Tips and Tactics

Canola nutrition and sulfur

Central West NSW, northern NSW and southern Qld

Northern Region

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Rethink sulfur for canola crops in parts of Qld and NSW

Growers in southern Queensland and central/northern parts of New South Wales can reconsider routinely adding sulfur to canola where there is good soil fertility and plant roots can access subsoil sulfur reserves.

Is sulfur over-rated?

- Canola has a high profit potential as well as farming system benefits, such as reducing disease load (e.g. crown rot, take-all).
- Canola is considered by many growers to be a high risk and expensive crop to grow, mainly due to concerns about high inputs, including fertiliser.
- Crop nutrition is a major determinant of profitable crop production, with both under- and over-fertilisation leading to economic losses.
- Field trials in central and northern NSW over five years have shown no significant responses to added sulfur (S) for yield and oil percentage (Street, 2014). This has prompted new advice for growers.
- Where canola is grown more intensively in southern NSW and crop removal of S is higher, sulfur requirements should be determined by deep soil testing, using test strips and keeping accurate records of previous S applications.
- Nitrogen (N) deficiency is far more common than sulfur deficiency. N and phosphorus (P) are crucial nutrients to get right.
- Sulfur responses are most likely when soil or seasonal conditions limit root access to deeper soil reserves. In this case, S applied at the surface is more likely to generate a response. Sulfur is more mobile in the soil and susceptible to leaching from the topsoil and accumulating at depths below 60cm.

Close-up of canola plants (Photo: Brad Collis)

KEY POINTS

- Recent research indicates that blanket early applications of 20 kg/ha of sulfur (S) to soil in central/northern NSW and southern Qld are not warranted.
- Sulfur deficiencies can be significant when they occur but occurrences are rare.
- Growers can adopt a watch-and-see approach. Be ready to fertilise in-crop if signs of deficiency occur as 100% of yield and oil percentage can be recovered, if sulfur is applied before stem elongation.
- Savings from S fertiliser costs may be better used to increase Nitrogen (N) rates.
- Most soils in the regions researched would have sufficient S in the profile to meet the requirements of most crops.
- Conducting KCl-40 soil tests before growing canola may be useful, however the currently recommended critical soil test levels are, in most cases, higher than needed.
- Soil requirements for sulfur should be determined by deep soil tests. Shallow soil tests are unreliable.

A new paradigm in sulfur thinking

Advice for growers based on best-available, past research into fertiliser rates (N, P and S) was to always apply a base level of S and to apply N depending on the season.

New research indicates this approach needs to be reversed. More than twenty trials across several seasons and locations in central and northern NSW have shown no yield or oil percentage responses to added S. They also showed no significant N x S interaction for yield. Getting N rates right is most important and S application may not be needed. Furthermore, S deficiency can be identified early on and rectified early in-crop.

Grain removal rates lower than thought

Commonly quoted grain-removal rates used in nutrient budgets are overestimates. Average crop removal rates do not support the requirement of 20 kg S/ha universally. While current industry references suggest 10 kg S/t grain removal rates, it is less than half this. Therefore planning S fertilisation for maintenance levels of 4 kg to 5 kg S/t of grain removed might be more suitable as a general rule. If soil levels are adequate, this may be reduced even further.

However, it is important to note that more research is needed to calibrate soil test critical levels to enable greater confidence in soil testing for S in canola.

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Canola requires higher inputs per tonne of grain for the major (macro-) nutrients N, P and S compared with other crops (Table 1). However, on a per-hectare basis, canola's nutritional requirements are similar to cereals, because yields are usually about half that of wheat.

FAQs

My crop is deficient, what should I do?
Add ammonium sulfate as this provides S immediately to the crop and also provides a nitrogen top up. As little as 5 kg S/t of grain removed may be enough to provide an economic benefit, but higher levels may also provide a good return on investment if the soil is very deficient. Avoid ammonium thiosulphate (liquid) as it can cause crop damage. Other sources may be appropriate but S must be in the readily-available sulfate form (elemental S is not effective as it needs to be oxidised to release sulfate-S).

How do I apply ammonium sulfate?
Applying just prior to rainfall is best. Surface applied ammonium sulfate requires rain to move it into the root zone. Sulfur is not volatile like N fertiliser, so while dry conditions may delay availability to the crop, losses will be minimal if rain is not immediately forecast. Avoid spreading granular product when the leaves are moist from dew to limit sticking of the prills and leaf burn.

Will I lose yield?
If deficiency is identified prior to stem elongation and S is applied, research has shown that 100% of final yield and oil percentage can be recovered (Hocking et al., 1996). This research also showed a 15% yield loss when S application was delayed until flowering.

What should I do to improve my canola crop?
Focus on N. Some of the crops requirements will be met by soil N, but in many cases additional N will be required to optimise yields. For example, the total N requirement of a 2t/ha canola crop is approximately 160 kg/ha#. In soils with low levels of soil N as little as 60 kg/ha of this will be supplied by the soil with the shortfall equating to a requirement of 217 kg/ha of urea.

Assuming removal rates of 40 kg/t of grain and a transfer efficiency of 50%.

Table 1: Comparison of the average quantity of major nutrients removed (kg/ha) per tonne of grain and stubble for a range of crops, including canola and wheat. (Source: Canola best practice management guide for south-eastern Australia)

	Nitrogen		Phosphorus		Potassium		Sulfur	
	Grain	Stubble	Grain	Stubble	Grain	Stubble	Grain	Stubble
Canola	40	10	7	2	9	26	3.5–5	3.2
Wheat	21	8	3	0.7	5	21	1.5	1.5
Barley	20	7	2.5	0.7	4.5	18	1.5	1.5
Oats	20	7	2.5	0.6	4.5	18	2	1
Lupins	51	10	4.5	0.4	9	16	3	2.5

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Useful resources

GRDC (2015) Canola GrowNote (North), http://www.grdc.com.au/Resources/GrowNotes

GRDC (2014) Soil testing for crop nutrition (Northern Region), www.grdc.com.au/GRDC-FS-SoilTestingN

GRDC (2009) Canola best practice management guide for south-eastern Australia, www.grdc.com.au/CanolaBestPracticeGuide

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More information

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