

Plants Dig Soil | Season 4 | Episode 4 | 028 Cover Crop Intercropping | June 1, 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]

I recently came across a story of Indigenous intercropping of cover crops in their intercropped cash crops. It is in the book “Weeds: Guardians of the Soil” by Joseph A. Cocannouer. The book was published in 1950 and in it the author was relaying experiences of his childhood, and presumably of his years of teaching conservation and biology. The time periods are not listed, and I cannot find much information on the man. The language is dated, but he was highly respectful of the Indigenous way of farming.

He had heard of messy looking fields and went to investigate. He saw the three sisters – corn, beans, and squash – all growing together. This was something normally seen in Indigenous agriculture, and I discussed it in more detail in the previous episode¹. However, he also saw a lot of other plants growing in amongst the crops.

What he thought of as weeds, the Indigenous saw as further food and medicine sources. Some were cultivated just like the rest of the crops. Some were left not for their food value but for their value in helping the crop. They called them mother plants: those that helped the others to grow². This could be in helping to break compaction, bringing nutrients up, or protecting the soil from erosion. They may have been a nurse crop as well: protecting the early seedlings from the elements. Perhaps they even gave some disease or insect protection. It was not understood exactly how they did it, it was just observed that the mother plants helped the crop plants.

What looked messy was in fact very productive. However, it was not left alone to just do what nature wanted. It was highly managed. Weeds were thinned so they did not get too competitive. They were also checked to make sure they did not produce too much seed. In this sense they were not weeds. To me, they were self-seeding cover crops.

In our highly mechanized system, we will not be able to hand select the plants that work well together each year in every square foot of our fields. What we can do is to select the companions that work well together. We may be able to get to intercropped cash crops with intercropped cover crops, but I think we should start with just looking at how cover crops integrated into a single species cash crop system can work and build from there.

Many people see anything growing along with their crop as a weed that takes away from what they could be getting with a clean field. While it may look like they are competitors it is important to understand that weeds are not always competing with your crop. Beyond a certain point they are not competitors. Only during the critical weed free period are they a threat to yield in your crop.

For most plants, the first one up wins. It gets the full sunshine. Anything emerging after the first plant knows it has others ahead of it by the quality of the light. It adapts its growth because it knows it is always going to be behind. If our cash crops can be the first ones out, they have the advantage.

Controlling the weeds that emerge with or after the crop can be delayed to a certain point at which time they can start taking too many reserves of nutrients and water. After this, there is a critical period to

keep the field weed free. This gives the crop the time to root deeply and grow its canopy. Any new weeds that come up must be controlled just prior to the crop entering its rapid growth phase. If this is done, any subsequent weeds will not affect the crop; or the loss will be less than the cost of another weed control operation.

As an example, if weeds that emerge with the cereal crop and are controlled at the 1-2 leaf stage, they will not cause problems for it. If they were up before it emerged, they can affect it. As long as weeds are kept out of the field until the 3-4 leaf stage the cereal usually gets ahead of them.

It is at this point that an interseeded cover crop can be planted. This is similar to the concept of thinning weeds and letting the beneficial ones live in the system. The difference is that instead of being out and hand selecting them we purposely select them and seed them every year. While a self-perpetuating cover crop would be ideal the problem is that the best cover crop may change each year with the cash crop that is being grown.

If we were intercropping all of our crops every year, as in the three sisters system, we could have the same mix of cover crops growing every year. If this were the case, we could reasonably work towards a self-perpetuating cover crop, but as our system lacks the ability to manage every square foot separately, we must focus on planting a cover crop every year. As precision agriculture advances with autonomous vehicles that can sense and learn what we want them to do we may yet see this in the future.

Having some weeds, or cover crops, growing in your crop will not affect yield, but this does not mean they should not be just left there. Weeds that set seeds quickly could be building your seedbank up for a flush of weeds the following year. Cover crops that set seed may be volunteer problems for years to come. Just like the Indigenous systems, it must be highly managed.

If you want to dive deeper into how this could work, including the machinery and how it can fit into a representative Prairie rotation, check out an episode from Season 3 of Plants Dig Soil called 020 Relay Seeding Cover Crops³.

[TRANSITION MUSIC]

In last month's episode I talked about intercropping cash crops. There can be advantages to pest control and fertility in these systems, especially if they over yield. Over yielding means you get more total crop than if each were grown on separate pieces of land. However, there are some challenges with this system, and I think focusing on just one cash crop and intercropping cover crops will be a much easier system to implement for the majority of farmers.

The first big advantage to focusing on cover crop intercrops instead of cash crop intercrops is not having to match maturities. Having one intercrop cash crop reach maturity before the other means potential losses of one before the other can be harvested. In some cases, they can work together to help maturity: Flax can use up the late season water and prevent the chickpea from continuing to flower. This allows a timelier harvest of both⁴. However, in most mixes this can be a challenge.

The next advantage is that you do not have to match crops with different seed sizes. In the case of chickpea and flax the large chickpea is easily separated from the small flax seed. Some people have found the chickpea may actually help threshing the flax boll as they all knock around in the combine⁵.

Again, in most cases this is tough to do. While I do not doubt farmers are going to find a way to do it, I believe the majority farmers are not going to want to go to the effort and expense of this.

Matching a cover crop to the cash crop allows a much wider range of selection than just being limited to one or two good partners. You can find a single species or mix of cover crops that work for each crop.

In recent years I have seen recommendations to increase the seeding rate of the cash crop to help out-compete weeds. Instead of doing this perhaps you can have a cover crop growing within the cash crop that achieves the same goal at a lower cost. Focus on the optimal cash crop density and allow the cover crop to smother the weeds.

This could even be applied to planning in the year before. As an example, if annual ryegrass were established in a pea crop and grew in the fall after harvest it would help prevent winter annual weeds and provide more residue cover than just leaving the pea stubble.

As long as this winterkills, canola could be seeded directly into the brown cover in the following spring. If it does not, then a conventional farmer would be able to apply a herbicide to kill it. An organic farmer may need a tillage pass or find a species that always kills in the winter. Not only would the cover help prevent more weeds it would give the canola protection from early season winds. It might even help hold more snow melt soil moisture in the soil, giving the canola more water than simply pea stubble alone.

Having a cover crop growing under the canopy could be a big advantage in a year that hail comes. You cannot rescue a crop that has been hailed out⁶. The damage is done. It is worse the closer you get to pollination and grain fill. If you have another understory crop you have something that protects the surface and is ready to grow as soon as the canopy is unexpectedly opened up. Yes, it may be damaged by the hail as well, but being vegetative it has more resources available to bounce back.

In my area you can buy hail insurance. My advice is to interseed a cover crop every year and make sure to buy as much insurance as you can. That way when the hail comes you do not worry. Yes, it hurts to see your crop flattened but you can take comfort in the fact that it will now be a soil building crop that will benefit you for years to come, and you were paid to do it.

All of this needs to be to be adaptable to the season and the current water cycle you are in. I addressed this more in the second episode of this season called 026 Cover Crops in a Drought⁷. The main point is to be aware of the overall trend and adapt. If you are in a drought and soil moisture reserves are low, this is the year to focus just on your cash crop and skip the cover crop.

If it is very dry and you can afford to fallow, it may be the year to fallow a portion of your land and look at growing cover crops for a short period to help improve the soil for the following year. As long as the cover crop uses the same amount of moisture you would normally lose to evaporation, you are ahead. You may even prevent some salinity from developing as you are running water through the plant, not the soil.

We cannot give the care and attention to every square foot of land that hand tended systems can, but we can apply the concept to our current highly mechanized ones. Overyielding of a cover crop does not give you more in the short term, as in an intercropped cash crop system. However, what it does do is to

invest in your soil every year and allow you to have a more resilient and stable system in the years and decades to come.

[TRANSITION MUSIC]

I am just scratching the surface here on cover crops. Did you get the pun there? Scratching the surface? Kind of like how plants dig soil?

Pardon the puns, but instead of just scratching the surface, why not go deeper by enrolling in my online course “Profitable From the Start: Cover Crops for the Prairies”? It is self-directed which means you can work on it at any time – morning, afternoon, or even in the middle of the night, if that is how you roll.

There is no start and stop times or waiting for other students. You just work on it when you can. If you have a good data plan on your phone you could even be listening to lessons while the tractor is autosteering you down the field, though I would prefer you are not looking at the videos then. Pay attention to what you are doing! And be safe.

It will take you about a half hour to an hour a day for a week or doing it all at once in a morning or afternoon. There are office hours where you can talk directly with me (and any other students that show up) about problems you are encountering, or you can upgrade to a time slot with one-on-one help.

The cost is \$159 Canadian dollars, and you can save \$20 by using the link in the description or putting the code “podcast” in the coupon box at checkout. You can also save an additional \$50 by prepaying for a one-on-one session at enrollment.

Paying in your local currency is no problem as you can use credit cards securely with Stripe payment systems or use PayPal. While this is most applicable to the Prairies ecoregions do not respect country boundaries so anyone from the Great Plains of the United States will benefit as well.

If you are listening from other parts of the world, and my podcast platform tells me you are, the specific examples may not apply but the principles can be transferred to wherever you farm. You will focus on creating a Cover Crops FIRST™ Plan. The five letters cover the main points: Fit, Implementation, Return on Investment, Species, and Termination.

The best time to learn and put this plan together is now. Even if you do not think you will be planting cover crops this year it always pays to plan. You will learn when, and when not, to plant them. Most importantly you will be ready and not be guessing. You will know when the time is right and be confident to go ahead with them.

[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 Scott Gillespie. May 4, 2022. "027 Cash Crop Intercropping"
<https://www.plantsdigsoil.com/podcast/027-cash-crop-intercropping>

² Joseph A. Cocannouer. 1950. p41. "Weeds Guardians of the Soil."
<https://www.amazon.com/Weeds-Guardians-Soil-Joseph-Cocannouer/dp/0815972059>

³ Scott Gillespie. July 4, 2021. 020 Relay Seeding Cover Crops.
<https://www.plantsdigsoil.com/podcast/020-relay-seeding-cover-crops>

⁴ Lana Shaw. March 10, 2021. Chickpea Flax Intercropping: Why its worth the trouble (16:31)
<https://youtu.be/uynn8N7EE5w?t=991>

⁵ Lana Shaw. March 10, 2021. Chickpea Flax Intercropping: Why its worth the trouble (18:10)
<https://youtu.be/uynn8N7EE5w?t=1090>

⁶ Barb Glen. December 17, 2020. The Western Producer. "Fungicides, fertilizer did not aid hail recovery"
<https://www.producer.com/news/fungicides-fertilizer-did-not-aid-hail-recovery/>

⁷ Scott Gillespie. April 4, 2022. 026 Cover Crops in a Drought
<https://www.plantsdigsoil.com/podcast/026-cover-crops-in-a-drought>