More soil characterizations mean Yield Prophet is easier to use!

Written for Grain & Graze 2 by Mike Roberts Communications, Research and Consulting

Advisors, what if you could help your clients to discover and understand the implications of knowing exactly how much plant available water and nitrogen was in the ground for a particular crop in a given year? Since its launch ten years ago, Yield Prophet has been touted as the tool which could make this happen, potentially change the way we manage our crops and take a good deal of the risk out of making farm profit.

For many advisors, the catch was that Yield Prophet is dependent on accurate soil characterization. Getting those characterizations was an onerous task if you had to do it yourself from scratch.

Prior to the launch of Yield Prophet in 2003 there was some excellent data from both state and university investment over the years that described soil types texturally, described the chemistry that might influence crop production but hadn't really described 'bucket size'. We hadn't described the water holding capacity of our soils. That key factor was crucial to our understanding of how much water is actually available to plants.

In order to describe 'bucket size' for a given soil, in addition to knowing something about its texture, horizon levels and chemistry you actually had to measure how much water it could hold at drained upper limit/field capacity (DUL) and compare it to what remained at the crop lower limit/wilting point (CLL). That meant wetting up soil profiles, doing bulk density measurements and erecting rain shelters post flowering to get accurate CLL figures in spring.

The good news is that since advisors began using Yield Prophet in SA in 2005, nearly 70 soil types around SA have been characterized. These have largely been done in the Lower North, Mid-North and YP regions with an additional few on EP and in the Mallee. Thanks to an important investment from GRDC through the "Where in the Landscape Project" and "Grain & Graze 2" we can now more easily select a soil type near to us that can be used with confidence in the Yield Prophet model.

There have been difficulties, as you might imagine, trying to characterize some stony soils, particularly on Yorke Peninsula. It's hard to describe water-holding capacity accurately when you hit rock, but research continues.

Bill Long, from Ag Consulting Co says, " with the characterization work done to date, there wouldn't be too many farmers unable to run a model like Yield Prophet in SA where soil type is a limitation. Most growers could select a soil type and use the model with a lot more confidence than they could 8 years ago."

One of the really good success stories out of the Grain & Graze 2 program has been a series of workshops for local advisors focused on building skills and knowledge on soil water issues. Through linkages with Neil Dalgleish's CSIRO "Soil Water: Doing it Better, Doing it Smarter project",

Birchip Cropping Group and private companies specializing in soil probes; the level of discussion and debate about soil water has vastly improved our understanding.

In conjunction with the CSIRO's soil water project Grain & Graze 2 initiated the creation of a **SoilMapp** that can be downloaded from the App Store. It provides a description of all the soil types right across Australia that are contained in the national soil database. That means that now we can stand in a paddock, dig a hole, look at a soil type and with our iPad or tablet search within a 25k radius to see if we can match an already described soil type with the one that we are standing on. If we can't find a match, then we might look further afield until we discover something we think is similar.

According to Bill, "**SoilMapp** is quick and easy for advisors to use. It gives us all the chemistry and soil water holding capacity data. That means you can stand in the paddock after having used your dig stick to take a sample and say, for example, that 'this **SoilMapp** picture looks pretty close to the soil we just dug up. I reckon I'll use this soil type as the basis on which to run my modeling in Yield Prophet."

Another helpful tool when using Yield Prophet is to scroll to the bottom of the soils page and ask it to give

you all the soils that occur in a 20 or 25k radius of your town. You can then select those soils that might be similar in water holding capacity, texture, etc. and use that data to run the model. It is now far easier for advisors to select the soil type that is in the ballpark to allow the model to function well. That is one of the outcomes of the 'Where in the Landcape' component of Grain & Graze 2.

A really important point to understand is that selection of soils isn't just location based. You don't need to do a characterization in every paddock and on every farm to make Yield Prophet function. We now have characterizations giving adequate soil type descriptions to satisfy many locations in our region. The reality is that you don't have to find the nearest soil type. You actually have to find the soil type that matches most closely to the texture, depth and chemical constraints of the one you are dealing with. Often that can be a soil type from outside of your region. You may find a soil type with similar characteristics in another region or state.

"It's pretty easy", Bill reckons. "Just click on the **SoilMapp** and see what's close to the district. Alternatively,

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you might know that if you are on a grey calcareous soil down at the bottom of Yorke Peninsula that there could be similar soil types on Eyre Peninsula so you could have a look at those. A little bit of sleuthing on soil types around the region or the state is useful in helping to pick the soil type that you are standing on at the time."

Using some of these new tools can save you heaps in costs, time and effort trying to characterize soils on your own for your clients. You might use a **SoilMapp** photo that is a pretty good match to the soil you are trying to describe but find that the horizon depths are slightly different. The A horizon in the picture might got to 16cm while yours is 10cm. It's possible then to use another program developed by Lawrence Burke (formerly CSIRO) called Soil Express to extrapolate the data to account for variations in soils such as these. Once changes are made in **SoilMapp**, you can transfer the data to Yield Prophet and run the model from there. It is important to send off some samples to the lab, however, to check out possible chemical limitations like salt or boron layers within the root zone.

So the message for advisors is that if you have been holding back from using Yield Prophet with your clients because you thought you needed to do all your own soil characterization, think again! There's a wealth of information out there on SA and interstate soils to be found on some easy to use tools that just might save you heaps of work and give you access to one of the most powerful tools available in Australian agriculture – Yield Prophet.

Grain & Graze 2 would like to thank Bill Long of Ag Consulting Co for information supplied for this article.