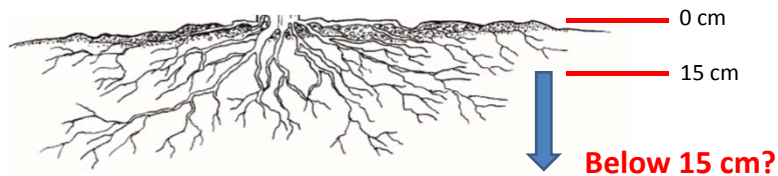
Soil sampling Points – Are they reflective?



Traditional Transect? Move towards site specific to soil types.

Sampling Depth

Citrus 0-15 (25-30 Cores transect, 8-12 **site specific/sub- soil**)



Role of tissue sampling

Subsurface Soil samples – sample to rooting depth

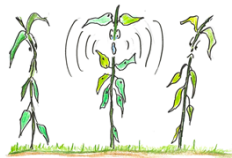
- Mobile elements
- Monitor and diagnose subsoil constraints (toxicities such as Boron and salinity, soil structure issues such as sodicity, and pH issues such as acidity or alkalinity)
- Subsoil fertility (Potassium), what is in the bank? Cations



Nutrient Management

Soil Testing – MONITOR & Predict what is going to happen

Plant Testing – Plants talk to us as to what is actually happening!



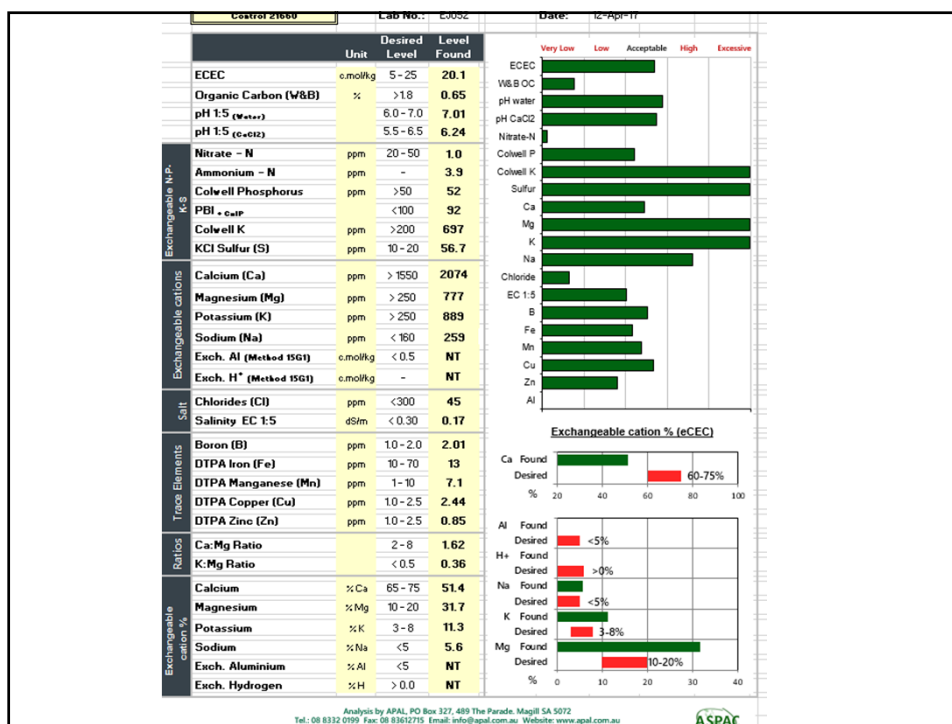
Combine as many tools as possible to reduce odds!!!!



Soil Sampling

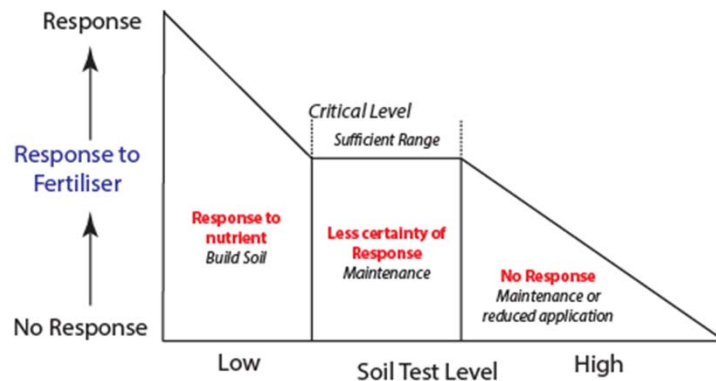
Why Soil Test?

- Establish soil current nutritional status
 - Diagnose plant nutrient deficiencies/toxicities
 - Fine tune fertiliser inputs-programs
 - Monitor soil fertility; ensure we are not mining soil, building soil health and fertility
 - Economic returns from fertiliser, Maximise yields and profits
- Indicate the ameliorants required to correct physical or chemical soil imbalances



What info am I getting from a soil test ?

Build, Mine, Maintain?



Is ONLY Soil Sampling an adequate?

To give the most economic soil management - fertiliser program soil testing should be best used in-conjunction with;

- Fertiliser history, seasonal information
- Crop nutrient requirements, how many tonnes am I aiming to grow
- **Soil type information, Physical characterisation, structural issues?**
- Plant analysis (Monitoring)
- Water Analysis

**Regular tests build better profile
Monitor and refine fertiliser inputs**

APAL 
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1. Plant testing 101 –WHY?

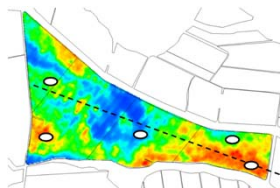
- Review current season's fertiliser program –
rates, type, timing and placement
- Monitor crop nutrient status, good insurance to protect the investment in a crop up to this point in time
- Predict nutrient problems during the growing season to avoid production loss, Measures what we cannot see (*"hidden hunger"*)
- The best way to determine if any more nutrient inputs are required this season
- A head start on refining requirements for next season

1. Plant testing 101- WHY?

- Another tool to Complement soil testing:
 - soil tests estimate how much nutrient is likely to be available
 - plant tests measure how much nutrient is available
- The availability of multiple nutrients (and interactions between nutrients affecting availability) is determined with one test
- No complications from nutrients being available or unavailable at depth – because a plant test reflects what's available to roots, wherever they are

Tissue Sampling (Citrus)

Same sampling location as soil



Timings:

Leaf – 4-7 month fully expanded leaves

Late Feb to Late March

Middle leaf from a non fruiting

Terminal, Spring flush



OR

Good vs Poor growth

If recent foliar application wash plant samples – wear gloves
Build data set across varying seasons

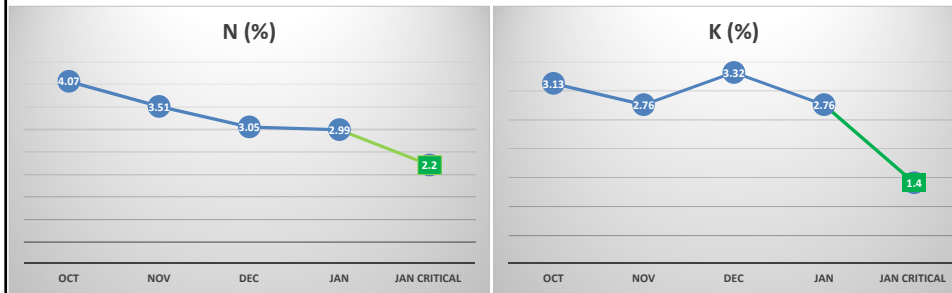


Notes checklist:

1. Crop details?
2. Visual plant symptoms (photo)?
3. Rotation and fertiliser history?
4. Have these symptoms occurred previously (under what conditions?)
5. Is the problem soil type specific (Is soil test info available, if not plan testing post crop)?
6. Do you have previous plant tissue data?
7. Seasonal conditions?
8. Pests or disease symptoms?

Tissue sampling, **Building your own data set**

Predictive (Seasonal adjustments) vs Monitoring Almonds



Bringing it all together!

The tools for interpretation?

- Review Current Soil Status (Critical levels, salt issues?)
- Vine Nutrient Requirements, how many tonnes do I want to grow?
- Nutrient Interactions
- Crop Monitoring (Plant Analysis- Soil monitoring)
- Long term Nutritional and Soil Health Plan
- Type - Rates – Timing – Placement

Summary

1. Soil testing one tool in a complex process
 - 2-3 year rotation
 - Sample to rooting depth to get a full understanding of nutrition
 - Understand soil variability
 - Understand crop nutrient requirements vs yield expectations
2. Plant sample annually and compile data
 - Monitor and refine fertiliser inputs
 - Precise sampling to allow direct comparison to soil test
3. Know what your are applying with your water supply



Summary

- Test regularly to build strong profile and refine Fert inputs
- Understand your soil and it's variability
 - Are you in the Build-Maintain or mine phase?
- Understand crop nutrient requirements and key timings for applications
- Ensure you are getting economic responses to Fert applied





This afternoon's session

Questions – Major issues facing the region

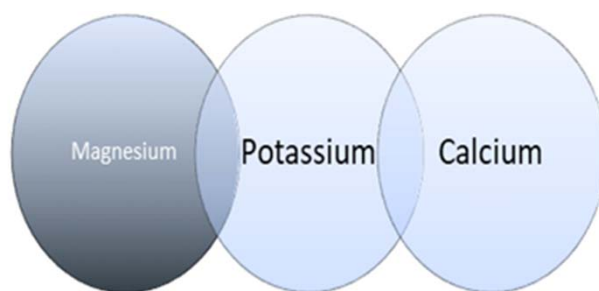
Potassium availability

Calcium nutrition

Tissue sampling

High Potassium, is it available???

A Potential Nutrient Interaction?????



Is it available at key timings during crops growth?????

