



SEEDHEADS TRANSCRIPT

Episode 10: JENNIFER MITCHELL FETCH English

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Steph Benoit

Hello! Welcome to SeedHeads, the cross-pollinating podcast where our Canadian seed heroes tell their stories, share their how-to tips, and talk about the seeds they love. I'm your host, Steph Benoit, coming to you from Ottawa, Ontario, on the traditional, unceded territory of the Algonquin Anishnaabe people.

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Steph Benoit

For this week's episode I had the pleasure of talking to Dr. Jennifer Mitchell Fetch. Jennifer is a retired Agriculture and Agrifood Canada oat breeder who resides in Winnipeg, Manitoba, on Treaty 1 Territory. In our conversation, we touched on her experience breeding Canada's only two registered organic oat varieties, AAC Oravena and AAC Kongsore. We discussed why organic seed matters, how to get farmers more involved in plant breeding, and Jennifer's favourite non-dairy milk... ok spoiler alert, it's oat. Jennifer was a pleasure to interview and I hope you enjoy this episode.

Steph Benoit

Alright. Hi Jennifer, thank you so much for joining me today.

Dr. Jennifer Mitchell Fetch

Well, it's great to be with you, Steph.

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Steph Benoit

So, for a long time, you were one of the only oat breeders in Canada and one of the only organic, I think, the only organic oat breeder in Canada. So that's kind of a big deal. You even have a Wikipedia page! I don't know if you are aware.

Dr. Jennifer Mitchell Fetch

Oh wow.

Steph Benoit

I wanted to, definitely wanted to have you on the podcast to talk a little bit about your work, and now you're recently retired and, sort of, looking back on your career. I was hoping to begin with, you could just sort of give us a little summary of the state of the organic oat world in Canada. Where is most of it being grown, and who's doing that? Who's breeding it? A little bit of that sort of stuff.

Dr. Jennifer Mitchell Fetch

Okay. Well, the largest production area is the Western provinces of Canada, with Saskatchewan being the leading acreage in the production of oats. Manitoba's pretty close behind that. And then Alberta is a little bit lower. There was a breeder working for Agriculture and Agri-Food Canada, Dr. Solomon Kibite, who was located at Lacombe, Alberta, and he was responsible for the Western half of Canada. There was a breeder located in Ottawa, a Dr. Vern Burrows, who was responsible for the Eastern part of Canada with Ag Canada. There was also an oat breeding program at the University of Saskatchewan in Saskatoon, and Brian Rossnagel was in that position when I started as the oat breeder in Winnipeg, and he was followed by Dr. Aaron Beattie.

So now Dr. Weikai Yan is the breeder at Ottawa, and he's still breeding for Eastern Canada. And I was the breeder located in Winnipeg. Dr. Kibite, unfortunately, passed away in the early 2000s, and I absorbed his program into mine. My program was developed to be a milling oat project. We didn't look at feed oats or forage oats or anything like that. And it was supported first by the Matching Investment Initiative. And so, it was always an industry-based funding matched with government-provided funding. And after Dr. Kibite died, the program just expanded across all of Western Canada instead

of just being in Manitoba and focused on milling quality oats with good disease resistance.

Steph Benoit

So how did you specifically get into organic plant breeding? Is that something you dreamed of since you were a little girl?

Dr. Jennifer Mitchell Fetch

No, not exactly. It was all sort of happenstance because as it happened, the spring wheat breeder, Dr. Steven Fox, who was located at the Cereal Research Centre Winnipeg, Manitoba, working for Agriculture and Agri-Food Canada and a group of the scientists from Agriculture Canada, would go down the street to have coffee. And they would get together with some of the University of Manitoba plant science professors and biology professors. And Dr. Martin Entz, who is very much into rotational long-term rotations and sustainable agriculture, and Steven got chatting at coffee. And they talked about, well, maybe we should do more organic research and maybe we should start breeding specifically for organic production. And Steven said that's a great idea, and he came back from coffee and came in to talk to me and said this is what we're thinking about doing. And I said well we really should include oats in that because, you know, they'd be a good crop as well.

And so, Martin was really nice and allowed us to plant some of our crosses, our populations on his organic land at Glenlea and at Carmen, Manitoba, and then it just morphed from there. We decided that, well, a lot of research was being done, showing that the organically developed or bred selected lines were performing better under organic management than lines that were developed under conventional management, which makes sense. So we thought, well, maybe we should try developing an oat cultivar. And at the time, my industry funding partners were quite interested in that as well. And Grain Millers Incorporated specifically was really interested because they wanted to start milling organically produced oats and have a line, a product line, that was organic. And having the organically developed cultivar in that processing system made a really good story. So, they were very supportive of that.

So it was happenstance, but very fortunate that I was able to get into the oat breeding. And when the Cereal Research Centre was closed in Winnipeg, Dr. Steven Fox left the wheat breeding program to go into a private canola

breeding company. So, his part of the organic cultivar development got dropped, unfortunately.

We were able to put AAC Oravena, which was just testing the waters to find out if it was something we could do or not. That one was the trial balloon, so to speak. And then we had AAC Kongsore developed as well, so I guess it was successful.

Steph Benoit

Still, to this day, those are the only two organic registered varieties, correct?

Dr. Jennifer Mitchell Fetch

Correct. In Canada, they're the only ones.

Steph Benoit

Wow. It's kind of funny to think that all of this started just over a cup of coffee as well.

Dr. Jennifer Mitchell Fetch

And that's how a lot of collaboration can happen. It's just getting together with someone and starting to chat about, well, we could maybe do this, or this might be a good idea.

Steph Benoit

Yeah. And so, for someone of my age, organics had already really taken off by the time that I was a real consumer for the first time, but a lot of this was happening in, like, the eighties and nineties. I'm guessing when you were doing this, it wasn't as mainstream as it is now. Correct?

Dr. Jennifer Mitchell Fetch

Correct. They were just brand-new, and the fact that a milling company would actually have an organic production line or shut down their plant just to mill organic oats, it was surprising to me even that they would see a market for that.

Steph Benoit

Right. So, why do you think organic plant breeding matters, then?

Dr. Jennifer Mitchell Fetch

Developing a cultivar that can produce under minimal inputs and organic production systems, in general, is critical because there's different traits that a cultivar needs to perform well under those conditions versus under a conventional production system where there's fungicides, fertilizers, all sorts of synthetic products available to help that cultivar do its best.

Steph Benoit

Yeah, it kind of makes sense if it's, you know, you're growing it and totally different conditions, then it would be best to have something that is sort of equipped from when it first goes into the soil to be ready for those conditions.

Dr. Jennifer Mitchell Fetch

Correct.

Steph Benoit

With that in mind, then, how are the plant breeding priorities different for organic growers than conventional?

Dr. Jennifer Mitchell Fetch

Yeah, I think mainly that the inputs are different. The growing conditions can be different. The organic cultivars or cultivars performing in an organically managed environment may have to compete against weeds and other things that a conventional production system wouldn't need. Quite often, you want something that has a larger seed size so that it can emerge quickly, get out of the ground in a hurry and cover the soil and out-compete the weeds around it. You might want something that's taller than a conventional production system because it can shadow again over the weeds and out-compete those weeds and have a lot of tissue available to collect all of the nutrients that it possibly can. The root systems could be a lot more extensive in an organically developed cultivar. There's a lot of things that adapt a cultivar well to that kind of lower input production system.

Steph Benoit

It's got to be a little hardier because it's got to fight for itself a bit more.

Dr. Jennifer Mitchell Fetch

It doesn't have the help of the, you know, neighbours and the synthetic fertilizers or inputs that it would normally get in a conventional program.

Steph Benoit

You were alluding to the fact that your breeding program was mostly for Western Canada. There's someone else in Ottawa who's growing towards the East. Do you think regional seed matters, and do local seed companies and local varieties matter?

Dr. Jennifer Mitchell Fetch

I think it does because some of the cultivars, for example, that Dr. Weikai Yan has developed for Eastern Canada, the Atlantic provinces, and Quebec do very well in those particular environments. In fact, some of his lines do better in Quebec and not in Atlantic Canada versus, you know, the other way around. So, I think it's important to have testing for sure in each section of the country. And he's done a lot of studies on macro environments, and he suggests that Western Canada is one big macro environment. I'm not sure I agree completely. But yeah, it's got a different environment than Quebec or Atlantic Canada. So, I think to have a cultivar that performs well across Western Canada, you've got a test in a lot of environments across Western Canada to show that. But if you want to specifically have a cultivar that performs well, in a certain region of the country, like for an organic producer, they want something that does very well in their specific environment, so you need to test over, I'd say, quite a few years, to make sure that your line is going to perform the best in that environment in all situations. So regional or localized production, I think, can be quite important in some cases.

Steph Benoit

Could you tell us a little bit more about the varieties that you've bred and registered?

Dr. Jennifer Mitchell Fetch

Well, AAC Oravena, as we mentioned, was the first one, and it was fairly tall, tall compared to the checks. It didn't yield as well as AC Morgan, which is a conventionally developed cultivar from Dr. Solomon Kibite's program, and it is our high-yielding check. And we're having a lot of trouble outperforming AC Morgan because it just, it's done so well over the last twenty years, but Oravena was fairly close in yield to Morgan. So that was good. It had a very high test weight and a large kernel size. So, I assumed that it would get out of the ground faster and compete with the weeds better. It had very high beta-glucan, which is the soluble fibre that makes oatmeal so healthy for you, for your heart and diabetes, and things like that. So that was a good trait. And it was relatively good disease resistance, so, or it had relatively good disease

resistance. So that was a good thing because, for an organic farmer, you need genetic traits to combat diseases. You don't have the options of fungicide and things like that or as many options as a conventional farmer would. So, at the time Oravena was released, it had quite good crown rust resistance, which is one of the more important problems in Western Canada. And it was also relatively resistant to stem rust, oat stem rust, which is another problem.

Kongsore is a little bit later maturity than Oravena, but it yields better than Oravena. And it, in both conventional and organic production systems, yields similar to Morgan. So it's a high yielder.

Steph Benoit

Wow, yeah.

Dr. Jennifer Mitchell Fetch

So, it's been good. It has a little bit higher oil than Oravena or some of the other check cultivars that we use. But that might be a good thing for someone who's feeding animals with the oats or maybe for oat cosmetics. Who knows? You know, there's or, and both Oravena and Kongsore are high in protein which might be very good for the oat beverage production areas. So, there's options available.

Steph Benoit

I was going to ask you, this is one of my hard-hitting questions, but when it comes to alternative milks, are you an oat gal?

Dr. Jennifer Mitchell Fetch

I have to be. I just have to be. Yeah.

Steph Benoit

You won't catch her putting soy in her coffee.

Dr. Jennifer Mitchell Fetch

No, no. And I have to admit oat beer is pretty good, too.

Steph Benoit

I mean, you're just, yeah, you got to believe in your product. You got to stand behind it. So once you had these varieties registered, did you face any challenges commercializing them and bringing them up to a wider scale?

Dr. Jennifer Mitchell Fetch

I didn't because Grain Millers was so directly involved that they got the license to sell from Agriculture and Agri-Food Canada. And they had their seed production through Fedoruk Seeds in Kamsack, Saskatchewan. And they took care of all of that part of the commercialization process. So that was not on my table for doing that. But they did have some problems producing organically managed seed of AAC Oravena. They had some really tough years where their yields weren't as good as they'd hoped, and that made it difficult to produce enough seed to sell commercially to the organic producers, who really wanted to try Oravena.

And I think with AAC Kongsore, they've decided they're going to produce it conventionally. Just so they can make sure they get good enough yields to then transfer to the producers who want to try and grow Kongsore.

Steph Benoit

Right. And those producers would be producing it organically or conventionally, then?

Dr. Jennifer Mitchell Fetch

I'm hoping most of them would be producing it organically, but AAC Kongsore can do okay under conventional management as well. So, I'm not sure how Grain Millers is going to govern that, if they'll say, no, we'll only sell to an organic producer or not.

Steph Benoit

Right. Interesting. Yeah, it seems like once it's out of your hands, it's sort of out there. It's got a life of its own.

Dr. Jennifer Mitchell Fetch

You hope it does well, but it's not really under your control.

Steph Benoit

Right.

Dr. Jennifer Mitchell Fetch

You can watch the statistics and see how many acres it's being grown on, but that's about all.

Steph Benoit

Yeah, are organic oats being taken up fairly widely? Is that a market that's expanding still?

Dr. Jennifer Mitchell Fetch

That's a good question. And I actually tried to look up some of the statistics on how much organic production there has been in the past few years, but the Canadian Grain Commission is now covering variety market share for, you know, all the cereals and all the crops but their last document was 2019, so 2020. So, there isn't a lot of information available on production statistics, specifically of organic oats.

Steph Benoit

In your opinion, how can organic plant breeding be better supported?

Dr. Jennifer Mitchell Fetch

Well, that's a good question because through the Organic Science Cluster, and the industry input, and the Government of Canada input, and the Organic Federation input, my program was very well supported and it was doing very well. But I think the interest is maybe waning a bit on actually doing the organic cultivar development because when Steven Fox left Agriculture and Agri-Food Canada, there was no push to continue with the wheat organic breeding program. And I'm wondering if the organic oat breeding will go the same way because producers can grow conventionally developed cultivars that may yield better, may do better on there, in their specific production systems, and get higher yields, which is more attractive than worrying about having an actual organically developed cultivar.

Steph Benoit

Right, makes sense.

Dr. Jennifer Mitchell Fetch

So it may gain interest with the increase in, you know, interest in organic products. Or the farmers may find more suitable alternatives for their own production systems.

Steph Benoit

Yeah, and I guess you're in a kind of an interesting and unique situation with cereals in particular compared to people who are breeding vegetables and just that there's a lot of interest, industry interest to begin with in seeing

those things growing and scaled up and what not. A lot of people who are just doing market gardening are not seeing the same sort of push by industry to have these things, these products available.

Dr. Jennifer Mitchell Fetch

Right.

Steph Benoit

So, you have worked a lot with the Participatory Plant Breeding program. Could you talk about that briefly and sort of describe it and where you see it going in the future?

Dr. Jennifer Mitchell Fetch

Yeah, that was a really cool idea from Martin's group. What happened was Steven and I developed populations, grew them on Martin's organic land, got enough seed that they could send little aliquots of seed out to several different producers that were interested in trying it. And then they made selections on their land, in their environments, under their management conditions. They would harvest the lines that they thought did the best, send them back to the University of Manitoba. And the people there, Anne Kirk, Iris Vaisman, and Michelle Carkner, all worked on that, and they would process the seed and then send it back to the initial breeder. And then they would grow it again. So, they did that for about three or four seasons. And then, for the organically developed oat cultivars, I put them into my trialling program under organically managed systems and just to see how they did compared to my lines. And I was quite pleasantly surprised at several of the Participatory Plant Breeding selections did better than my lines.

Steph Benoit

Oh, wow!

Dr. Jennifer Mitchell Fetch

So we moved them in from what we call our preliminary yield trial into our B Organic Trial or BORG, which the crew loved. So, they went into the BORG, and they still performed well enough to go into the registration trial so that they could become, if the participatory breeders want to, Dr. Kirby Nilsen, who's my replacement, will move the line forward and get it registered and help them, you know, with that part of the commercialization system. And there is one line that's still in the Coop Test, that was a participatory plant breeder's line. So that's kind of exciting because that shows that that specific

line performed well enough across all sites in Western Canada that it could compete with the check cultivars.

Steph Benoit

Wow, that's very cool.

Dr. Jennifer Mitchell Fetch

The Participatory Plant Breeding experience was very interesting for me because the individual producers had very different ideas about what they wanted to see and what they thought was a good performer in their particular environments. And for the organic economy or production systems, I think it's not a bad idea. Participatory breeding for an individual area or region of the country is a good idea, and I hope it can continue, but I guess time will tell.

Steph Benoit

Yeah, it's wonderful to have different voices in there and to hear from different people's experiences.

Dr. Jennifer Mitchell Fetch

Exactly. I always learned a lot when I talked to producers, always.

Steph Benoit

So, I'm wondering, just in general, how do you think farmers could be more connected to public plant breeding? If someone has like an idea of what would be useful for a new variety of oats, let's say, how could they connect to a plant breeding program?

Dr. Jennifer Mitchell Fetch

I think the best option is to actually get to know a public plant breeder, if possible, to be able to talk to them, go to their field days, go and tour their plots. Most breeding programs, if you call them up and say I'd like to come and visit your program are more than willing to spend an afternoon or longer just boring you to tears with all the information that they can possibly provide, you know. So, I think it's something that and that's maybe something that's a bit lacking. It's better in the organic industry. There's a lot more extension to the producers. The conventional systems used to be really good about field days and tours and that kind of thing. They were going on all the time all summer, and it's not as much as it used to be. And that's maybe a downfall of the public breeding programs that we're not doing as much

extension, getting to know the producers because the producers have really good ideas on what could improve the crop.

Steph Benoit

Right.

Dr. Jennifer Mitchell Fetch

The breeders, the participatory breeders, though, have to realize that it does take a while to make the cross and build up the population enough so that you can actually make selections and throw away the bad ones.

Steph Benoit

Right.

Dr. Jennifer Mitchell Fetch

And, you know, and then you got to get a line registered, you got to produce quite a bit of data to support that registration which takes at least three years. So, it's not something that if a producer told me today, well, we need higher compound X in this oat line, I couldn't have a line out there tomorrow for them. It's going to be a while.

Steph Benoit

Yeah.

Dr. Jennifer Mitchell Fetch

It takes some time.

Steph Benoit

Yeah, you have to have a little bit of the patience with nature to go through the cycles and seasons. Absolutely. How long does it take, on average, to go from sort of the inception of this idea to see it being a registered variety? What is sort of the average time span?

Dr. Jennifer Mitchell Fetch

It's at least ten years because Oravena, AAC Oravena's initial cross was made in 2004, and it got supported for registration in 2014.

Steph Benoit

Wow.

Dr. Jennifer Mitchell Fetch

And that was just to get it registered. Then you have to blow it up for certified seed production which is another three to four years after that.

Steph Benoit

Okay. So, it was only really entering the scene for commercial production just a few years ago then.

Dr. Jennifer Mitchell Fetch

Correct.

Steph Benoit

Wow. It's still early days, even though the whole idea started in 2004.

Dr. Jennifer Mitchell Fetch

Yeah.

Steph Benoit

Well, I guess that forward look that you have to have is definitely, probably, a personal quality that made your work here work.

Dr. Jennifer Mitchell Fetch

It's true. You have to be very, very patient.

Steph Benoit

Is there anything that a lifetime of breeding oats has taught you?

Dr. Jennifer Mitchell Fetch

Don't get attached to your babies. Because as much as work that you put into making that original cross, like thinking about what you want in that population and trying to get it, the genes all together in that population, you end up throwing away seventy-five to ninety percent of the babies get thrown out. So you can't, you can't get really tied to them.

Steph Benoit

Yeah.

Dr. Jennifer Mitchell Fetch

Because you can get a line to the co-op and have it doing fairly well, and there's no marketing group that wants to market it. They don't see a potential

for it. So you could have a line that you've lived with for ten to twelve, thirteen years, and nobody wants it.

Steph Benoit

That would be devastating.

Dr. Jennifer Mitchell Fetch

It is hard. Like because thirteen years prior to that, you thought this was going to be a great line. You thought it was going to be the barn burner, and it isn't.

Steph Benoit

Yeah, but then what motivates you to, you know, knowing that? Is it the possibility of having one that really takes off and really making an impact that keeps you going?

Dr. Jennifer Mitchell Fetch

Exactly. And it's like AC Morgan, Solomon Kibite when he made that cross back in the late nineties, he was just developing a feed wheat or a feed oat. He wasn't thinking of a milling quality oat or a high-yielding line, but it's been like the line that we can barely beat for yield in the last twenty years. So it's really done amazing things that he never expected. He never expected it to be that good a line. So it's fortuitous, maybe or serendipity.

Steph Benoit

Well, then I think also like that, that element of surprise and sometimes that element of uncertainty can be really tantalizing. You just don't know. It's just so interesting to think that humans have been sort of co-evolving with a lot of these plants for thousands and thousands of years, you know, in a lot of ways, this is a very ancestral process and to plant plants and to try to guide them in the direction that you want with a gentle, but loving hand—not getting too attached to your babies, throwing seventy-five percent of them out.

Dr. Jennifer Mitchell Fetch

Exactly.

Steph Benoit

Yeah, it's something that people have been doing for a long, long time. And also, in particular, women have been doing and have been involved in for a

long time, but nowadays, when you look at plant breeding, it's largely a male-dominated field. So, I was wondering if you ever felt, I don't know so, any sort of the effects of being very much a minority, gender-wise, in your field and amongst your colleagues?

Dr. Jennifer Mitchell Fetch

Not so much, but when I first started doing, going into my master's program in Agriculture and Crop Science at the University of Saskatchewan way back in the mid-seventies, aging myself, but I was the only female grad student at the time. I went into that thinking, oh, I'm going to have to fight battles, but I really didn't. Most of the people around me were very supportive, very helpful, very willing to teach me things. If I asked questions, they answered me. They didn't blow me off sort of thing. So, I was pleasantly surprised at the good support that I got throughout my career. And I became a triticale breeder at the University of Manitoba after my master's, and I was the one that felt people aren't taking me seriously, and it wasn't just because I was a female. It was because of my lack of training and education, and experience. And I made the decision to pursue my Ph.D. then, and I felt a lot more prepared and able to enter the plant breeding field at that time. And Dr. Anna Storgaard who was a forage breeder at the University of Manitoba at the time. I didn't interact with her a lot, but the fact that she was there and a strong woman and a good leader and an excellent breeder gave me the hero that I could look at and say, well, I could be like that. So I'm going to go get my Ph.D., and you know, maybe I can be somewhat successful like she is.

Steph Benoit

Yeah.

Dr. Jennifer Mitchell Fetch

That helped a lot. But the men around me were always helpful and supportive and really tried to be helpful. So that was good. I appreciated that.

Steph Benoit

Yeah, no, that's awesome. That's the story that you want to hear. You want to hear that someone has been supported despite being a minority in whatever way within their field. That's awesome. And yeah, I think it definitely has an impact to have someone who looks like you sort of on the trail ahead of you. Blazing that trail and giving an example, and I'm sure it'll have a big impact on the next generation of plant breeders to have seen now multiple women plant breeders being very successful. Leaving a big legacy, becoming oat doctors.

Dr. Jennifer Mitchell Fetch

There you go.

Steph Benoit

Do you have any words of wisdom for women who want to get into the field? Or anyone, I suppose?

Dr. Jennifer Mitchell Fetch

Yeah, for any new plant breeder, and that's a bit dicey in a way or questionable because I might have been one of the last classically-trained plant breeders that I know of because everyone now coming out has so much experience in the biotechnology, the information, the data analysis, the artificial intelligence, the digital world that I didn't have when I started.

And so, some of the classical training that I got out in the field might be lacking. So, I think it's really good if anyone who's potentially interested in plant breeding if you could as a high school student or a university student, during the summers, if you can get a job with a plant breeding program to see what it's like to really be out in the field and seeing the plants in their environment and how they grow in that environment is really good.

And I think the main thing you should do too is find people you can collaborate with because you can't be an expert in every area. You have to understand or know about all those areas, but you can't be an expert in all those areas. So, you need pathologists, you need phyto-geneticists, you need quality personnel, you need production, agronomy. All of that kind of expertise. So, if you can collaborate with people who are experts in those areas, you can build a good breeding team.

Steph Benoit

Right.

Dr. Jennifer Mitchell Fetch

So, and I think that's really important for a breeder.

Steph Benoit

It seems like, you know, it sort of takes a village to raise a variety.

Dr. Jennifer Mitchell Fetch

Yes, definitely, definitely.

Steph Benoit

The last question that I have, this is, it's important to me. Do oatmeal raisin cookies taste better when you've bred the oats?

Dr. Jennifer Mitchell Fetch

Yes, especially if they have chocolate chips in them.

Steph Benoit

Alright, well, thank you so much. After this conversation, I'm ever the more confident that you fall into the category of seed hero.

Dr. Jennifer Mitchell Fetch

Thank you.

Steph Benoit

Pleasure to talk to you, Jennifer.

Dr. Jennifer Mitchell Fetch

Okay, thanks so much.

Steph Benoit

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