# GRDC PODCAST TRANSCRIPT

**Acid soil management - 5cm rule for soil pH testing**

[00:00:05] **Intro** This is a GRDC podcast.

[00:00:11] **Mark Richards** So we know that soil acidity is a major handbrake for production in our northern and southern regions. We really need to look at our soil testing methods and really start working out ways for growers to look at that five-centimetre interval testing. The five-centimetre rule for pH testing is really the key moving forward to understanding our soils.

[00:00:29] **Camilla Plunkett** Hello, I'm Camilla Plunkett and that was Mark Richards from the New South Wales Department of Primary Industries. We're at a trial site in the northern region of Methul, looking at the effects of limed and unlimed soils. Indications from this trial site show that good sampling practice is the key to productivity and profit. While previous acid soil testing practice was not to test as deep, new research has identified greater acidic layering where crop roots remained under the soil, not benefiting from the full potential of amelioration. By using the five-centimetre rule for soil testing, the hidden acidity in lower layers can be recognised and treated, giving growers increased productivity and profit. Mark, can you tell us what is the five-centimetre rule for soil pH?

[00:01:25] **Mark Richards** Well, the new five-centimetre guidelines is a really good new system where it really gives us a good answer on what our soil pH levels are, basically down the profile. Because we know it can vary greatly, and the old testing methods really don't tell us the full picture of the pH down the profile. Whereas if we can do it in five-centimetre segments, we get a lot better understanding and then we can answer the questions on what we need to do to fix those issues.

[00:01:52] **Camilla Plunkett** So, basically you test down at five centimetres and then down in five-centimetre increments, and you get a different mean, which you can use for your variable lime application?

[00:02:02] **Mark Richards** Well, once we do our five-centimetre testing and then we look at our results, we can then work out what lime requirements we need to fix those issues down the profile. Basically, the total overall amount of lime we need to apply to really keep the service above five and a half pH because that's the level we really need to get movement down the profile. And then if we do have serious issues at depth, maybe to 10 to 15cm, it's working out how do we actually get the lime down there. So, what tillage strategy do we need to try and get the lime to that area to fix that issue?

[00:02:38] **Camilla Plunkett** Mark, the trial site we're here at is growing pulses in deeply ameliorated soil where the new five-centimetre rule was used. What differences is it showing?

[00:02:48] **Mark Richards** Yes, so certainly this trial site we've observed where lime was only applied last year at three and a half tonnes, and this was on soil that was not severely acidic, roughly around 4.5 down to 15cm. That long application has really shown the benefit, only within 12 months. And looking at the lentils in the barley subsequent to last year, and we can really see huge increase in the root biomass on the long treatment and also a large number of nodules indicating modulation. Whereas on the unlimed treatment we really have much poorer biomass in the root systems, on both the barley and the lentils and really no nodules observed on the lentils. So a really stark contrast in a short time period and a three and a half tonne lime investment. So, I think down the track that investment will certainly be returned in the near future, looking at the crops we've observed.

[00:03:41] **Camilla Plunkett** Pulse crops are acid sensitive. So, by fixing the hidden acidity in these layers, you've been able to grow these crops here. What is the benefit for growers then using pulse crops?

[00:03:52] **Mark Richards** We know that pulses with their nitrogen fixing ability, which it fixes free nitrogen from the atmosphere and stores it in the soil and then breaks it down slowly over time. It offers a big benefit to our cropping system. You know, we can extend our cropping system because it gives us a disease break between our cereal crops and canola, and also gives us better weed management options throughout the system so it can extend our cropping sequence and also, you know, adds value by giving us another crop. We have some human consumption markets available overseas now, particularly for chickpeas and lentils and faba beans and field peas. And you know, we need to have good soil health to maximise our production, to maximise our returns. And then we also see benefits from fixing our soil acidity issues across the whole farming system, throughout not only our legume pastures, but also through our cereals and our wheat, barley, and canola crops as well.

[00:04:45] **Camilla Plunkett** So you fix the acidity with a new five-centimetre rule. Then you can grow your pulse crops, which puts nitrogen back into the soil, which is free nitrogen you don't have to buy.

[00:04:55] **Mark Richards** Yeah, certainly we know that soil acidity is a major handbrake for production in our northern and southern regions, and this new five-centimetre tool is really going to help answer and ameliorate some of those issues. And that will help maximise our pulse production and reduce that handbrake.

[00:05:13] **Camilla Plunkett** That was Mark Richards from the New South Wales DPI, sharing the benefits of using the new five-centimetre rule for soil pH, and how deep amelioration and pulse rotation can increase productivity and profitability. Also with us here is grower Andrew Lord, who has had first-hand experience with using this new practice. Andrew, you've been using the five-centimetre rule with great success, after receiving your test results from the deepest subsurface acidity levels. What decisions did it to allow you to make?

[00:05:46] **Andrew Lord** Well, the biggest decision we have made has been two-fold. The first one was to be able to be able to variable rate lime, and the second one was to be able to incorporate lime at the right depth correctly. The five-centimetre rule has really helped us by identifying where the issue is in our paddock, identifying how to solve that issue by how much lime we need to incorporate at the right depth. And the depth is very important because often we thought we were doing the right thing, but we weren't just going deep enough. And so, when you put variable rate lime, where you put lime at light rates and other areas where you put really heavy rates, and then you can incorporate it at the right depth, whether it be 10cm or 20cm. We've been able to fix our pH in our soils.

[00:06:34] **Camilla Plunkett** What were the results showing? What did you find after changing to the new practice?

[00:06:39] **Andrew Lord** We thought that we had very even paddocks. And what this information has shown us is that the variation that we're getting in our yields is from pH. And what this information has helped us to do is how can we fix our pH in our soils correctly to get a good, even yielding crop?

[00:07:00] **Camilla Plunkett** What would you tell other growers who are interested in trying this?

[00:07:03] **Andrew Lord** Yeah, I'll just say if you want to start deep ripping, incorporating lime and thinking you're fixing the problem without doing the correct soil testing, it would be a waste of time. You really need to do your due diligence. Do your 0 to 5, 10 to 20, all the way down to 20cm of your soil testing. Identify what your problem is because it could not be actually lime. You might not need to put any lime or incorporate at all some of your paddocks. And also, you need to identify how much lime you need to apply in certain areas, because certain areas probably don't need lime, you just need to incorporate the soil as it is and that would fix the problem. So just don't go buy a machine and incorporate without actually doing the research or finding out what your problem actually is in the first place.

[00:07:50] **Camilla Plunkett** I guess that is the benefit of the new test. It'll give you better results, and from there you can really look at what solutions you need given where the acid is, so you can calculate those lime requirements.

[00:08:01] **Andrew Lord** Our yields have increased and have improved and have been a lot more consistent across the paddock. For an example, I remember in 2020, we grew a canola crop that was three and a half tonnes. And in the paddock next door that we incorporated lime, it went four tonnes, and the only difference was that we incorporated the lime. The other benefit from doing this is, if there is no more need to apply lime or lots of urea, etc. in one spot because the problem actually isn't lime. It could be a different acid source, or it could be a different issue. So really, we're becoming more efficient in the inputs we're putting into our cropping system and getting a much better return from those inputs.

[00:08:43] **Camilla Plunkett** And since you fix the acidity, have you had any luck with growing pulses?

[00:08:48] **Andrew Lord** Legumes have always been a fantasy crop in our system. Because we want to grow them, because we know they fix that nitrogen in a stable format in the soils for a long time that a very plant accessible essentially. With fertilisers like urea if you get a lot of rain, they can just leach out from the system. It's also expensive fertiliser, urea. But with a pulse crop, we can just fixate nitrogen in one year and the next year don't have to apply as much fertiliser urea to get a nice crop. The problem we had was we were growing these pulses, but we were really struggling to do that. And essentially the reason was our pH stratification in our soil profile. By fixing our soil profile, we are now very confident that we can grow a really good pulse crop that fixates a lot of nitrogen in a stable form for plants to access next year. We know that we can get the most bang for buck essentially by doing that. And so, we hope by the end of the fourth year of doing this, our whole farm would have its pH fixed.

[00:09:55] **Camilla Plunkett** That was northern region grower Andrew Lord sharing his firsthand account and success of using the new five-centimetre rule for soil pH testing. And earlier, Mark Richards from the New South Wales Department of Primary Industries. If you'd like more information, head to the show notes section of this podcast, where you can find links to additional resources for the new five-centimetre rule for soil pH testing. Or visit the GRDC website at GRDC.com.au. I'm Camilla Plunkett, this is a GRDC podcast. Thanks for listening.