

# Fertigation Pros and Cons

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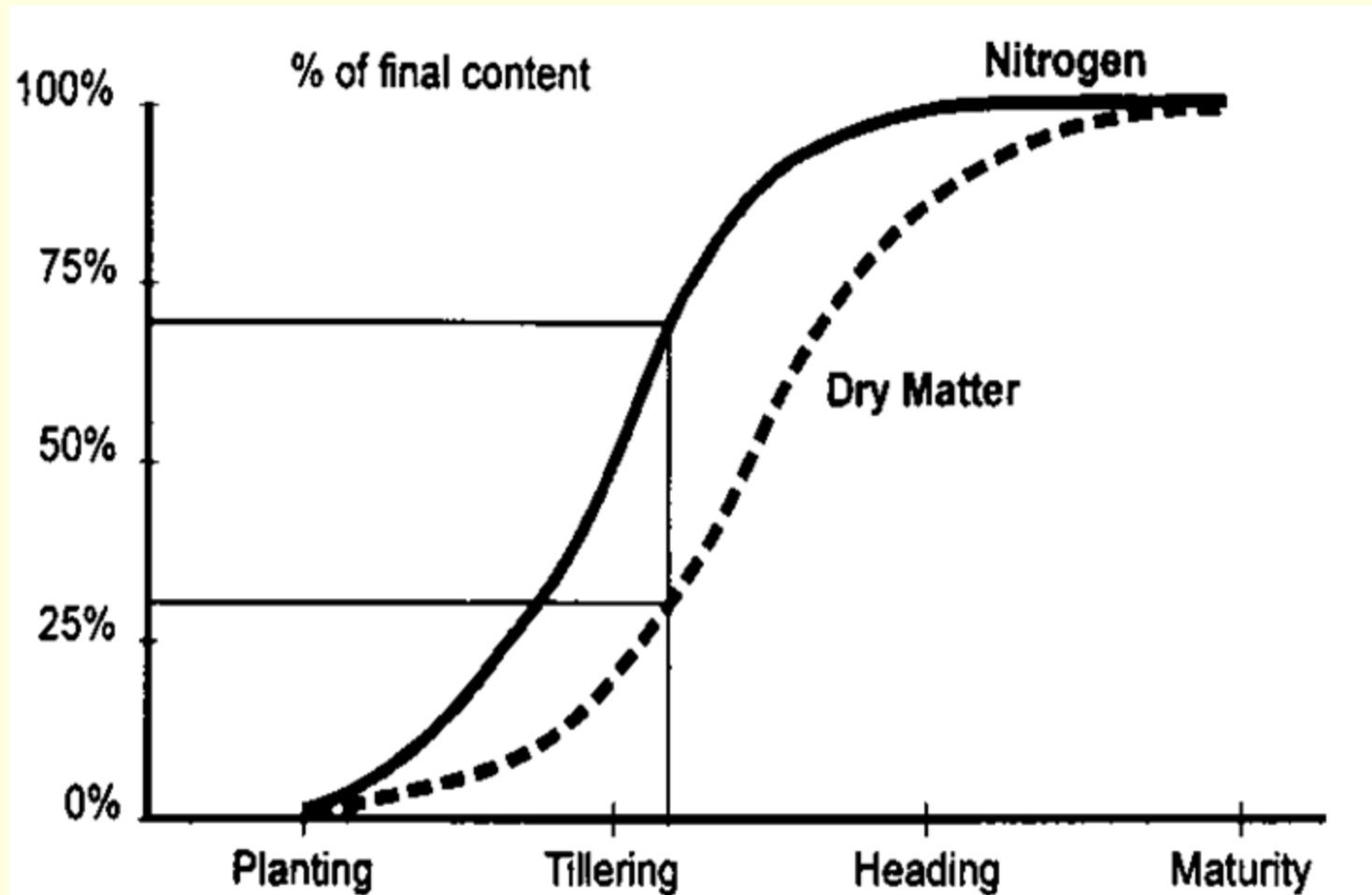
Lethbridge

# Nitrogen recovery in wheat from soil and foliar urea applications at anthesis

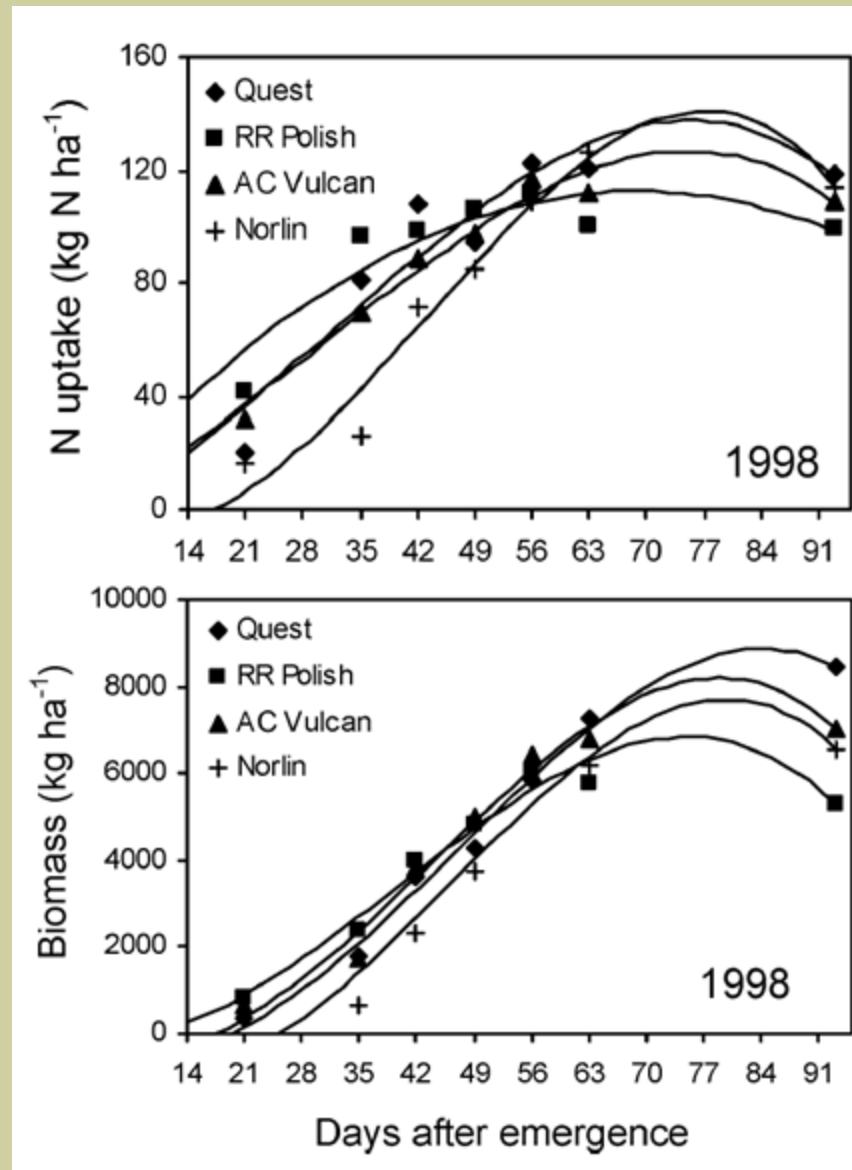
Base N rate	In-crop Treatment	% Recovery Exp 1	% Recovery Exp 2
0	Soil Urea	32.3	62.9
0	Soil Urea + Agrotain	50.4	70.1
0	Foliar Urea	4.5	9.8
0	Foliar Urea + Agrotain	6.6	10.6
50	Soil Urea	37.0	67.7
50	Soil Urea + Agrotain	57.1	67.1
50	Foliar Urea	7.8	11.3
50	Foliar Urea + Agrotain	9.4	10.6

Rawluk, et al. Canadian Journal of Plant Science, 2000

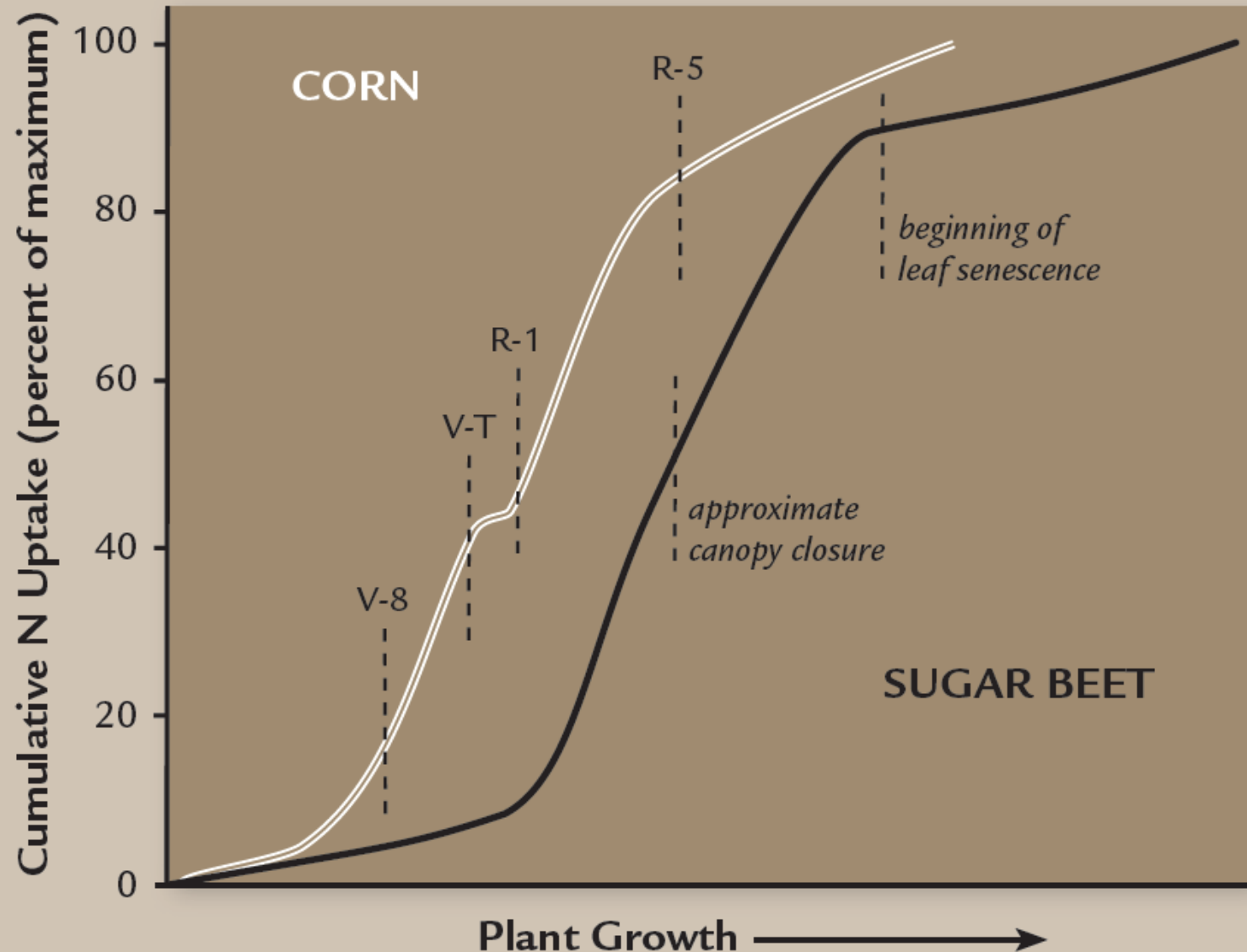
# Nitrogen uptake and dry matter accumulation in cereals



# N Uptake and biomass accumulation by oilseeds at Melfort



Source: Malhi, Journal of Plant Nutrition, 2006

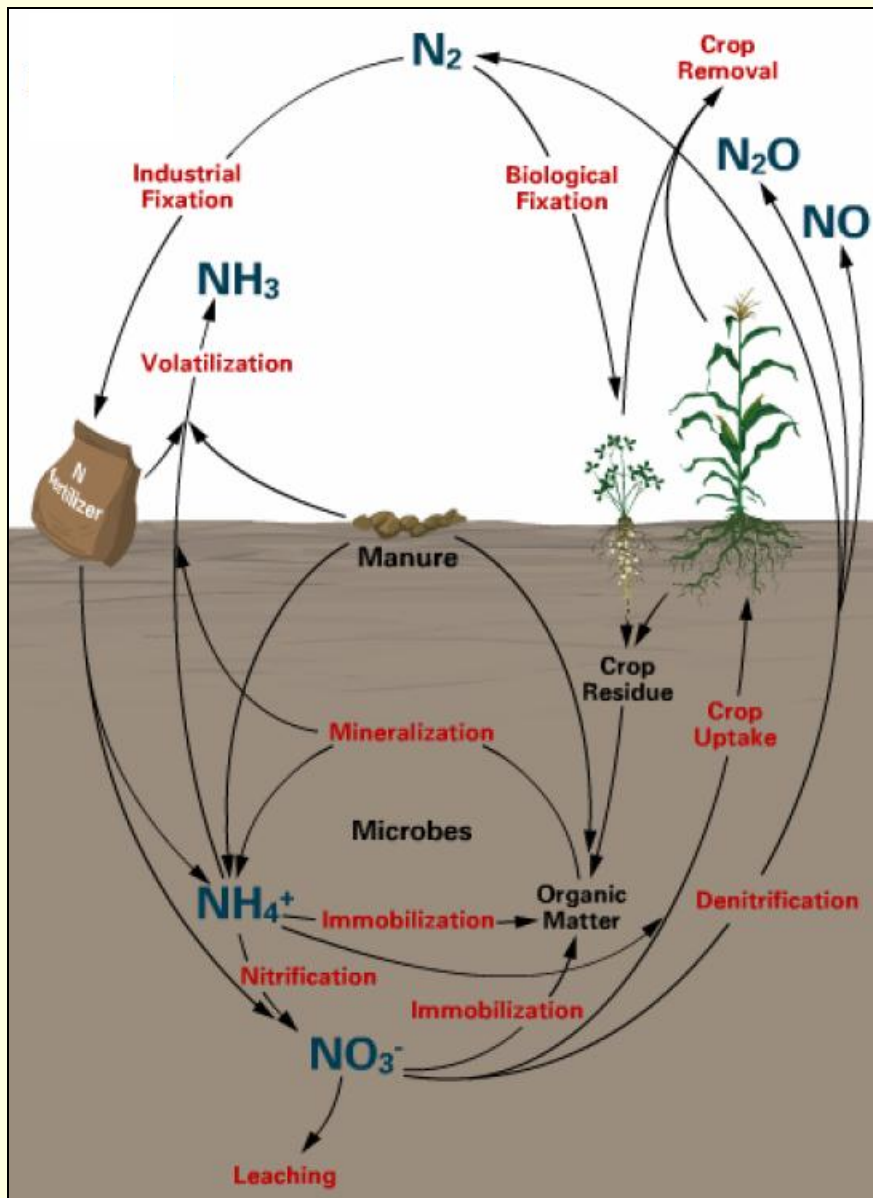


As reported in: Nutrient uptake timing by crops: to assist with fertilizing decisions. Montana State University <http://landresources.montana.edu/soilfertility/PDFbyformat/publication%20pdfs/Nutrient%20Uptake%20Timing%20EB0191.pdf>

# Supplemental N fertilization to meet crop requirements

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- Cool season crops like spring cereals and canola have narrow window early in season
- Winter wheat, timothy need N before water is available
- Longer season crops like corn, potatoes, sugar beets have wider application window



## Potential losses from system

- Denitrification
- Volatilization
- Leaching

Temporal “Loss” through Immobilization







# Wheat and canola response to fertigation

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- Both crops direct seeded
- Base fertilization: 0, 30, 60, 90, 120 kg N/ha mid-row banded at seeding
- ESN mid-row banded at 60 kg N/ha
- 30 kg N/ha fertigation applied with 10-12 mm water at 1 of 3 times or all 3 times

# Fertigation timing

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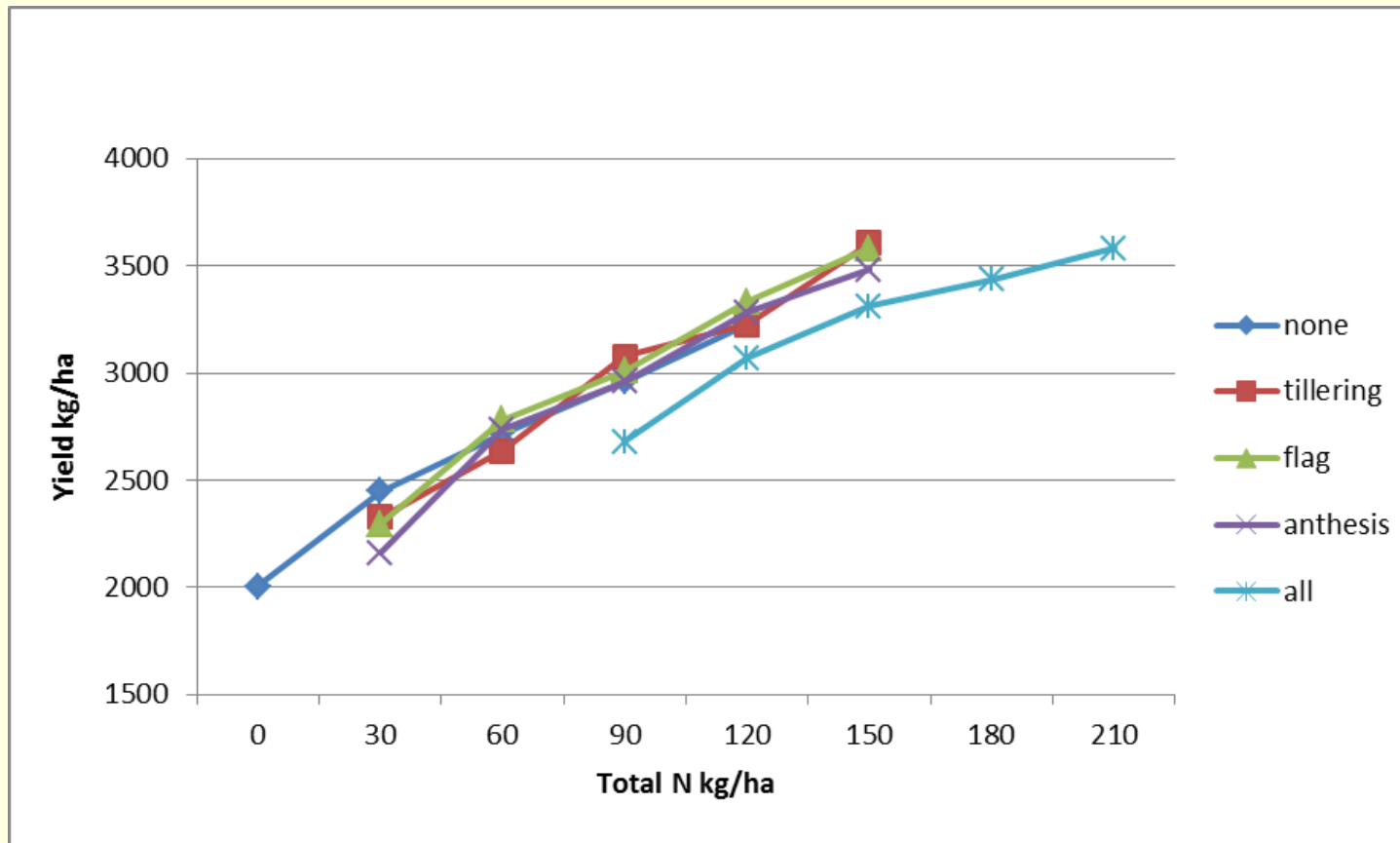
## Wheat:

- Tillering (June 10)
- Flag Leaf (July 4)
- Anthesis (July 12)
- All 3 times (90 kg N/ha total fertigation)

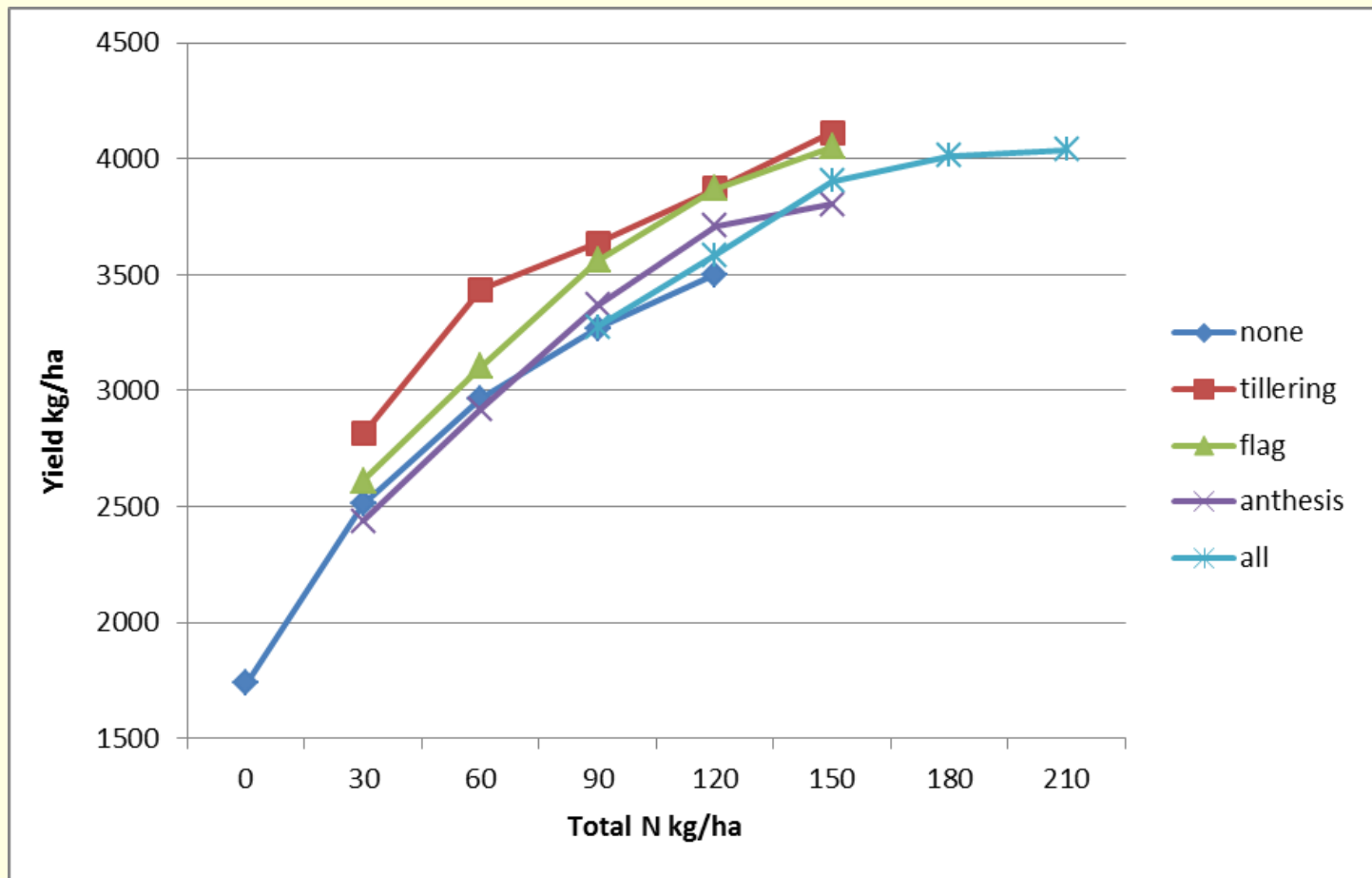
## Canola

- 4-5 leaf rosette
- Bolting
- Flowering
- All 3 times (90 kg N/ha total fertigation)

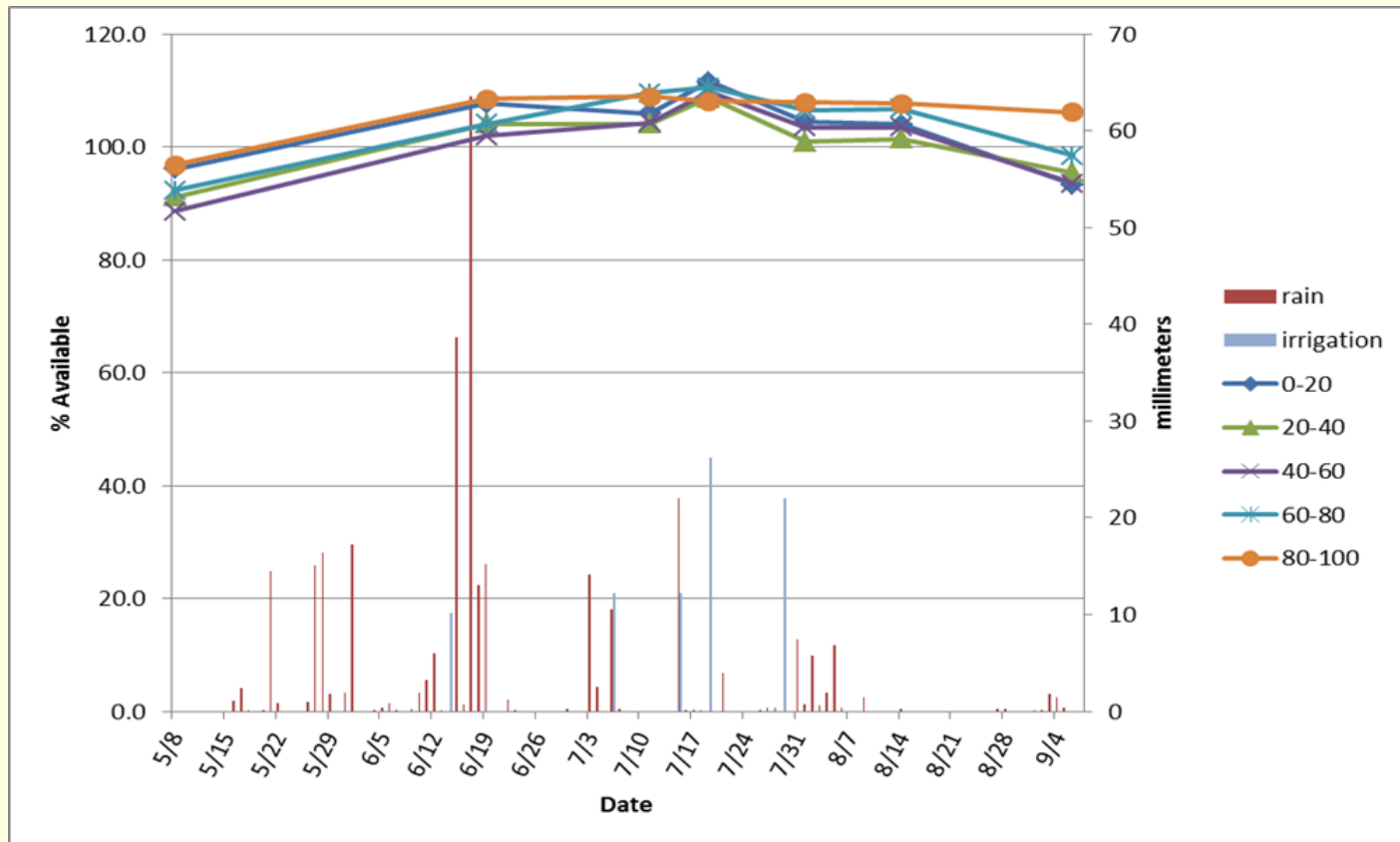
# 2013 canola response to fertigation



# 2013 wheat response to fertigation



# Soil moisture, rainfall, and irrigation on wheat fertigation trial



# Fertigation Advantages

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- Reduced fertilizer handling at seeding and seeding efficiencies
- Potential fertilization efficiencies over all N at seeding
  - If fertigation gets N into root zone when needed
  - If there is loss event from N applied at seeding



# Fertigation disadvantages

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- Application window may be small and easily missed – lost yield potential
- Untimely precipitation: denitrification, stuck pivots?
- Immobilization issues – fertigating into or through residues
  - Rate threshold?
  - How much water?

# Final Comments

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- Allan Middleton, Pat Pfiffner, Chris Hietamaa, Darryle Thiessen, Colin Enns
- ACIDF, Agrium
- Platform for work by Guillermo Hernandez-Ramirez (U of A) – GHG losses under fertigation
- Next ICPU