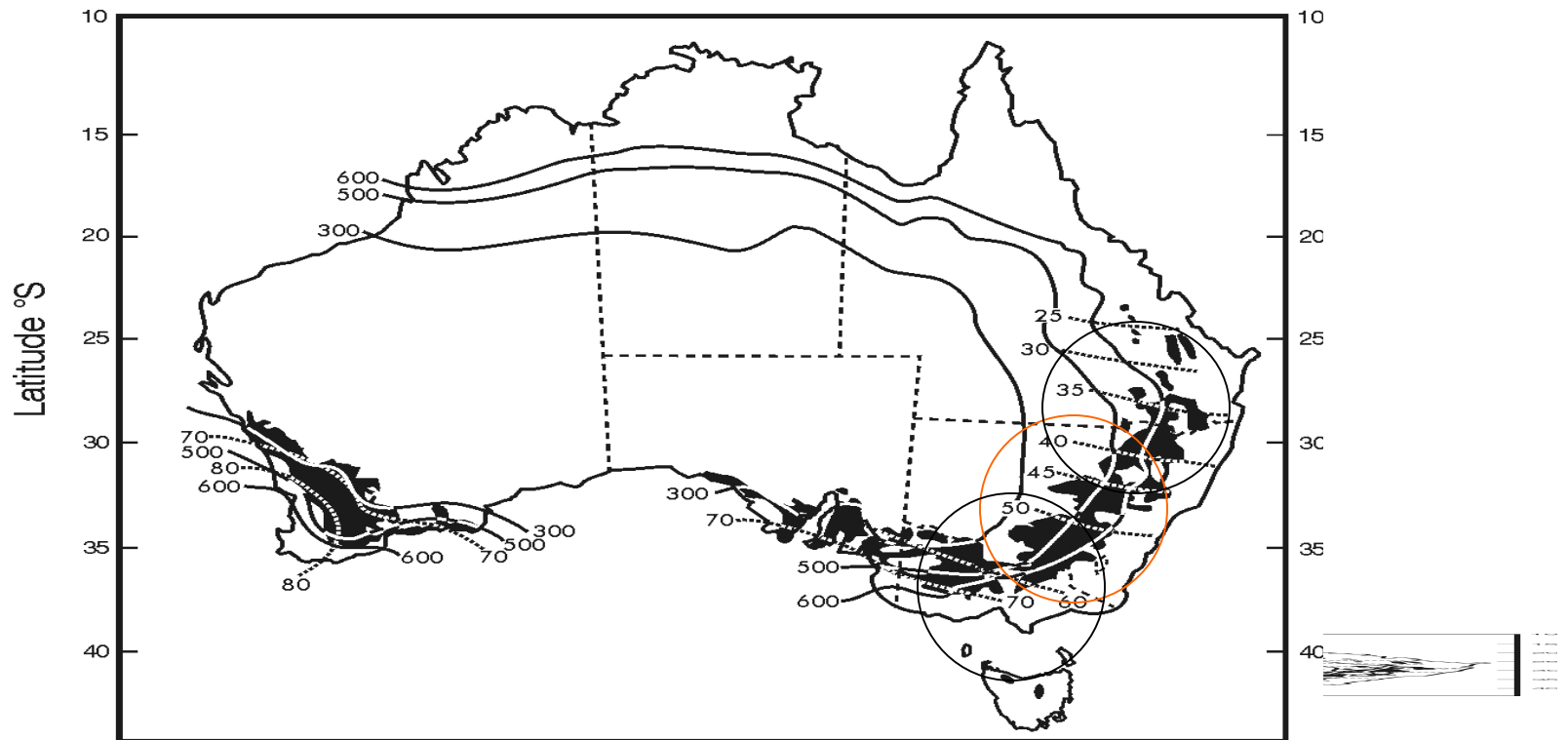
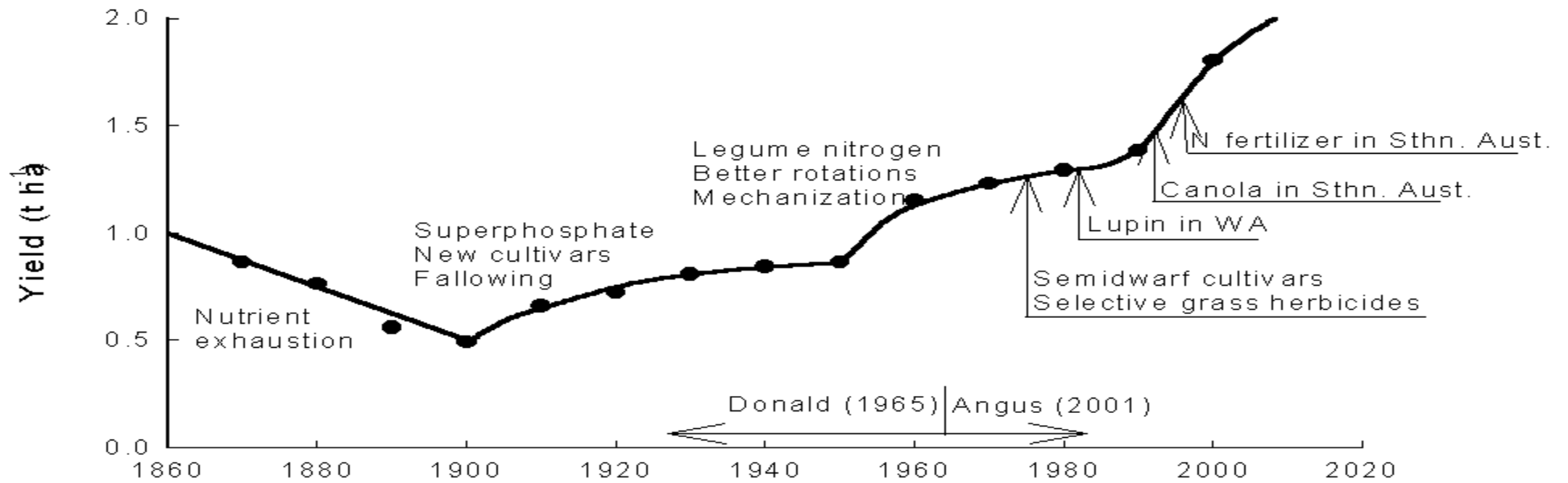


Nitrogen - East to West

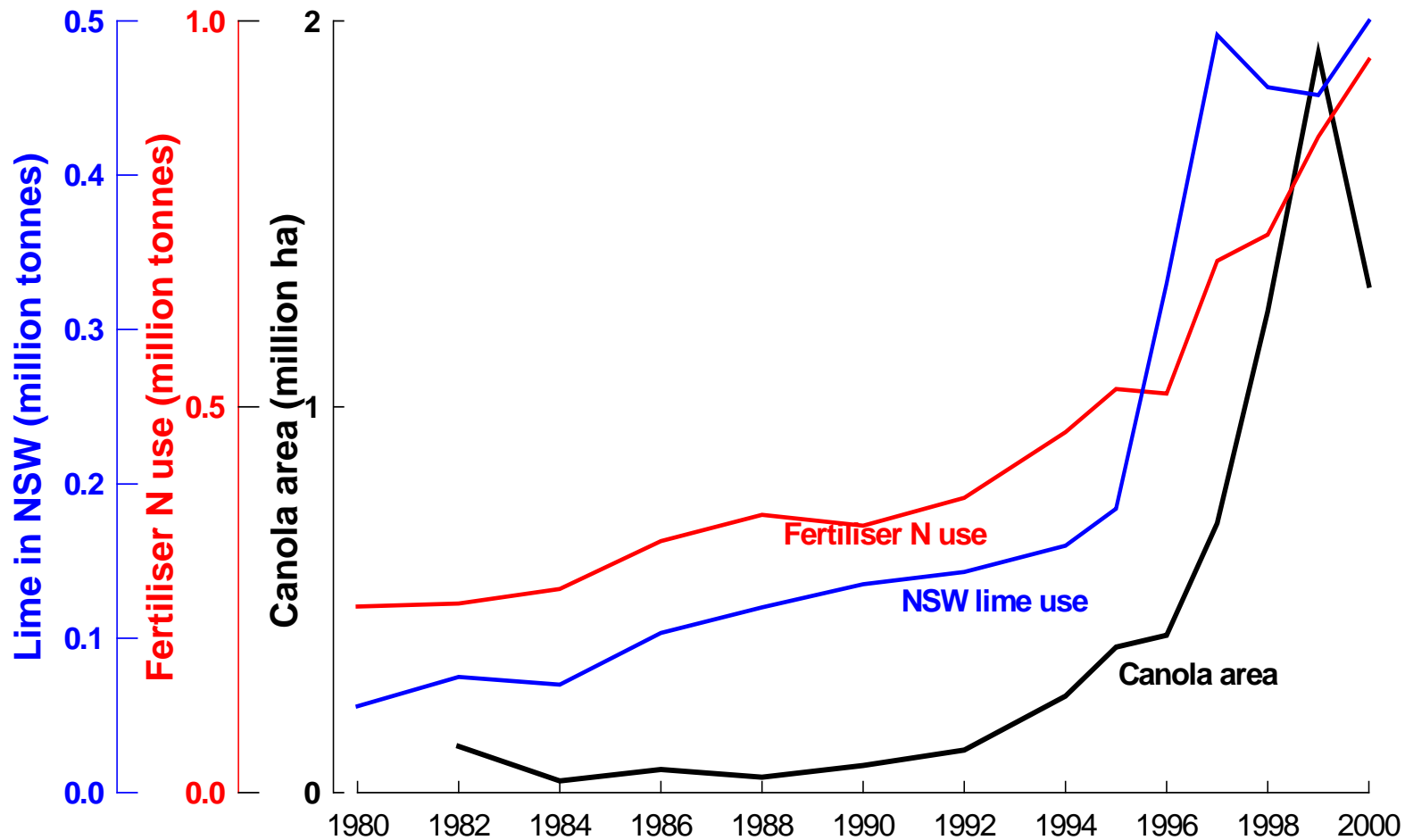
Tony Good Cowra



National Wheat Yield Trends



Canola area, lime use and N-fertiliser use



Where is NSW going ?

- Lime, canola (breakcrops) and earlier sowing have doubled average wheat yields over 15 years in SENSW.
- Average protein levels lifted by 3%.
 - More Prime Hard SNSW than NNSW.
 - Increased P, Zn rates



Key profit drivers



- Farm management deposits.
- Increased wheat yields and quality (% ASW vs AH).
- Mostly 80 % crop.
- Increased % lucerne in pastures
- Increased lamb weights
- Roundup cocktails up to 3X over summer
- More N applied to wheat than canola
- Spring lambing
- Grain handling and transport reform
 - 1987 - \$40/t
 - 2002 - \$28/t
- Block farming
- Scale and aggregation
 - No stock for some
- Farming 2nd class “cheap” country
- Leasing and contractors

Biggest threats to profit



■ Canola

- Yield stability
- Canola does hayoff
- Blackleg - new form ??
- Sclerotinia

■ Wheat

- Losing canola
- *The banning of stubble burning*

■ Farming

■ CWC or WCW ??

- Lack of alternate crops
 - Triticale, Barley - ??
 - Grain legumes - noxious
- Escalating land values & over-population
- Not acid soils or salinity
- Complicated farming systems

Nitrogen



- Water is everything.
- N at booting or flowering can work - long season areas.
- Urea IBS can be hazardous.
- Midrow banding - OK.
- Split N best.
- On “leaky soil” protect N by banding at planting; or,
- Split up to 3 times during the season.
- N applications can be profitable on crops with difficult subsoils.

Nitrogen Snapshots



- Peak mineralisation rates for cropping are in the preceding summer and autumn.
- Take no prisoners with summer / autumn weeds.
- Grain legumes increase rates of organic carbon decline
- Perennial pastures and N carryover “backbone” of Eastern Slopes cropping.
- Re-water crop soils following lucerne before adding N.

Nitrogen snapshots



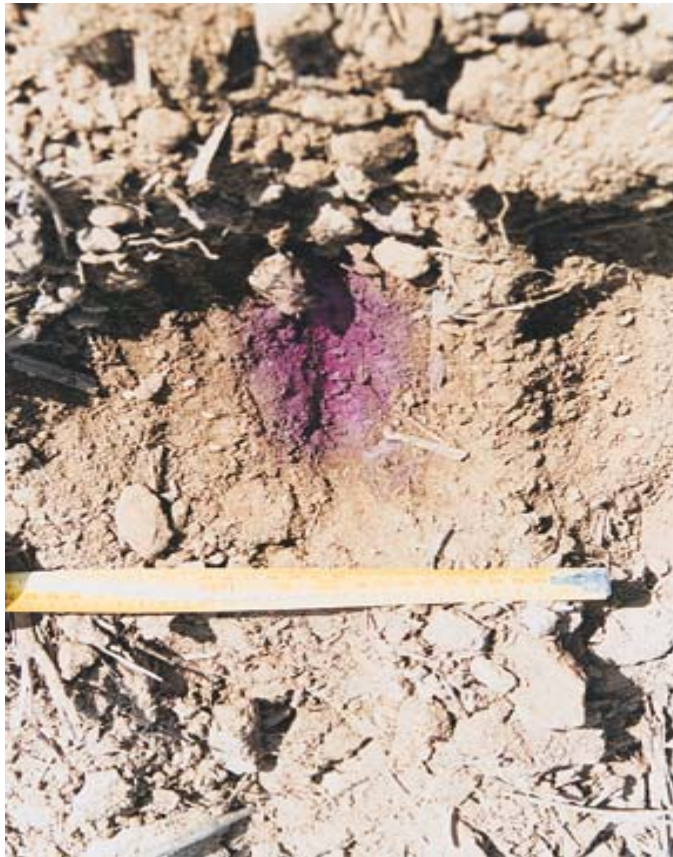
- "In crop" deep soil N tests and shoot counting
- best prognostic tools for topdress N decisions.
- Urea is still the most cost effective N source.
- No consistent advantages with additions.
 - Humic acid, Agrotain, Sugar or Vegemite
- Ammonium Nitrate and UAN solutions OK certain situations.

What do I hear about WA?



- Low CEC topsoils where topdressed urea (may) push pH and increase volatile losses.
- High potential for surface N leaching.
- Rapid transition from water surplus to deficit
- Prime Hard South experiments showed “pinching” worse in WA than S/E Oz.
- Lead the world in Group A & B herbicide resistance
- These factors suggest that -
- Midrow banding at planting, or;
- In crop N side banding (with shielded herbicide spraying), or;
- UAN solutions may be worth trying.
- Invest \$ in high-capacity spreaders.

Midrow banding (aka N Sausage)



- When N concentrated enough raised pH > 8.0 and ammonia in band > 300 PPM delayed nitrification by 12 to 16 weeks.

One-pass seeders with urea and Big N.

■ CSP 169 - GRDC Report.

- No difference between products with similar application methods.
- Mid row banding was often superior to urea IBS.
- Splits (with banding) were best (in NSW).

■ Canopy Management

- 4.5 t/ha wheat with 13,000 kg/ha DM, or;
- 5.4t/ha Wheat with 11,000 kg/ha DM.



Seed at 9"
Nitrogen at 18"



The N sausage



- Protects N
 - from use;
 - and leaching.
- Slaughtered or anaesthetised bugs in the band. No effect away from band.
- Rate of reflux - 10 to 100 X the original population.
- Increasing N concentration not banding deeper delayed nitrification.
- Problem with resistant ryegrass.
- Problem in very short seasons.
- Risk of over-fertilisation.
- Stripes in following crop with carryover.

Midrow banding - variants



Canopy Management



Canopy management reducing the risk with topdressing.

Significant plant available water at time of topdressing.

- Promise of significant rainfall following topdressing.
- In areas NSW areas < 350 mm - Don't topdress unless rainfall > 50% of average.



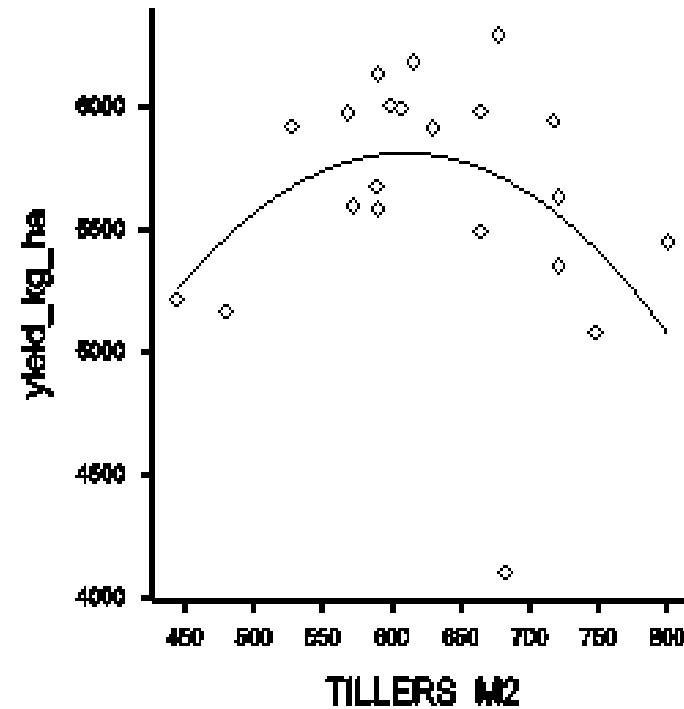
Critical stages for N in cereals

Crop Stage	Action
DC 0 – 13 Sowing to 3-leaf	Ensure crop has 70% of N requirement for target yield.
DC 30 –31 Fully tillered – 1 st node	Tiller counts – if below target, top up immediately, on target – hold, above, no further action.
DC 41 Boot stage	Last chance to top up for yield in good seasons – top up to prevent tiller loss. Will also contribute to grain protein at this stage.
DC 61 – 65 Early to mid flower	Opportunity to top up protein levels, PROVIDING THAT CROP HAS GOOD PROFILE MOISTURE.

Tiller counts

- Cereal crops only produce 10 - 20% of total dry matter production by fully tillered stage.
- Most active root mass occurs under a crop from fully tillered to boot stage.
- Hence it makes sense that most N is required from fully tillered onwards.
- Rule of thumb - 100 tillers/m² equates to 1 t/ha yield ($r^2 =$ poor).

Fitted and observed relationship

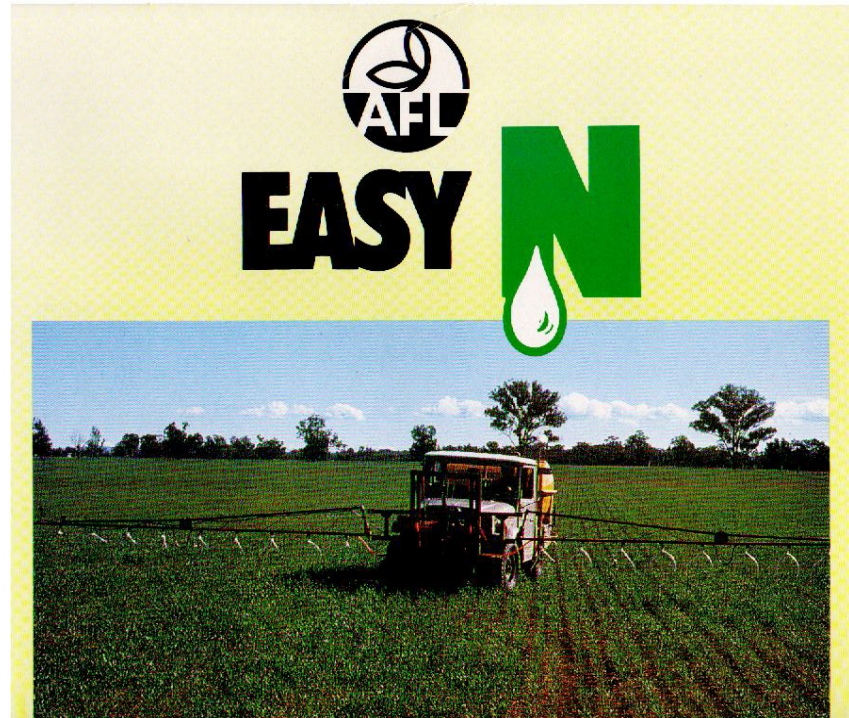


Expected responses to 50 kg/ha topdressed N

Shoot density at DC30 v's rainfall zone			Yield response to added N	Protein response to added N
250 - 350 mm	350 - 450 mm	450 - 650 mm		
<250/m ²	<350/m ²	<500/m ²	Positive	No effect
250 - 350/m ²	350 - 500/m ²	500 - 700/m ²	No effect	Positive
>350/m ²	>500/m ²	>700/m ²	Negative	Highly positive

UAN solutions

- UAN solutions not new - 1982 photo.
- Magic additives add cost - little else.
- New application technologies need testing.
 - Pesticide mixtures
- Slightly acid product with low volatility potential on low CEC soils



What people may forget!

- Is that plant absorb nutrients through their roots.
- At best only 15% of nutrients can enter via the leaves.
- Plant roots are subterranean
- So, until the “gene-jocks” develop leaves with root hair , rely on soil uptake for nitrogen.
- Flat Fan OK mid-tillering - expect leaf burn.
- Use streaming bars for applications after Z 4.1 (Flag leaf present).



Managing Subsoil constraints

- Acid and alkaline soils
- Sodid and saline soils
- Boron effect over-rated
- Controlled traffic
- "One pass" tillage
- Primer crops
 - Lucerne and Cocksfoot



Other issues

- Trace elements responses
 - Soil run down
 - Increased demand
 - Increasing fertilizer purity
 - What else?



Tony Good - NSW



- Phone (02) 6342 9241
- Fax (02) 6342 9250
- ajg@allstate.net.au