

Plants Dig Soil | Season 4 | Episode 1 | 025 Fertilizer Strategy 2022 | March 2, 2022

Hello! This is Scott Gillespie and welcome to the fourth season of Plants Dig Soil. In this podcast, you will learn how to think critically about regenerative agriculture claims so that you can apply proven and profitable practices that benefit your farm now and in the future.

[TRANSITION MUSIC]

What we have normally taken for granted is no longer the case. We have been used to going to our fertilizer dealer and getting whatever fertilizer we want from them. We have seen high prices before and grumbled but they always seemed to follow crop prices so we just had to grin and bear it.

But this year is different. It is possible you may go to your fertilizer dealer and not be able to get what you need, no matter what price you are willing to pay. For the past couple of years, we have heard the phrase “supply chain issues” and have started to get used to it. This spring could prove to be a year we will not soon forget.

Organic farmers will not be having the same issues as their conventional neighbours, as the main challenges appear to be with urea and mono ammonium phosphate (MAP). However, as an organic grower, you could find that products you were relying on not able to make it to you in a timely fashion.

I am not going to get into the why as there are many, many factors in that. I am going to cut to the chase and bring it right down to the farm level. What do you do when faced with the challenge of limited supplies of products essential to your farm?

In the immediate time period, the most important thing you can do is get a soil test. This will help you to allocate the fertilizer you have to the fields that most need it. If you do not have enough fertilizer, it may even influence what crops you grow as you can focus on the ones less reliant on seasonal applications.

Any test is better than no test but having a local lab doing it with procedures that match your soil response is important. The soils in my area are geologically young and react different to soils further north in my province and further east through the prairies. The work was done and phosphorus and potassium tests were better calibrated through a modified procedure. As much as possible, get locally calibrated tests.

The best time to take the samples is before freeze up, but we know that is challenging. Again, it is better to have something than nothing so that you can make some plans prior to seeding. Technically, the best time is right before you fertilize but logistically that is nearly impossible. If you do not have any soil tests now, look into ways you can get them done. Some companies have trucks that can punch through frost. Other ones may be booking time slots now for when they can get out as it thaws.

If you have a soil test already, let us take a look at what this means for your fertilizer strategy. If you had very little crop due to the drought this year, you might be pleasantly surprised to see most of your nutrients still there. Unlike areas with higher rainfall, nitrogen tends to stick where it was placed in our region. It can be lost in three ways – going up, running off, or going down.

When it goes up, nitrogen is lost through gassing off when it is near the surface, the surface is wet, and the surface is warm. A strong wind will increase these losses even more. Since most of our nitrogen is banded into the soil and most of our weather is cool and dry, this means we do not lose much this way.

Banding or light incorporation also prevents most of what could be lost through runoff from happening. Even though it is dry, this can be a way to lose nitrogen when it is on the surface and when snow melts on frozen soil.

Going down is only going to happen under rainfall conditions that allow the top metre of soil (a little over 3') to get fully saturated. Even then, the roots can get down to it. Considering it would take 100-200mm (4-8") to fill this profile (depending on your soil texture), we are a long ways from this.

While it is important to have your own soil tests, pooling of soil test data by labs in Western Canada has shown that more nitrogen is there than normal. Some have even plotted out past drought years and shown an increase in nitrate soil tests. If you want to see the data, I suggest you check out a presentation by Rigas Karamanos¹ from Agronomy Update this past winter. The link is in the transcript.

Also in that presentation is some interesting insight into phosphorus. It tends to increase after a drought year but this is not because what you applied is still there. Phosphorus is quickly tied up in your soil and what makes it to your crop is usually only 15-30% of what you apply each year. The rest comes from phosphorus that gets liberated through microbial and chemical processes.

Very small portions of this may be microbially mined phosphorus from the soil particles but the majority of this is legacy phosphorus. This is the fertilizer that you applied over the past 5-10 years and may even go back further than that. Why it is showing up is that the pH tends to drop slightly in drought years, which helps bring more into the readily available form that your crop can use.

If you want to explore more on phosphorus, I suggest you go back to an episode of Plants Dig Soil from last year talking about the three pillars propping up regenerative agriculture². The link will be in the show notes and in the transcripts.

[TRANSITION MUSIC]

Let us talk about cover crops. Some farmers had re-growth of crops when some rains showed up in late August. There were "zombie plants" that had both mature seeds on brown stems and green leaves with new flowers. It seemed like a great idea to let these grow for soil health benefits, and it is possible that they did give the soil a little boost, but they have taken from the potential of this coming years crops.

The moisture proved to be all that was to come. If you let your crops grow or planted a cover crop you likely found that it used your moisture and your nutrients. The nutrients are still there, but they are not available to the coming year's crop. They are stuck in the roots and the above ground biomass. Our annual crops such as wheat, barley, and canola take up most of their nutrient supplies in the first month after seeding. These nutrients will release, but not in time for this crop.

If the above ground biomass held your soil from eroding, then it is still a benefit. If the biomass helped to trap more snow this winter, which infiltrate more water than if you had just had stubble, then it is still a benefit.

This is just one way the cover crops may not pay for you. Over the fall I put together an online course that you can work on at your own pace to learn when, and when not, to plant cover crops. It is called Profitable From the Start: Cover Crops for the Prairies. In a drought, they likely will not pay. However, there will come a time when the moisture returns, and you need to be ready to capitalize on them.

When you take the course, you will have a Cover Crops FIRST™ Plan that will help you to discover the fit, the implementation, the return on investment, the species, and the termination you will need to know.

Go to www.plantsdigsoil.com and click on the course or check the show notes for the link. For being a listener of the podcast you can get \$20 off by using the coupon code podcast at checkout (<https://plantsdigsoil.thinkific.com/courses/cover-crops-prairies?coupon=podcast>).

[TRANSITION MUSIC]

Now that you have a soil test and you know where you have high and low nutrient carryover, let us look at how we can most efficiently distribute them.

Nitrogen is relatively straightforward. Using response curves and using the low moisture scenarios you can determine how much needs to be applied. If you have samples from deeper than 15cm (6") you'll know what is potentially available if we get rains to fill that part of the profile. In some cases, you may be able to rely on this as your in season supply in case it starts to rain. No need to go out and try to add more nitrogen – it is already there.

Phosphorus is trickier, but it is worth coming back to how it behaves in soil to think about your strategy. If we export more than we apply over a 5-10 year period then we will be mining the soil. If we are adding more than the crop takes off, we are building the soil. What have you been doing? Calculations can be done with yields to estimate how much is exported each year. For example, a 40bu/ac wheat crop will remove 25lb/ac of phosphorus while a 35bu/ac canola crop will remove 35lb/ac.

To know how much you put into the system you will need to look at all the fertilizer sources you apply. This includes seed-row, mid-row, and compost or manure. Cover crops do not add phosphorus. They only liberate some of the more tightly bound phosphorus. Again, go back to the three pillars propping regenerative agriculture podcast to go more in depth on this.

If you have been maintaining or building your phosphorus over the years, and the soil tests back this up, you may be able to take a year to mine the soil. I'm not talking no phosphorus, I'm talking less than removal. Since the seed row is where you get the greatest response then concentrate on that area. Be sure you are following seed safe amounts, especially in a dry year. Perhaps instead of having to put the seed safe amount on and some in the midrow to build soil levels, you just do the seed row this year.

If you have been mining your soils over the years, and the soil tests indicate this, mining the soil this year is not really an option. Of course, you can just keep doing what you have been doing but you are not going to maximize potential. It still comes down to allocating resources where they are most needed, but you will not be able to take advantage of the lower priced phosphorus in your soils already.

This where biological stimulants may be worthwhile. I stress "may" because they are notoriously unpredictable and inconsistent. I've talked about product claims in the second season in an episode called "009 No Stats. No Effect³". If you have not listened to that episode, or want a refresher, I encourage you to go back to it. The link will be in the transcripts and description.

Be aware of product claims by manufacturers. They oftentimes show pictures that show the effect or they show trials that show the effect. What you do not see are all the other times when there was no effect. As you will learn in the older episode it can sometimes take dozens of trials to get one that show a difference. The trial that does work in their favour may be statistically significant, but to judge from it

you need to know why. A positive result in Iowa does not mean much for a farm in Saskatchewan. Locally produced data is critical.

If you insist on using these products think of where that money could have went. \$20/ac may seem like a reasonable amount to gamble but could you be further ahead with that money in fertilizer? Yes, it is high priced, but at least you know it is there for your crop.

Where I see biologicals working is in cases of low soil fertility and/or low organic matter soils. In these cases, there is not much there to help with nutrient cycling and so these products might be what helps to give that little push. They will not be sustainable in the long term, as you will still be taking more than putting back, but they can get you out of a tight situation.

I have been negative about cover crops in this episode but that's because this is not the place they will fit. They are best used to solve immediate problems, such as soil erosion, nutrient capture, or weed displacement. All of these are things that they will only solve for next year's crop. They will not help you this year. They also will not help you in a drought. In order for them to pay they must not use more moisture than you'd otherwise lose to evaporation, runoff, or deep percolation.

Your best payback will be to base fertilizer applications on solid soil test numbers. Allocate fertilizer to where it is most needed and do not be afraid to mine the soil if you have been building it for years. It may not hurt to try out some biologicals on areas where you have a greater chance of response, but do not bet the farm on it.

You will make it through this year. When you make it through the other side do not push it away and try to forget about it. Going through it will give you insights for how you can plan for future events like this.

[TRANSITION MUSIC]

Thanks for listening. While you have got your podcast app open can you do me a favour? Ratings and reviews really help podcasts to reach new audiences. I have decided to keep my podcast free so if you want to help me, there is no better way. While you are there, make sure you are subscribed so you see new episodes when they come out.

If you prefer email, consider going to my website, www.plantsdigsoil.com and click on the newsletter option (<https://mailchi.mp/plantsdigsoil/newsletter>). New subscribers get a \$20 off coupon for my online course. It comes out once a month with new episode listings, events that I will be at, and carefully curated content with commentary so you can keep up on the essential news in regenerative agriculture.

Another great way to help me is to share on your social networks. This could be with something interesting you learned and using the #RealisticRegenAg or sending direct to a person that you know could benefit.

I always like to know how people that give out information for free actually make money. The podcast is free so that you can learn something new and get to know how I work through issues. If you need a little more help than the podcast can provide, I have a self directed, online course to help you dig a little deeper. Included in the course are office hours that let you have time with me to fine tune your plans. When you need more than that, I provide one-on-one consulting services

My expertise is centred around the Canadian Prairies. I have a B.Sc. (Agr.) with an agronomy focus and a M.Sc. with a focus on Plant Science. Beyond my formal education, I have attained, and maintained, my Certified Crop Advisor designation and am a member in good standing with the Alberta Institute of Agrologists.

Closer to my home in Southern Alberta, Canada (just north of Montana, U.S.), I provide scouting services throughout the summer with weekly field checks for crop staging, pest presence, and, under irrigated fields, soil moisture and weekly irrigation plans. I go beyond the standard crops of wheat, barley, canola, and peas to include things like potatoes, quinoa, and hemp. And of course, I love taking on cover crops.

Ecoregions do not respect country boundaries, so if you are in the Northern Great Plains of the United States, I am sure I can help you as well with remote consulting options. Are you further afield than that (pun intended)? Many of the principles and frameworks that I have created adapt to farming anywhere in the world.

I use Anchor (from Spotify) to send this podcast out to the world across many platforms and it tells me I have listeners from every continent. Oddly, it even says I have listeners from Antarctica. If that, is you, I would love to hear from you, or wherever you are in the world. Send me an email or connect on Twitter or LinkedIn. If you go to Anchor you can leave me a voice message.

See you next time.

¹ Rigas Karamanos. January 2022. Agronomy Update. "Fertilizer considerations for 2022."

<https://assets.swoogo.com/uploads/1551309-61ed7d10cda0e.pdf>

² Scott Gillespie. May 9, 2021. Plants Dig Soil. "018 Three Pillars Propping Regen Ag"

<https://www.plantsdigsoil.com/podcast/018-three-pillars-propping-regen-ag>

³ Scott Gillespie. Apr 21, 2020. Plants Dig Soil. "008 No Stats. No Effect."

<https://www.plantsdigsoil.com/podcast/008-no-stats-no-effect>