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This article contains information most relevant to the less than 350 mm rainfall mallee farming region

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Mallee Sustainable Farming Inc. SA NSW VIC

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Summary of Soil Results from NSW Farmer Paddocks: 2004-2006

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The issue

Soil testing is becoming increasingly important as a soil fertility and fertiliser management tool. Although soil tests alone do not provide a complete answer as to what fertiliser rate and type to apply, they do however provide the basis for making decisions about a fertiliser program.

The data represented in this farmtalk are farm soil results that have been generated from an extension program in the Lower Murray Darling (LMD) catchment.

What we know

- Regular soil testing enables management of the crop and its input and it gives insight into how to increase productivity.
- Understanding and knowing your Plant Available Water (PAW) enables refined nutrient budgeting.
- Establishing the unavailable soil water can take more than one year and should be monitored until you have full confidence in this figure.

Why have soil testing programs?

By conducting programs, dryland cropping farmers in the LMD catchment gained a better understanding of their soils health. The objective was to facilitate a greater emphasis on maximising production through soil testing whilst generating a positive environmental outcome like reducing deep drainage potential.

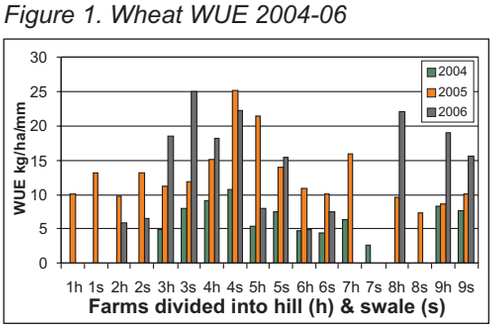
What did the package include?

- 10 landholders involved with the soil sampling program for 3 years.
- Landholders to implement one on-farm activity per year like a test strip of varying fertiliser rates.
- In March of each year, 4 soil depths (0-10cm, 10cm-30cm, 30cm-60cm, 60cm-100cm) at two different locations within the paddock (swale and hill) to 1m were taken.
- Agronomic reports were developed and sent out before sowing and harvest and included a recommended nutrient budget and the results of the soil analysis.
- Landholders provided their rainfall data and their end of year harvest results.

What it means

From the Water Use Efficiency (WUE) data (see figure 1) there was a trend toward the 16-20kg/ha/mm target: for every millimetre of water available to crops in the Mallee, 16-20kg of grain can be produced per hectare. However, over time, the overall WUE values indicate that there are still barriers which need to be overcome. The inability to reach this target may be as a result of an imbalance between Phosphorus [P] and Zinc [Zn] or a combination of micronutrients rather than a Nitrogen [N] issue or a constraint issue.

Figure 1. Wheat WUE 2004-06



Nitrogen [N] is an essential part of proteins and is needed for early tiller development and to set up the crop for a high yield potential. It also largely determines the protein concentration in grain.

Due to the dry growing seasons and the crop not utilising the available soil [N], it was not a limiting nutrient over the 2004-06.

Phosphorus [P] is essential for development of roots and seedlings and stimulates flower and fruit development.

Over time, [P] levels in the soil at the 10 properties monitored have declined (see figure 2). Generally, 3kg of [P] are removed with every tonne of grain that is

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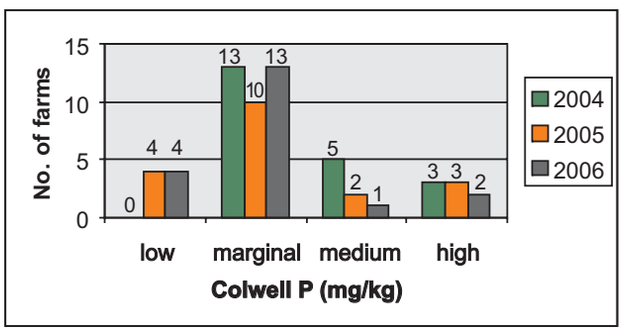
produced, with the replacement value not being added back to the system. Even in low rainfall years, soil [P] levels need to be assessed in order for production to reach its potential. This can be done through regular soil testing.

Figure 2. Colwell Phosphorus levels 2004-06

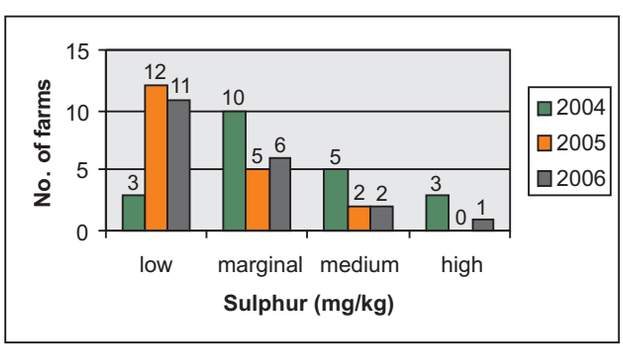


Sulphur [S] deficiencies can result in retarded growth and delayed maturity.

Historically, [S] has not been added to farming systems in the NSW Mallee but has been slowly recognised as an important macronutrient that needs to be added to the fertiliser composition.

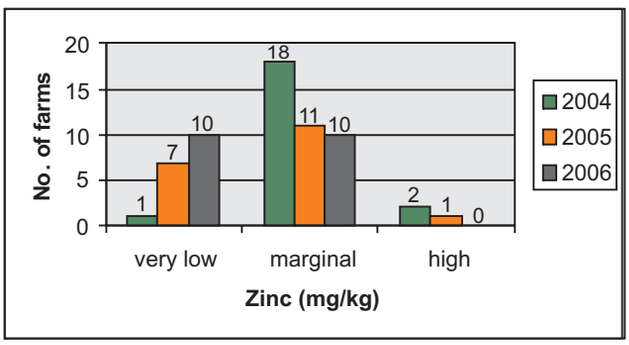
[S] levels in fertiliser increased over the monitoring period (see figure 3).

Figure 3. Sulphur levels 2004-06



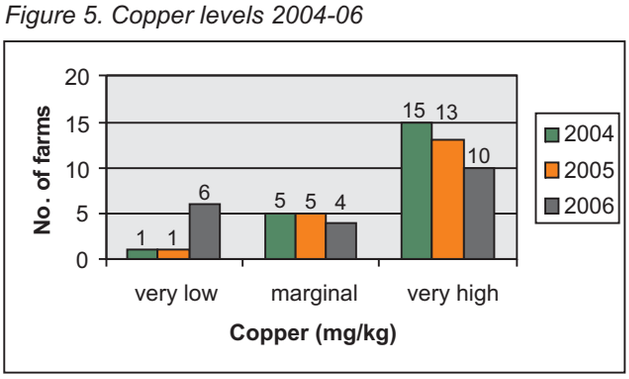
Zinc [Zn] is an important micronutrient in the overall health of crops, especially in continuous cropping regime. [Zn] deficient crops are prone to root disease and pest attack, which reduces the overall health of the crop and can have a direct effect on yield. Over the monitoring period, [Zn] levels shifted from marginal to very low (see figure 4). This may be due to the high demand the crop places on [Zn] and the lack of replacement [Zn] to the crop during the growing season.

Figure 4. Zinc levels 2004-06



Copper [Cu] is important for seed and grain development. Slight deficiencies can result in yield losses of up to 20% with the entire head becoming sterile. [Cu] levels shifted from high to low over the 3 year period (see figure 5).

Figure 5. Copper levels 2004-06



Where to next

With the agronomic reports that have been provided to the ten landholders involved with the project over the past three years, they now have the skills, confidence and the knowledge of their soil type and its nutritional health to be able to make informed decisions when planning their cropping program.

In 2007, ten new landholders have been inducted into the soil coring program.

Acknowlegements

To the ten landholders involved with the program, to Anthony Baird for his help in collecting the soils over the duratioThe project and to CSBP for soil analysis.

For further information

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