Crop Guide

Grain testing at harvest

Understand what's been removed, plan for what's next.



Incitec Pivot Fertilisers

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What nutrients has your harvest removed this season?

Grain testing can provide the answer and help inform fertiliser decisions for next season.

With forecasts pointing to one of the largest winter crops on record in some growing regions across southern Australia, many growers will remove significantly more nutrients from their paddocks than in an average year.

The latest Australian Crop Report published by ABARES in September 2026 shows the 2026-27 winter cropping season has improved throughout winter with timely rainfall in most southern cropping regions.

In Victoria particularly, area planted to winter crops in 2026-27 is estimated to have increased by 3% to 3.8 million hectares, the highest area on record.

In South Australia, the area planted to winter crops is estimated to have increased by 4% to 4.1 million hectares which is the third largest area on record and 9% above the 10-year average to 2025–26.

Higher yields remove more nutrients, and with phosphorous (P) prices at an all-time high, understanding nutrient removal and optimising every kilogram of nutrient is more important than ever.

Grain testing can help growers build a more complete picture of nutrient removal, identify variability across paddocks, and make more informed fertiliser decisions.





Simple nutrient planning process

HARVEST

↓

GRAIN TEST

↓

COMBINE WITH YIELD DATA

↓

COMPARE WITH SOIL TEST RESULTS

↓

BUILD 2027 NUTRIENT STRATEGY

How do I start?

Grain testing is available through Incitec Pivot's Nutrient Advantage® Laboratory for wheat, barley and other cereals, plus canola and pulse crops.

It is as simple as collecting 400 grams of threshed seed off the header, putting it in a plant tissue sampling bag and submitting it to Incitec Pivot's Nutrient Advantage® Laboratory for testing with test code G1.

Plant tissue sampling bags are available by contacting Nutrient Advantage on 1800 803 453.





Grower case study: Why variability matters

In the past, standardised national averaged removal tables have been used to estimate nutrient removal, but there is a large natural variation between paddocks, regions, and farming systems.

Grain testing from NVT trials on wheat Norton (2012) and canola Norton (2014), found large variations in nutrient removal (***Table 1***). These studies highlight why relying on standard nutrient removal tables can mask significant variability within an individual paddock.

Using this nutrient variation and applying it to a 1,300t silo of wheat (***Table 2***) and canola (***Table 3***), the total kilograms of nutrient removal can be highlighted. This nutrient removal variation can then be calculated (based on single nutrient supplied from fertiliser) to show the requirement of fertiliser rate required to meet removal.

Table 1: Variations in nutrient removal

WHEAT 11% MOISTURE			CANOLA 6% MOISTURE		
	Max kg/t	Min kg/t		Max kg/t	Min kg/t
Nitrogen	2.74	1.92	**Nitrogen**	4.6	3.44
Phosphorous	3.55	2.37	**Phosphorous**	6.39	4.27
Potassium	4.67	3.53	**Potassium**	7.4	5.5
Sulphur	1.75	1.36	**Sulphur**	4.45	3.19
Zinc (g/t)	21.2	19.82	**Zinc (g/t)**	42.86	28.4

Table 2: Nutrient variation contained in a 1,300-tonne silo of wheat

VARIATION IN KG OF NUTRIENT WITHIN SILO (WHEAT)			EQUIVALENT FERTILISER (KG)			
	Max	Min		Max	Min	Diff.
Nitrogen (N)	3,562	2,496	**Urea**	7,743	5,367	**2,375**
Phosphorous (P)	4,615	3,081	**MAP**	21,073	14,068	**7,004**
Potassium (K)	6,071	4,589	**MOP**	12,142	9,178	**2,964**
Sulphur (S)	2,275	1,768	**GranAm**	9,479	7,366	**2,112**
Zinc (Zn)	27.5	25.8	**Gran Z**	2,750	2,580	**170**

Table 3: Nutrient variation contained in a 1,300-tonne silo of canola

VARIATION IN KG OF NUTRIENT WITHIN SILO (CANOLA)			EQUIVALENT FERTILISER (KG)			
	Max	Min		Max	Min	Diff.
Nitrogen (N)	5,980	4,472	**Urea**	13,000	9,721	**7,110**
Phosphorous (P)	8,307	5,551	**MAP**	37,931	25,347	**12,583**
Potassium (K)	9,620	7,150	**MOP**	19,240	14,300	**4,940**
Sulphur (S)	5,785	4,147	**GranAm**	24,104	17,279	**6,824**
Zinc (Zn)	55.7	36.9	**Gran Z**	5,570	3,690	**1880**



Identify management zones

Using EM mapping, this grower was able to identify three distinct management zones across a paddock as shown in ***Figure 1***.

Having identified these zones, they could be used to sample grain at harvest, taking one grain sample per zone, to help identify paddock variability.



Figure 1: EM map results taken on-farm in Victoria. **Source:** Incitec Pivot

Link zones to harvest performance

Once samples were taken from each zone, the paddock yield map (***Figure 2***) could be used to assign a zone yield, for example, Zone 1 6.0t/ha, Zone 2 5.0t/ha and Zone 3 4 t/ha.

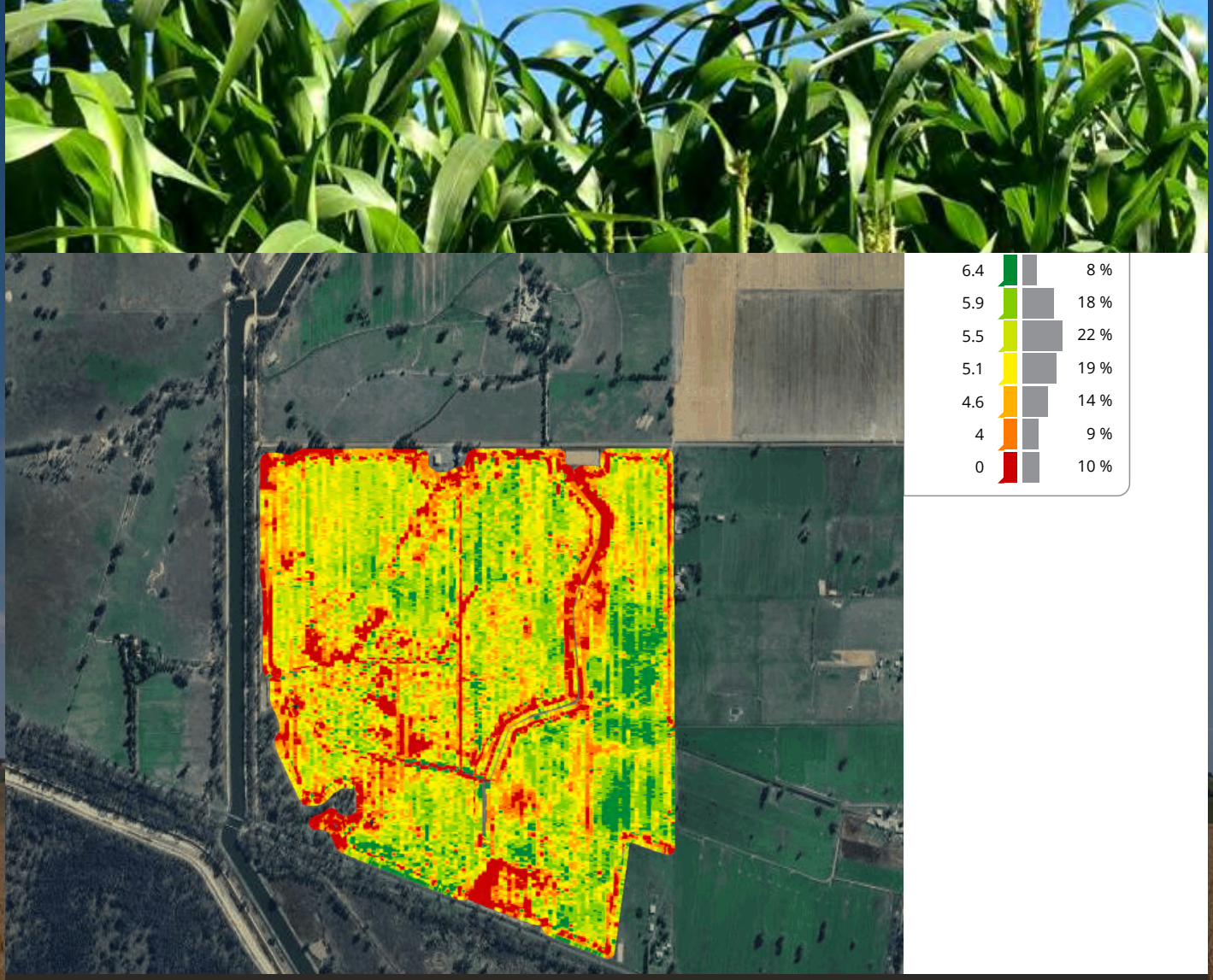


Figure 2: Yield map. **Source**: Incitec Pivot

Calculate nutrient removal

With the yield that has been assigned to a zone, multiply that by nutrient removal numbers that come from grain testing to establish nutrient supply requirements.

Prescription maps for variable rate application can then be created for sowing fertiliser rates.

If paddocks are not zoned, or variable rate technology is not available, take a representative grain sample from an area of a paddock where yield is median and stable.





What grain testing tells you

While grain testing does not replace the need to soil test, it is a quick and accurate way to refine nutrient removal budgets and measure nutrient removal per hectare of grain.

A well-planned and executed soil testing program establishes whether there is a requirement for capital applications of nutrients to lift low soil test values into the optimal range, or whether a maintenance application of nutrients to maintain soil test values in the optimal range is required.

The maintenance determination of nutrients can then be refined based on grain testing data to determine application rates.

Grain testing can also assist with post-harvest reviews of fertiliser budgets by providing an exact figure on how efficient nutrient assimilation was for a certain crop.

The flow-on benefit for growers next year is that they will have more data to inform P application rates.

Potential economic benefits

The value of grain testing ultimately depends on how the information is used within a fertiliser decision-making process.

As an example of potential economic benefit, assuming a MAP price of $1,200/tonne, for every 5kg/ha reduction in MAP rate, you're reducing 1kg P/ha and saving approximately $6/ha.

This is an illustration of potential savings where rates can appropriately be refined, rather than a guaranteed saving.

Seedling strength: An additional benefit

For growers retaining grain for seed, grain testing can also provide insight into potential seed vigour.

Strong seed vigour has been found with greater than 500 nanograms of zinc (Zn) per seed (Rengel and Graham, 1995t) and 130 micrograms of P per seed (De Marco 1990).

Where wheat grain is below these benchmarks, growers may need to consider another seed source or additional fertiliser to support early growth.

Understanding potential seedling vigour before deciding on which grain to use as seed can save headaches when preparing for planting next season.





Step-by-step grain testing

1. **Collect** grain samples by paddock, zone, crop are area as required.
2. **Record** yield with the area/zones sampled. Yield is multiplied by removal from grain analysis to calculate kg (or gms) per hectare removed.
3. **Supply** approximately 400 grams of threshed seed (no stalks), in a Nutrient Advantage plant tissue test bag.
4. **Submit** to the laboratory under the code G1.
5. **Receive** your report.



Your report will include:

- Moisture percentage
- Nutrient results (in mg/kg or % units)
- Some important nutrient ratios
- 1000 grain weight (for wheat only)
- Seed Zn and P contents (for wheat only)
- Nutrient removal scaled up to 1 t/ha yield to gain a quick insight into crop removal.

Moisture percentage and 1000 grain weight are reported to allow an appropriate seeding rate to be accurately calculated.

An example of a Nutrient Advantage grain testing report is shown in ***Figure 3***.



PLANT TISSUE ANALYSIS REPORT

Analyte	Unit	Value	Optimum	Low	Adequate	High
Total Nitrogen	%	2.00				
Phosphorus	%	0.28	> 0.5			
Potassium	%	0.43	> 0.53			
Sulphur	%	0.14	> 0.18			
Calcium	%	0.03				
Magnesium	%	0.12				
Sodium	%	<0.01	0.005 - 0.08			
Copper	mg/kg	6.1	> 1.0			
Zinc	mg/kg	24.0	> 20			
Manganese	mg/kg	62.0	15 - 18			
Iron	mg/kg	47.0	> 2.0			
Boron	mg/kg	2.4	0 - 2			
Dry Matter	%	96.2				
Moisture	%	3.8				
1000 Grain Weight	g/1000 seeds	40.0				
Seed Weight (average)	g	0.040				
Seed Zinc Content	ng Zn/seed	960.0	> 500			
Seed Phosphorus Content	ug P/seed	110.0	> 180			
Phosphorus Removed per 1 t/ha Yield	kg/ha	2.70				
Potassium Removed per 1 t/ha Yield	kg/ha	4.10				
Sulfur Removed per 1 t/ha Yield	kg/ha	1.30				
Calcium Removed per 1 t/ha Yield	kg/ha	0.31				
Magnesium Removed per 1 t/ha Yield	kg/ha	1.20				
Manganese Removed per 1 t/ha Yield	g/ha	60.00				
Iron Removed per 1 t/ha Yield	g/ha	45.00				
Copper Removed per 1 t/ha Yield	g/ha	5.90				
Zinc Removed per 1 t/ha Yield	g/ha	23.00				
Boron Removed per 1 t/ha Yield	g/ha	2.30				

Figure 3: An example of a wheat grain testing report from Nutrient Advantage. **Source:** Incitec Pivot



Summary

Harvest presents a valuable opportunity to gather the data needed to make smarter P management decisions.

With a simple grain test, you'll be better equipped to refine nutrient budgets, manage input costs and navigate the uncertainty of next season with confidence.

Fertiliser decisions matter. Make them with data. Be prepared.

More information

For more information visit ***Nutrient Advantage Laboratory | Incitec Pivot Fertilisers*** or contact an Incitec Pivot Technical Agronomist:

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