Foliar K Applications

Chickpeas

HMAg

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Key findings from AMPS trials

- **Application timing**
  - Application at 5% flowering recommended as it consistently increases yield
  - Application at 10 nodes/mid July largely failed to increase yield

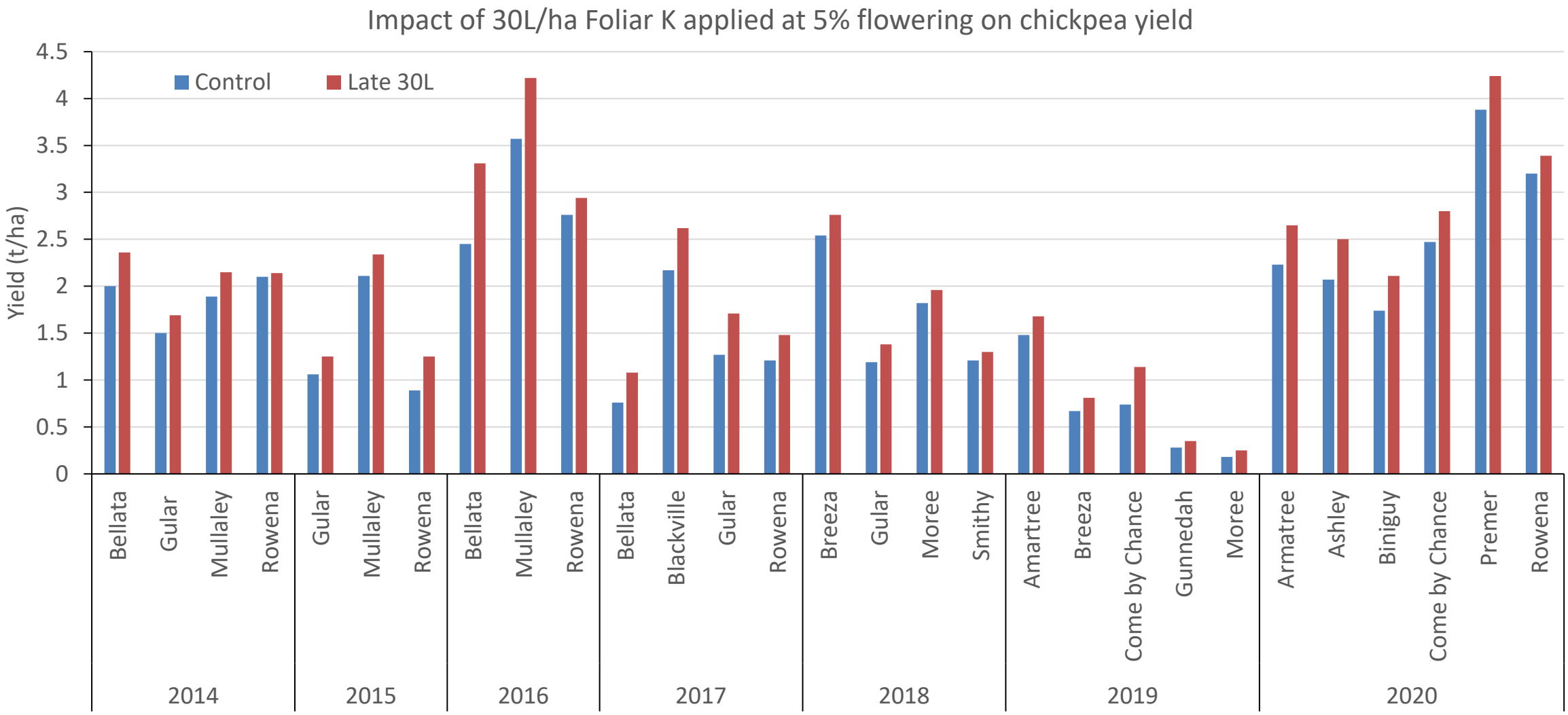
- **Rate**
  - 30L/ha is the recommended rate as over the 7 years of trial data it consistently increased yield
  - 45L/ha is **not** recommended as it generally did not increase yield above what was achieved with 30L/ha
  - 20L/ha is **not** recommended as it did not consistently increase yield

- **Yield impact**
  - Yields increased by 0.2 - 0.4 t/ha

- **Economics**
  - Across 7 years of trials $140/ha Net Return with Chickpeas @ $600/t OR $5 return for every $1 spent

- ***Take home message – 30L/ha rate applied at 5% flowering is the best bet to increase yield and achieve a good return on investment***

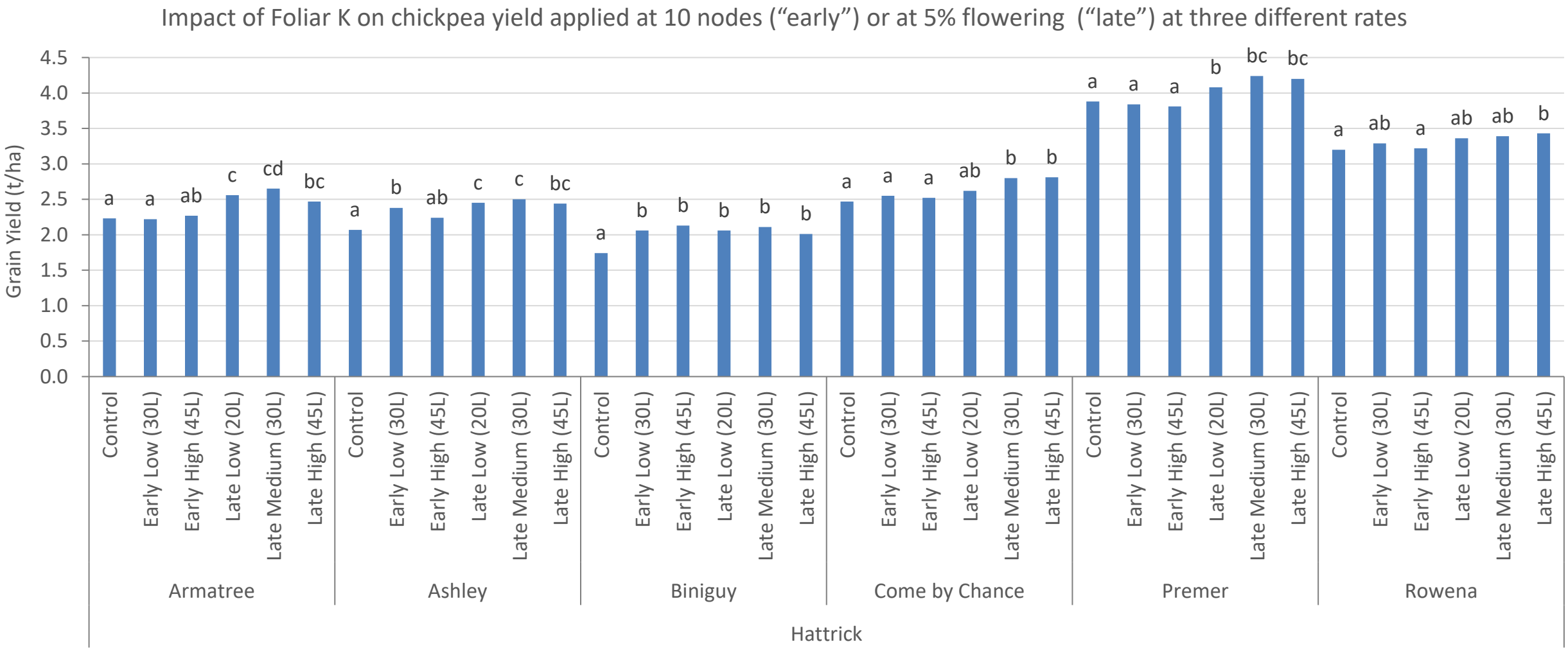
Chickpea Foliar K - 7 years of trial data



Notes

- "Late 30L" is starter fertilizer plus Super K at 30L/ha (9% K, 3% N) applied at 5% flowering
- Control is starter fertilizer only

Chickpea Foliar K – 2020 Trials



Notes

- **Early** applied at 10 nodes (mid July), **Late** applied at early flowering (5% flowering)
- **Rates: 20L** super K/ha (9% K, 3% N), **30L** super K/ha (9% K, 3% N), **45L** super K/ha (9% K, 3% N)
- **Control** is starter fertiliser only, all other treatments also received starter fertiliser; **Variety** Hattrick
- **Significance:** Letters denote significant yield differences for single sites only and are not comparable between sites

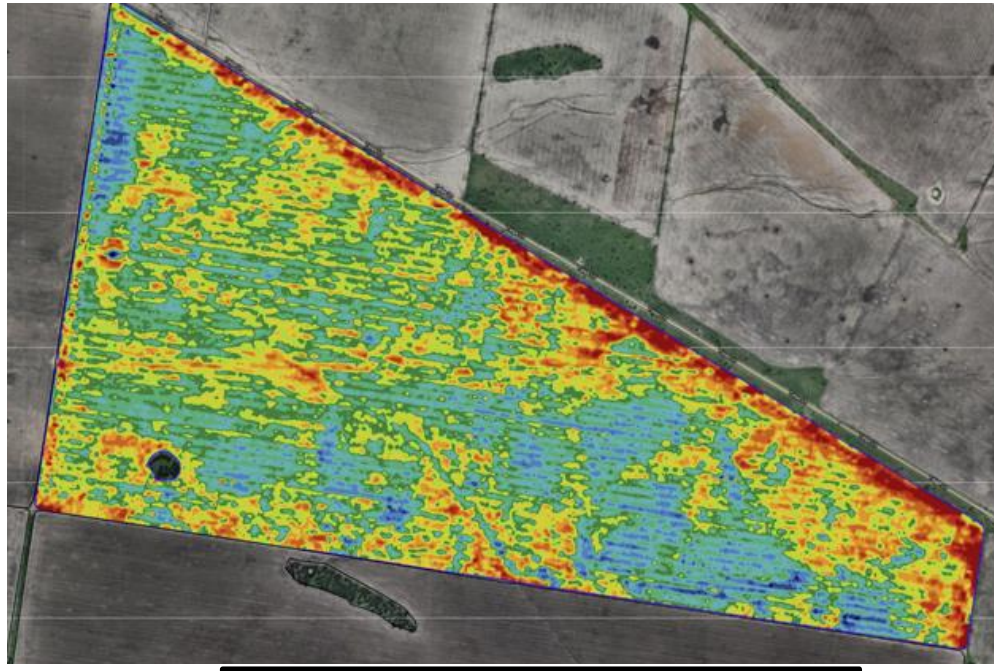
Chickpea Foliar K - 2020

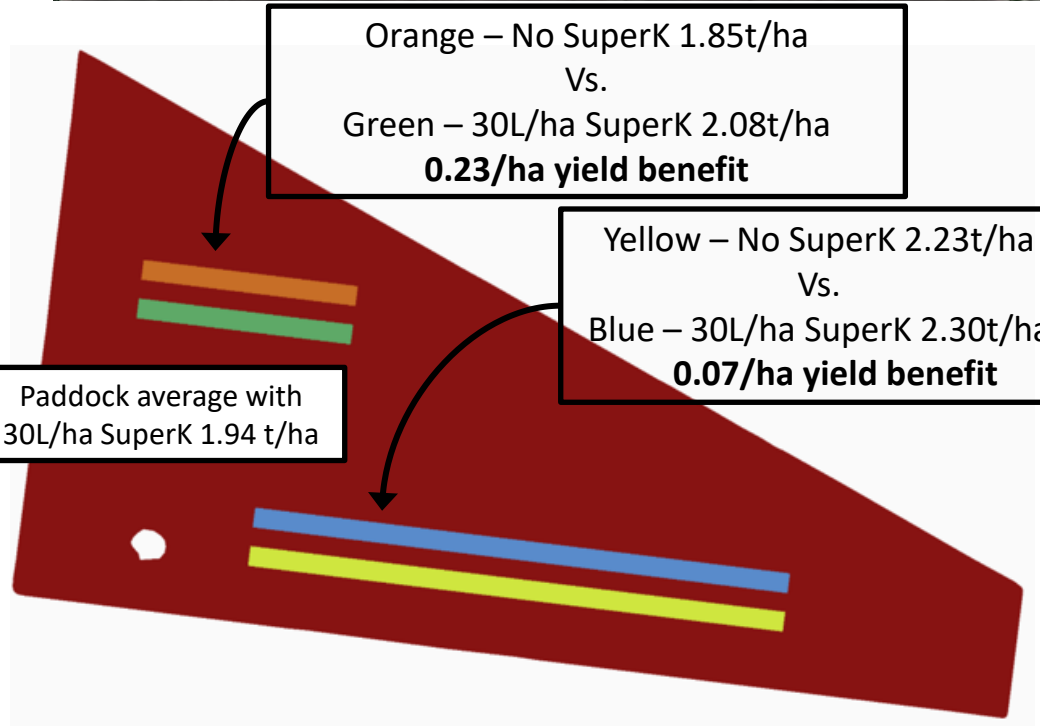
Site	Untreated Yield (t/ha)	Yield increase from Foliar K applied at 5% flowering (t/ha)		
		20L SuperK/ha	30L SuperK/ha	45L SuperK/ha
Armatree	2.2	+0.3	+0.4	+0.2
Ashley	2.1	+0.4	+0.4	+0.4
Biniguy	1.7	+0.3	+0.4	+0.3
Come by Chance	2.5	No increase	+0.3	+0.3
Premer	3.9	+0.2	+0.4	+0.3
Rowena	3.2	No increase	No increase	+0.2

Notes - Data presented in this table is the same data presented in the graph on the previous slide
- Rates: 20L super K/ha (9% K, 3% N), 30L super K/ha (9% K, 3% N), 45L super K/ha (9% K, 3% N)

Commercial Example Croppa Creek Area

- **2019**
  - Applied 30L/ha at early flowering as strips across two paddocks (total 2,000L applied)
  - Anecdotally, it increased yield from 300 kg/ha to 400 kg/ha in a tough year
- **2020**
  - Applied 30L/ha at early flowering (total 30,000L applied)
  - Using PCT, HMAg agronomist Rob Holmes did side by side comparisons of Nil and 30L/ha SuperK in two paddocks. Note, that for both paddocks the whole paddock had SuperK applied except for the two Nil comparison strips.
  - Paddock 1 (see the yield map and PCT images opposite) Foliar K increased yield by 0.23t/ha or $115/ha on the northern side and by 0.07t/ha or $35/ha on southern side. Note that these yield differences didn't show up visually on the yield map but needed the PCT comparisons to demonstrate the yield benefit
  - Paddock 2 (images not shown) Foliar K increased yield by 0.13t/ha (4.0t/ha to 4.43t/ha) or $65/ha on the northern side and by 0.05t/ha (3.57t/ha to 3.62t/ha) or $25/ha on southern side.
  - Approximate cost of application was $25/ha for product + $7/ha for application, total cost $32/ha.





Data courtesy of HMAg

What is driving foliar K responses

AMPS research shows the yield response is driven by…

- The yield increase from Foliar K is largely driven by an increase in seed size or “1000 grain weight”.
- While AMPS foliar K trials also increased “seeds per pod” and “pods per plant”, these increases are not as consistent as the increase in seed size.

Other research shows the yield response is driven by…

- While there is currently little use of foliar K in grain crops except for maize, foliar K is commonly used in horticulture to improve both the yield and quality of produce.
- Horticulture growers apply foliar K during both active growth and fruit filling, with potassium deficient fruit and vegetables usually small in size, this corresponds to the increase in 1000 grain weight seen in AMPS trials.

Why are we getting a response?

- There are concerns about negative K balances in the northern grains region and variable reserves of exchangeable and slow release K, with some areas potentially approaching very low levels due to stratification, high sodium or low slow release K reserves (Bell et al 2012).
- For chickpeas, they remove 8-20kg K/ha/year over a 5 year crop sequence (Norton 2017) compared to 3.7kg for wheat, OR alternatively 1t chickpea grain removes 10.7kg K (Bede O’mara, Incitec)
- There appears to be a poor relationship between soil tests for K and crop yield responses (GRDC)
- Thus, as chickpea K uptake appears to peak around early to late pod filling (Fotiadis et al, 2020), it appears that soil K reserves are unable to meet peak demand so we are seeing a yield response to foliar K when applied at early flowering.

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