Are you throwing money down the drain with poorly applied nutrients?

By Wayne Pluske and Tom Cowlrick – Nutrient Management Systems

Prices for most fertiliser products have at least doubled in recent years so it is worth considering how best to respond to the situation – and the saying "you cannot manage what you cannot measure" is very pertinent.

Testing plants to detect nutrient deficiencies before the end of tillering is one of the best ways of increasing the chance of reaping optimum returns on every precious kilogram of fertiliser.

For some, this may be particularly important where significant changes have been made in fertiliser programs this season as a response to fertiliser prices. Are decisions such as skipping the liming program, not putting on soil-applied trace elements and cutting the phosphorus rate this season having an effect?

Plant tissue analysis measures the concentration of nutrients in plant tissues for comparison with the concentration required for optimum plant growth and yield. It shows the plant's view of the nutrients it sees as being available up to the time of testing compared to soil testing which predicts what may be available.

Common deficiencies that can be detected up to the end of tillering (Z31) include nitrogen, copper, zinc, manganese, phosphorus, potassium and sulphur. A limitation of just one of these nutrients prior to the end of tillering not only reduces yield potential but also the return on fertiliser applied at sowing.

And with fertiliser price increases, the relative cost of plant testing has never been lower as a powerful means of targeting inputs to crop needs.

But a recent national Grains Research and Development Corporation survey shows too few growers use plant testing before deciding whether or not to add additional fertiliser.

Nationally, less than one quarter of growers surveyed believed they took sufficient plant tissue samples suggesting most thought they had scope to increase their crop returns using the tool.

Plant testing can be used as a diagnostic tool (to check the reasons for poor crop growth) or as a monitoring tool (to assess the effectiveness of the current fertiliser program).

Some plant analysis services will request the collection of 'whole tops' which includes the whole plant minus the roots.

A DIAGNOSTIC TOOL

While there are plenty of indicators that can point to a particular nutrient deficiency, plant growth and grain yields can be restricted by nutrient stress before symptoms become visible, even to skilled advisers.

In this case plant testing acts like an early warning system that detects if nutrients are higher or lower than the range necessary to produce optimum harvest yields and grain quality.

So, just like a person with Type 2 diabetes needs to monitor their glucose levels using blood tests, plant testing allows an undersupply or oversupply of nutrients to be picked up before harvest returns are compromised.

For example, one Western Australian grower only discovered a copper deficiency after he sent plant samples for testing as no symptoms were visible within the crop.

After careful interpretation of the results, in partnership with a qualified nutrition expert, the grower decided to correct the deficit using an in-crop foliar spray. An area was left untreated to check the impact on yield and profit.

At the end of the season the grower reported an additional half a tonne in yield where the crop had been treated with copper, producing a 20 per cent profit advantage over the unfertilised area.

MAKING THE RIGHT DECISION

There are situations where adding additional nutrient can cause crop yields and profitability to go backwards. This is particularly so for those who routinely top-dress crops with nitrogen at tillering when another nutrient is in poor supply.

If one nutrient is deficient, plant growth and production will be poor even if all other nutrients are abundant. If the nutrient that is lacking is supplied, growth will increase until supply of that nutrient is no longer the limiting factor. Increasing supply beyond this level is not economical, as another nutrient would then be in minimum supply and become the limiting factor. This other nutrient then needs to be applied.

While soil tests predict the amount of nutrients available for uptake, plant tests will show what has actually been taken up. As such, plant tests are a valuable way to assess the effectiveness of the pre-sowing fertiliser program and allow any adjustments to be made for future years.

If a laboratory can detect a particular nutrient in a plant, that nutrient is considered to be freely available within the soil and accessible to plant roots. This means plant tests used in conjunction with soil tests will point to potential subsoil constraints because what was measured as available in a soil test is not being taken up by the plant.

Factors such as leaching rain, root disease, placement problems, erosion, reduced cultivation, poor soil moisture, herbicide damage, acidity, alkalinity, salinity and sodicity can all limit plant uptake of nutrients from large reserves detected in soil tests carried out earlier in the season.

INTERPRETING THE RESULTS

Accurate plant analysis and interpretation are critical if fertiliser is to be targeted to a crop's nutritional needs. To be confident in the results, ask if the testing service uses a scientifically based interpretive system such as SoilMate. The best sampled plants and the most accurate laboratory tests have no value unless the results are properly interpreted.

Careful interpretation in partnership with a skilled nutrition expert will determine the best course of action and offer the best chance of delivering the most profitable returns from any money invested in fertilisers and plant tissue analysis.

Contact Wayne Pluske
E: nutrientmswa@optusnet.com.au,
Mob: 0418 726 121 or
Tom Cowlrick E: tcowlrick@nutrientms.com.au,
Mob: 0409 992 407.

Nutrient Management Systems

Nutrient Management Systems is a leading specialist in soil health and plant nutrition. From a position independent of fertiliser sales, we provide agronomists with the information tools to help improve economic returns on fertiliser for farmers.

COLLECTING SAMPLES

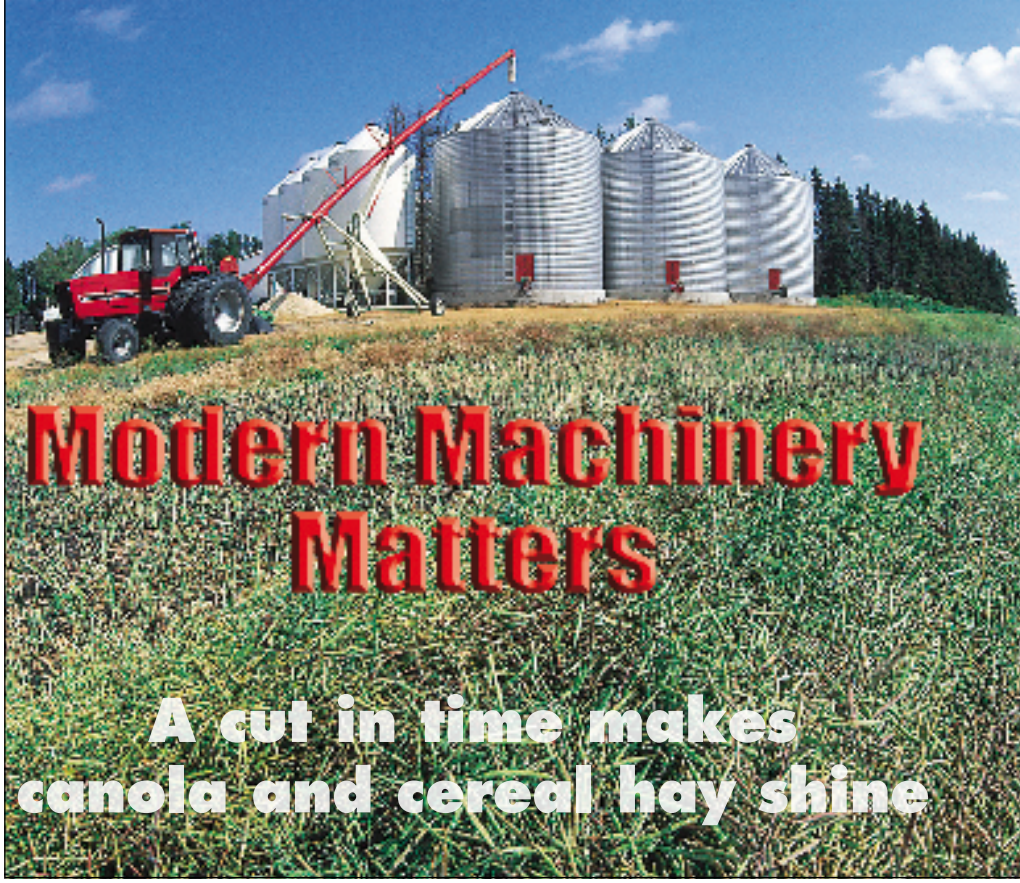
Before collecting plant samples, contact a testing laboratory that has been certified as proficient with the Australasian Soil and Plant Analysis Council (ASPAC). A list is available by visiting www.aspac-australisia.com and clicking on 'Certified ASPAC Labs'.

Most plant tissue testing services will provide a sampling guide to explain when and how much plant material to gather as the method differs according to the crop of interest.

Some plant tissue analysis services will request 'whole tops' requiring whole plants to be supplied without their roots while others will want the 'youngest emerged blades' or leaves. Nonetheless, the method used will depend on the purpose for sampling so it is important to declare this to the testing service responsible for carrying out the tests or the adviser chosen to interpret the laboratory results.

Before taking samples, ensure they are representative of the management area and free of non-nutritional limitations such as compaction or waterlogging.

Plant samples requested by testing laboratories will vary depending on the purpose of the analysis. Pictured is an example of a 'youngest emerged blades' sample.



New trials to determine the best time to cut canola for hay have shown that the oilseed can add flexibility and reduce risk in unpredictable seasons.

Consultant Kate McCormick, who is overseeing the trials as part of the GRDC and Australian Oilseeds Federation *Better Canola* program, says the results show canola can provide an important disease and weed break as a rotation crop and another income stream as either hay or grain.

The 2007 season trials cut canola grown at Longerenong College, near Horsham in north-west Victoria, at four different stages.

- Full flowering (September 6);
- Late flowering (September 27);
- Mid-podfill (October 17); and,
- Grain harvest (November 20).

Sampling by the Birchip Cropping Group and Feedtest (a commercial feed-analysis business of the Victorian Department of Primary Industries) found the optimum cutting time to achieve the best compromise between quantity and quality was at late-flowering stage.

In this case that was in late September, where a $270 per tonne price for hay and a 3.9 tonnes per hectare yield was able to return as much as $660 per hectare after accounting for all production and haymaking costs.

"Even at $200 per tonne for hay, a net return of $400 per hectare is a more desirable outcome than harvesting the grain," Kate says.

Canola harvested for grain at the same site would have lost $26 per hectare overall with a yield of just 0.4 tonnes per hectare – and at an oil quality seven per cent lower than the quality the grain price is quoted on.

"The trials are saying that canola hay is another option if the grain outlook isn't looking particularly good," Kate says. "And the trial analysis has shown that if you cut later you're going to have poorer quality – if you cut earlier, you might have fantastic quality hay, but you won't get the bulk."

While the trial cut earliest – at full flowering – returned the highest quality, its yields, at 3.1 tonnes per hectare were lower than the second hay cut, netting a final return of $475 per hectare based on a price of $270 per hectare. The early cut would need to command a premium to make as much money as late-flowering-cut hay – something unlikely in drought years, despite the high hay price, Kate says.

Canola cut at mid-podfill in October yielded the same as in late flowering, although quality was lower.

"One of the key findings is that the later you go with cutting, the more you reduce protein, dry matter digestibility and metabolisable energy, and the more you increase fibre," Kate says.

"So, in a nutshell, quality goes down the later you cut it."

Just a fluke or the real deal?

The project was initiated after a season where the combination of late frosts and drought meant growers who had been forced to cut their canola grain crop for hay found a keen market from a hay-hungry dairy industry. For some growers it became their most profitable paddock.

"So the questions were asked: 'Is this just a one-off fluke? Could we do it again?'," Kate says. "Could you grow canola specifically for hay in most years or are you better off to grow it for grain? We wanted to get some science to back up the experience."

Kate says the trials have revealed not only the best cutting time, but have established that canola can be used with confidence as a rotation crop, with markets for hay or grain, according to how the season unfolds.

She suggests cutting canola for hay reduces the overall risk of growing canola because it provides an alternative use.

"People who have dropped canola from the rotation because they haven't been able to grow it profitably for grain could bring it back as a weed or disease-break and cut it for hay."

Source: GRDC *Ground Cover* – Melissa Marino.
More information: Kate McCormick, 0429 852 230. ■

THE MAIN POINTS

- Hay quality decreases the later you cut.
- Cutting at the late-flowering stage is a good compromise between quality and quantity.
- Sow early to maximise potential.
- Manage inputs to avoid high up-front costs.
- Chemical record and withholding periods of chemical applied should be checked before cutting for hay.
- Hay removes more nutrients from the paddock than grain, so nutrient budgeting and soil testing to assist with fertiliser planning are advised.