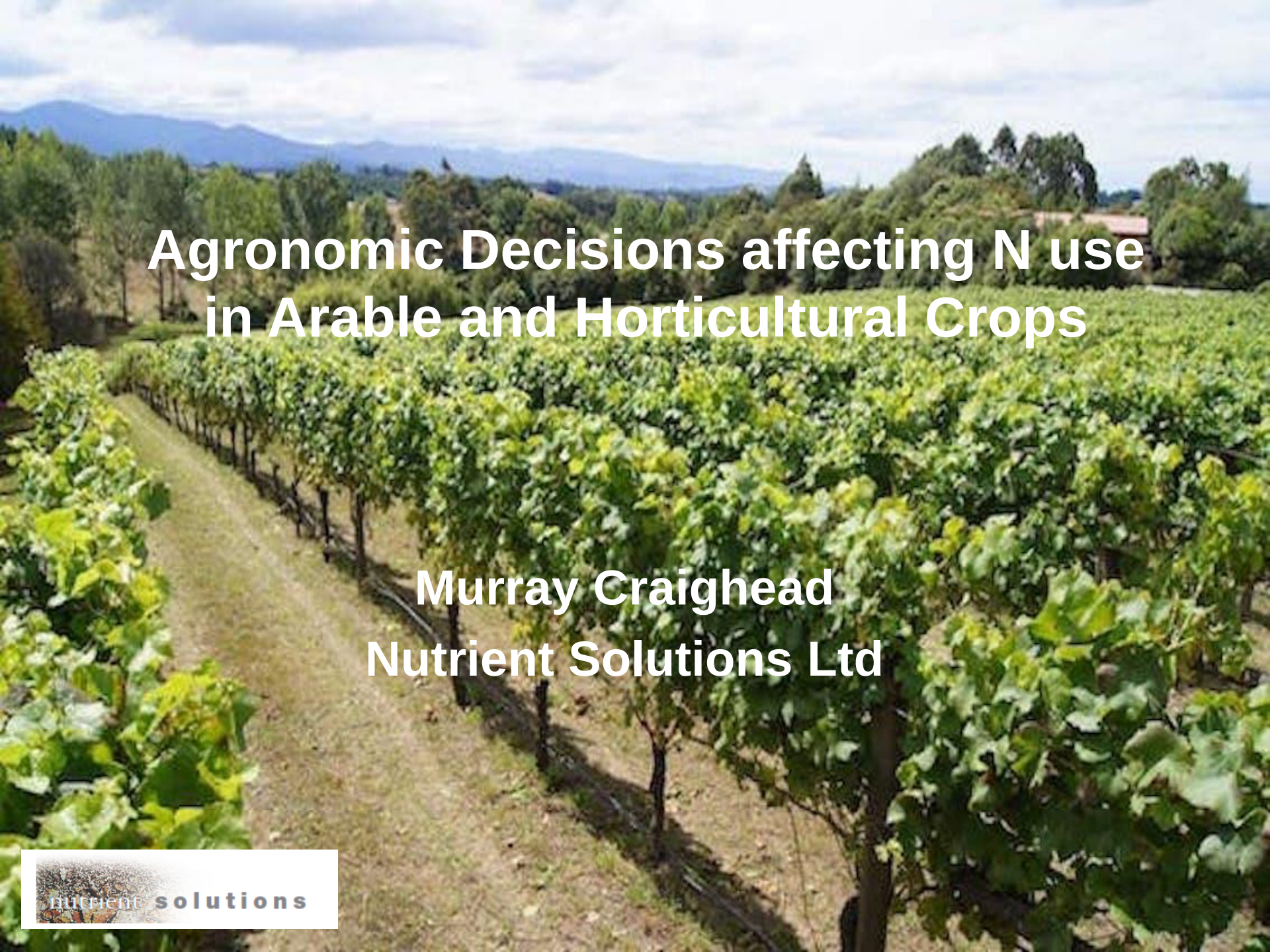

Agronomic Decisions affecting N use in Arable and Horticultural Crops

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nutrient solutions

Background

- New Zealand arable rotations are very diverse
- Animal grazing may be involved
- Increasingly more continuous cropping
- Increase in perennial crops being grown

- Therefore a **large range** of N requirements

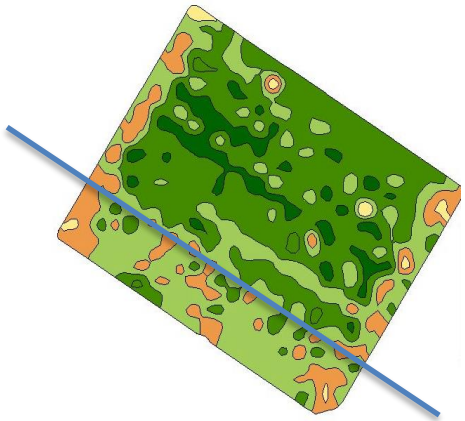
Range 0-350 kgN/ha Annuals/*Perennials*

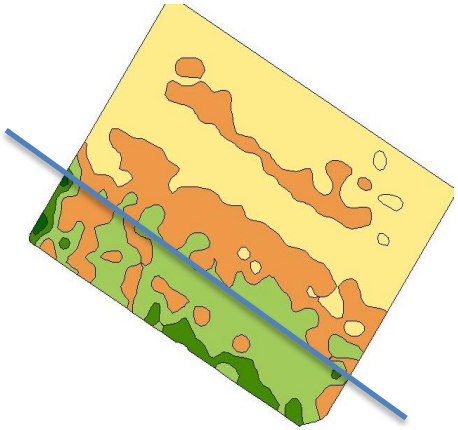
- Low – 0-50 – legumes, *grapes*
- Low/med – 50-80 - seed potatoes, *blackcurrants*
- Medium – 80-160 – spring cereals, grass seed, brassica seed, *apples*
- High – 160-240 – autumn cereals, maize, potatoes, *hops*
- V. high - 250-300 – main crop/fry potatoes

Soil Nitrogen testing

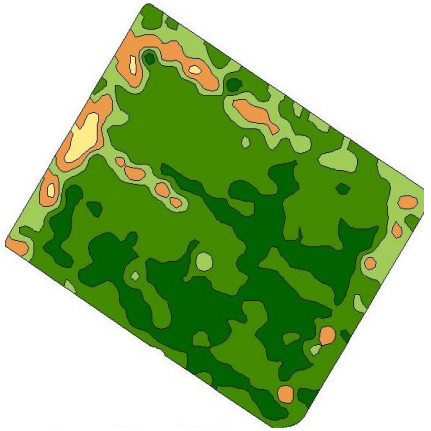
- Nitrogen tests - measure a small proportion of the soil N – therefore use with caution
- Potentially available soil N tests should be used in 40-50 kg bands – estimate of mineralisation potential
- Mineral N tests – measure immediately available N - subject to rapid change, handling issues – use (smaller) bands
- Sap – ongoing, accuracy

Soil Type and Nitrogen





By far the greatest factor in determining N use is **soil type** (and its moisture retention)



Clover and N fixation

Temp/Waimak soils	History	AMN kgN/ha
Light/stony	Ex 1 yr clover	55
Light/medium	Ex 1 yr clover	90
Medium/deep	Ex 1 yr clover	170
Light/medium	Ex 2 yr clover	235

Peas – fix N for themselves, fert N trading veg vs seed

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Crop history

HIGH soil N

2 yr white clover crop
Ex long term (3yr+) pasture
Intermediate peas, greenfeed
Rape, brassica seed
Vegetable crops
Ex continuous cereals

LOW soil N

Previous Crop History and N use

- Exhaustive N history – malting barley – needs low N carryover, no late N
- Carryover fert history – many potato crops – so low starter/early N
- Ex pasture/some greenfeed, cover crops – delays in N release, need earlier N

End use and Nitrogen

- Wheat – feed and biscuit vs milling - protein yield
- Barley – feed vs malting
- Potatoes – seed, early, crisp, main crop, fry
- Peas – seed, process, straw - rotation

N efficiency

Crop removal less soil N/efficiency factor

Annual crops – 50-60% ⟶ 65-75%

- Genetics, grazing/fungicide/PGR/irrigation management – *eg. ryegrass*

Perennial crops – 80-90%

- fert banding, root system, pruning, irrigation – *eg. blackcurrants*

- *Remember also basal P, K, S – rotation, tradeoff*

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Forms of N

- Urea – most cost effective, but N pulse
- CAN – economics?, but more gradual
- Ammonium sulphate – economics, S, acidifying

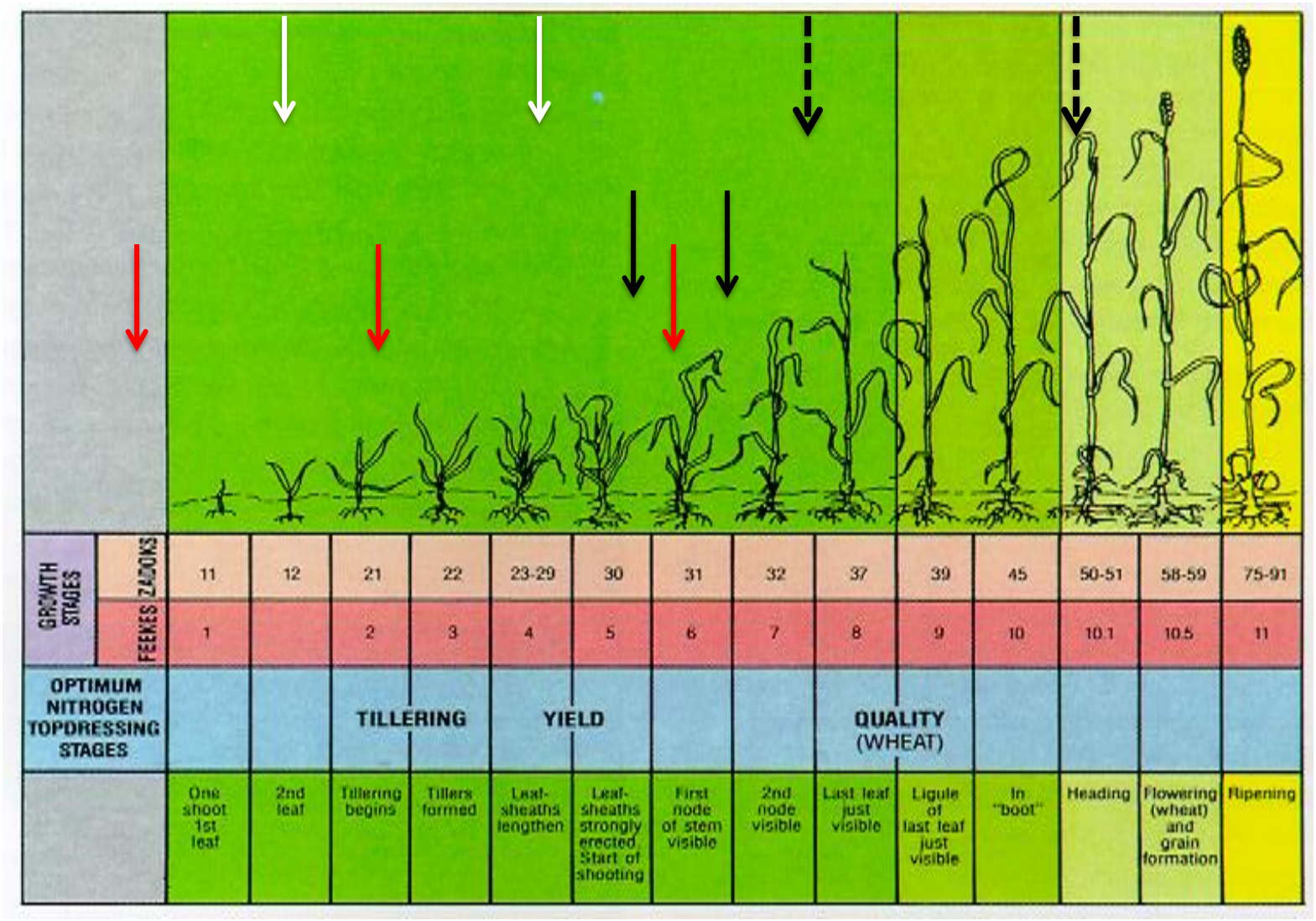
Other

- ASN, Calcium nitrate, NPK
- Nitrification inhibitors?
- Coatings?

Timing of N

- Continuous (from spring) – hops
- Early to bulking - main crop potatoes
- Flexible – blackcurrants
- Early – maize,
  spring crops

Wheat/Barley



Efficiency -Nitrification inhibitors?

- Variable results in arable situation
- Losses embellished (pasture + management)
- Why when farmers can alter timing of N to suit critical growth stages

- Value in late sidedressing?
- Main benefit is actually in reducing germination damage when Urea applied preplant

Efficiency - Solid vs Liquid

- In theory no difference

  eg. late N on Wheat
- Liquid N rates dictated by burn
- Via irrigation – regular low rates (evenness timing)