

[Theme music plays]

Hannah Senior: Welcome to this episode of the Plant Breeding Stories Podcast, where I talk to leading lights in plant breeding, asking what they do, what makes them tick and what fascinates them about the world of plants. I'm your host Hannah Senior of PBS International, world leaders in pollination control. We design and produce specialist pollination bags and tents used by plant breeders and seed producers all around the world. And through this, I've been privileged to get a unique perspective on how plant breeding globally affects our diets, farming systems, and the environment.

Hannah Senior: I'm excited to share a little of this with you as we meet some of the amazing people who make plant breeding their life's work.

Hannah Senior: In this episode I'm talking to Tress Walmsley of Intergrain, an Australian Wheat, Barley and Oat Breeding Company. Early in her career Tress was instrumental in setting up the really quite unique end point royalty system which in Australia manages intellectual property payments back to plant breeders. And you'll hear from her how this works and what the advantages are for cereal breeders. We'll talk about slurping Udon noodles, developing varieties for regenerative and no-till agriculture and building an open culture in an organisation and how this leads to a competitive advantage. I hope you enjoy it.

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Hannah Senior: Well thank you very much for joining me today Tress Walmsley, CEO of Intergrain. Perhaps a good place to start is would you like to introduce yourself?

Tress Walmsley: Yes Sure, Hannah. Tress Walmsley or Intergrain and I live in Perth, Western Australia, and I lead a cereal plant breeding business. And so at the moment we are in three crops - wheat, barley, and oats.

Hannah Senior: Tell me a bit about your background. Were you Western Australia

born and bred? And how did you get into plants and plant breeding? What was your route in?

Tress Walmsley: So I grew up on a farm in Western Australia and unfortunately, my dad sold the farm when I turned 20. I didn't actually intend to end up in agriculture, I went off and did a science degree, more in macro invertebrate biology. And then though, I followed my boyfriend, soon to be husband, up to a small country town in Western Australia called three springs, which literally only had 314 people living in it, and ended up working for the local government department agricultural office. I think probably, you know, the grains industry was in my blood. And it all came back to me and I just fell in love with it. And I never left the grains industry after that. So never went back to finish, or really to start, my PhD and take that path into biology.

Hannah Senior: And so your parents farm was an arable farm was it? It was grain?

Tress Walmsley: It was a wheat and sheep farm, relatively small, pretty close to Perth. We were only like an hour and a half away. But it still meant that I went to boarding school for high school and that had a big impact on me. Taught me that I love travel and I actually did a gap year between high school and university. So I went to Brazil for 12 months. And that was a big eye opener for me.

Hannah Senior: Oh that sounds great. And then that first role after university was in agronomy right? Tell me how you got from that into the world of plant breeding?

Tress Walmsley: My first role was, we used to call it a development officer but really it was an agronomist. So I would go and help farmers grow better crops and in that process I managed a national program called Top Crop. And then one day I had a boss who kind of came to me and he said "Tress, you look a little bit bored. We've got this other little project that involves intellectual property and working with all the malters and the brewers who have been contributing to the plant breeding program. And now I've got a variety to release and everyone thinks they should own a bit of it. So I need someone to come and sort out all the background IP."

Tress Walmsley: He told me it would be a job that would probably only take about two weeks. Well, it took much longer than that, once we got into it, it was quite an in depth little project. But I really enjoyed the whole legal framework and understanding the Plant Breeders Rights Act and everything that eventually I just said, no, I want to

go down this path. So I moved into the commercialization and intellectual property department and ended up managing the grains section for that. And then my very last job in that, while working for the government department, was actually to set up the company structure for Intergrain. So we were basically privatizing or spinning off the wheat breeding program out of the West Australian government. We decided that it had a commercial platform and could basically exit and transition to a private breeding company. And so I set that job up and then resigned and then started as the first employee with Intergrain.

Hannah Senior: The role setting up the intellectual property piece was that for the federal government? Or was that for Western Australia?

Tress Walmsley: That was for the state government, Western Australia.

Hannah Senior: I understand that as part of that you set up the end point royalty system. Is that correct?

Tress Walmsley: Yes.

Hannah Senior: Tell me a little bit about that, and what it is and how it works.

Tress Walmsley: So in Australia, we established what we call, or refer to, as the end point royalty system, in really the early 1990s. I suppose, we recognized that we wanted to have a better value capture system using the plant breeders rights, and everywhere else in the world had really done that system using seed royalties. But in Australia, seed was often traded by individual farmers, it didn't go through a small number of seed traders or certified growers. So we set about saying, okay, what would be the most efficient system that we could build in Australia. And so when we looked at our system, we recognized that because primarily, a lot of the wheat that then was exported, that there was this small funnel point, which was at the traders, so back then there might have been 10,000 wheat growers. But at that point, there was only one wheat trader, it was the AWB. And so we essentially went to the AWB and had a conversation with them that said, look, if we could set up an end point royalty system where you capture and pay the royalty back to the grower, it's the most efficient system that we could run in Australia. And it's really grown from that.

Tress Walmsley: Now we have over 100 grain traders participating in the system.

It's an area where, as plant breeders, we've actually decided to collectively act in a pre competitive manner. So we've basically all said for our future growth and survival we need an efficient value capture system, rather than us all individually do it we've actually come together. We operate as a national collection system, we manage it together. And it's become a really powerful system that we have in Australia.

Hannah Senior: That's a really unusual system. Is it complex? How does it work?

Tress Walmsley: It's a pretty simple system. A lot of people go, "Oh, can you explain this system thing?" and I'm like, "Okay, it's not rocket science!". It's actually when the grower buys the seed, he takes a variety license. That variety license uses a combination of the Plant Breeders Rights Act and contract law that basically says to the grower, when you sell grain of that variety, you authorize an end point royalty to be deducted at the first point of sale. And so it's just a very easy, but relatively unique system that we've got operating in Australia.

Hannah Senior: How is it different to a levy system?

Tress Walmsley: So a levy generally is established through a piece of legislation, which says, you have to do this. It's like a tax, essentially. Whereas the plant breeders rights, the end point royalty uses the power of the Plant Breeders Rights Act and we combine that, as I said, with contract law, so that the breeder controls the system. Each breeder sets their own end point royalty rate for their variety. So there's a lot more control to the individual plant breeders.

Hannah Senior: This is unique to Australia, is that right? Why do you think nobody else has adopted it?

Tress Walmsley: We did have that advantage of when we originally set it up, that we had the power of being able to have wheat all be collected by the AWB. And so we didn't have to go and initially get 100 different grain traders to agree to the process. You know, we tackled the big one - AWB. And then we tackled, as it got deregulated, there were four or five other big ones, so we tackled them. So we were able to incrementally build this system. But I think the other unique thing is that Australia has always had this philosophy of where growers farmer to farmer trade seed. And so we recognize the value of that. And we worked collectively with the growers to demonstrate with them why this was a really important system for them.

Hannah Senior: Okay. And I guess the other question is because you said a levy is more of a tax so that's compulsory, whereas this doesn't sound like it's compulsory in quite the same way. So does that not lead to people trying to work their way round it or claim that they grew a variety which had a lower charge associated with it than the one they actually grew? There must be a bit of game playing goes on?

Tress Walmsley: There's always game playing. And even, you know, people like to dodge tax. So, you know, it happens in every system. We all like to sometimes be creative, shall we say! We do have ongoing compliance programs, we acknowledge that there's really two avenues. So the one and the first that we always place most effort into is about demonstrating the value to the growers. If the growers understand the benefit of paying their end point royalties, and understand that gets driven back into the plant breeding programs, then attitudinally we hope that they buy into the concept, and therefore we have increased compliance. But there's always the reality. And sometimes it's actually a genuine accident, where someone delivers a variety, they've had a mix up or their truck drivers had a mix up or something like that. And they do say it's the wrong variety. So we are also looking at bringing in new technologies, where we can, at the receiving point, basically do a rapid test to determine or to check what the variety is.

Hannah Senior: Would that be based on appearance? Or would it be based on genetics?

Tress Walmsley: You could actually do both of those. Intergrain is actually working with a company called ZoomAgri and theirs is actually using machine learning visual appearance. So yes, we've been scanning many, many thousands of individual grains of the different varieties so that we can develop an algorithm that can, within two minutes, determine the variety.

Hannah Senior: That's really clever stuff.

Tress Walmsley: Yeah. It's like my first little foray into machine learning, but it's quite exciting. And when I initially brought this project concept back to our business and said to the plant breeders "There's a company in Argentina, and it actually says he can scan our things in two minutes and tell us what the variety is." Their eyes all kind of glossed back, and went "Oh, yeah, Tress, this is one of your dream projects!"

So yeah, it's been quite funny when I've been able to send them "Well! It's worked!"

Hannah Senior: You went from the end point royalty system and intellectual property, and then you became the CEO of Intergrain. So tell me about Intergrain, what's the scope of its activities?

Tress Walmsley: So initially, when I came into Intergrain, I was actually only second in charge. So I was like the deputy CEO for the first four or five years. And eventually, I got to be selected for the top job. So I've done the CEO's role since 2012. And initially, when we set up Intergrain we were only wheat breeding. Then two years later, we bought in barley breeding. And actually, this week, we are formally announcing that we've started an oat breeding program. And we have been selected to transition the oat breeding program out of the government into a private breeding business. So it's actually pretty exciting to see the growth as we go into another crop.

Hannah Senior: Presumably, you know, as a for profit company, there is a P&L measure of success. But then in addition, from what I understand you have some other ways that you would consider yourself successful.

Tress Walmsley: That's right. So in Intergrain, we actually have a pretty unique situation where we only have two shareholders. One of those is the West Australian government and the other is the Grains Research and Development Corporation. So the GRDC also operates basically on a grower levy. So both of our shareholders provide us a relatively unique position where the way that they see that they get value out of their investment in Intergrain is not by us returning them just a pure dividend, but they actually say "We want you to deliver value by the products that you provide to the grains growers." So it allows us this fantastic capacity to be able to drive the profits and expand the business and be very focused and know very clearly that our customer, who we are going to deliver value to, is the Australian grain grower.

Hannah Senior: And are you focused mostly in Western Australia? Or is your focus national?

Tress Walmsley: It's very much a national breeding program. And there's a lot of reasons for that. But one of the primary reasons is actually risk management. And so within Australia, we may have a drought on the west coast and a good season on the

east coast. So to buffer, I suppose, your revenue and your exposure to these seasonal impacts, it's really good to have a national spread of products. But also within Australia there are many varieties that actually perform well in Western Australia and just as well in Victoria. And then the other reason is that if you run a national testing program, one thing that has a very big impact, because we have very large G by E, season makes a huge impact. And so by testing across multiple environments in Australia, we expose our genetics to a number of different season events. So we can actually gather a lot more data and more powerful data, which allows us to breed for basically yield stability and a really broadly adapted variety.

[Theme music plays]

Hannah Senior: You're listening to Plant Breeding Stories brought to you by PBS International, world leaders in pollination control. We're exploring the personal stories behind people who've dedicated their careers to plant breeding. Helping us to more productive plants, greater food security, and more sustainable agriculture. Now back to the podcast.

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Hannah Senior: When we spoke previously, you were describing how you have a national focus, so there's a whole load of different uses that that grain is going to, once it's been grown and harvested. But within that there are some specific niches that you mentioned previously, and one of them we talked about was udon noodles. Tell me a little bit more about that, because that was a really good example.

Tress Walmsley: Yeah, so our udon noodle story is one probably that we're somewhat famous for. Intergrain is really one of the leading global suppliers of the Japanese and Korean udon noodle products. Apart from Western Australia, the udon noodle grain is only grown in Japan. And it really has come about through this beautiful story of working really closely with your end user. And so it was back in the '80s, when we had a cereal chemist who recognized that the Japanese in particular were coming down to Western Australia and sourcing one particular variety. And so he did a fact finding trip to the market, and learned on that, that there were some unique chemical properties in a particular variety that made a good udon noodle. And so he bought that information back and then worked with the plant breeders.

And over the last 30 years, we've really refined the genetic gene pool to make a very specific breeding program that strongly services those unique characteristics.

Hannah Senior: So what does makes a perfect udon noodle?

Tress Walmsley: To make a perfect Udon noodle we said basically it had to have, it's called mochi mochi. And essentially, you have to have the perfect color, so it has to be this lovely creamy colour that can't be too yellow and it can't be too white. It's also got to have brightness. So you don't want a udon noodle that sits in your bowl and goes dull. It's got to maintain this beautiful glossy brightness of cream. And then there's the texture taste. So when you slurp it in over your lips - and it's actually impolite if you don't slurp an udon noodle. So it's like [*Tress makes a slurping sound*] - you practice your slurping. It must feel smooth as it passes through your lips. And then the final test is you take a piece of the udon noodle, you put it between your back teeth molars, and you press down on it really quite slowly, but not enough to cut it. And then you release the pressure and it should bounce back to its original shape. And that makes a perfect udon noodle. Now, that actually has a lot of chemical and physical properties all wrapped up in it. Some which we still don't understand. But a lot of people say "oh can you *really* pick a difference between varieties?" And the Japanese take this very seriously - they send down sensory experts every year to some and work with us and test individual lines to tell us which ones make the perfect udon noodle.

Hannah Senior: That's incredibly precise, isn't it - the requirements? Was the variety that's being grown in Australia based on a Japanese variety or a Korean variety?

Tress Walmsley: No, it wasn't. So it actually comes from Australian genetics. It was a variety called Gamenya. But over time we've improved it. Now we have one particular variety, which we actually call Supreme, which is very much recognized, you know, making the best udon noodle.

Hannah Senior: Supreme udon noodles! [They both laugh] There was another example, which I'd be keen to touch on. Australia is one of the leading countries in terms of adoption of regenerative and no-till agriculture. It's certainly a much more widespread thing in Australia than it is, for example, in the UK, albeit, I think there is

growing interest everywhere. But it must require different varieties for that growing in that system, so would you just tell me a little bit about varieties that you bred for the no-till system and how that fits into Australian agriculture more widely?

Tress Walmsley: I think the way we've gone about breeding for no-till varieties is we haven't set out to breed the perfect no-till variety. But very much when a plant breeder conducts his field trialing, we want to mimic the farmer practice. And so because no till has been, particularly in Western Australia, a farming system tool that we've used for 30 plus years now, our breeding selection process has shifted towards selecting varieties that suit a no-till variety. And so by that, I think some of the characteristics that we've probably inadvertently selected for are things like, you know, often in the no-till system, our growers are dry planting. And so we need a variety that... We don't know when it's going to germinate. So it could germinate the end of April, or if we don't have rain, it may not germinate until early June. So we've, we've been trying to, I suppose, find varieties that have that yield stability, that have early vigor, long coleoptiles, they're good at getting up and out of the ground, and utilizing that first burst of moisture. So it's not that we've directly set out to say, Oh, we've got to breed a no till variety, but it's one of those great things of where plant breeding and technology change come together and over time it's this immersion process that just happens.

Hannah Senior: So it's more like a selection pressure rather than a specific targeted intervention in some ways.

Tress Walmsley: Absolutely! Yeah, there you go, you're more on top of the breeding thought than me! [They both laugh]

Hannah Senior: Tell me a bit about the culture of Intergrain, because I think that is also quite distinctive from the way you've described it to me.

Tress Walmsley: One of the unique values that we've worked really hard, I suppose, to build and engender in our business is an open, collaborative approach. It kind of has come about in many ways. One, because I think I, as a leader, am naturally like that. I'm hopeless and keeping a secret. So you know, I can't keep secrets or store information and I really despise those people who use information as power. To me, like that's the wrong philosophical approach. But it's also come about because we,

because of our unique shareholders, and we're in little old Australia, or little young Australia, I suppose what we should really call it. But we're somewhat removed from some of those big global, international businesses. We recognize that and so we say, "Okay, we've got to be really good at leveraging and connecting, and building collaborative systems with other researchers". So, but internally, we have a research manager, whose fundamental job is to be scanning the world to see what research is going on and fostering those connections. A really good example of where we are true to our collaborative and open approaches, we have worked with La Trobe University in Agriculture, Victoria to develop a wheat and barley genomics platform. And this platform, it was an expensive system to set up for genotyping. We think that it's actually a pretty good tool and has some great advances on some of the other platforms that are out there. We recognized that many researchers, particularly in universities, or small breeding programs, or little government department run programs, they would never have the opportunity to build one of these platforms. So we're making our platform via Illumina, to be available to the global research world. And in return, what we get out of that is an opportunity to engage and you know, work with some of these researchers, and they publish a paper on their work, then that is easily translatable back into our system. So there's a win, win. But it's a different approach to where I think many particularly big global corporations hide away their IP and keep it as their own internal competitive advantage. We've done the complete opposite. And we've said, right, we're going to make it open and get a competitive advantage by sharing.

Hannah Senior: Ah-ha! [affirmative] And that's an interesting and completely different way to think about a commercial organization isn't it. Has it been well received so far?

Tress Walmsley: It is. I think we're actually starting to see some fairly big players starting to. In particular, our genomics approach. But we do hear it just locally in Australia that many of the research organizations say "Tress you really are an open and collaborative organization and we like working with you." So yeah, that makes me proud.

Hannah Senior: Yeah, exactly. I'm going to move on to some general questions now. One of the things that would be interesting to talk about is, if you went right

back to the beginning of your career, are there any things that you would choose to do differently, knowing now what you do?

Tress Walmsley: I've actually been... I've been satisfied with my career. One of the interesting things was by being with Intergrain now for 12 years, and you know, a lot of people say, "Oh, you know, where's your next job?". And in my mind my next job was actually - not saying that it was soon - but it was always going to be "I'd like to go and do an overseas posting". But now, because of COVID and because Perth has just turned out being one of the best places, it makes you re-evaluate, and you think, "oh, maybe I won't take a global posting". [They both laugh]

Tress Walmsley: But, I have so much genuine pleasure of coming to work every single day and working with the Intergrain team. And we're still on this amazing growth path and doing some crazily exciting things that it's like, yeah, my cup of tea is not finished here yet.

Hannah Senior: Oh, that's great. That's really nice. I think there are many people out there in the world who would envy that energy and enthusiasm for your role. Good for you! And I guess an interesting question is for the future, where do you see opportunities arising. What looks exciting or what looks... What's attracting your interest?

Tress Walmsley: What's amazing to me is just the growth and the acceleration of all new high throughput phenotyping methods and genomics. Those types of things are exciting. Half the time, I don't understand them, they're like, way outside my science understanding. I think an area that has potential to really capitalize on some more scientific improvements is probably in the space of cereal chemistry, like, we've just invested quite a lot of money setting up our own internal cereal chemistry lab. And you can just see that a number of the pieces of equipment are still the same pieces of equipment that were developed 50 years ago. And so you know, that there's just, I think, a lot of opportunity to improve the throughput to embed genomics in it. So yeah, to really radically change how we do cereal chemistry.

Hannah Senior: Last question for me, are there any influences you're particularly grateful for? Be it in work or outside of work as you've been on this journey?

Tress Walmsley: Yeah, I would always have to say my mum, because she actually

had a number of community leadership positions. So she really, I suppose, demonstrated to me why in my mind, it was normal, that I had a working mom that took leadership positions, and just was always “Well, we can do that! We can do that!” So she probably gave me my can-do attitude. But then as I suppose came into my career, at every point there was probably one strong mentor who I looked up to, got guidance from and I think they change as you go through your career, but they're always essential to have.

Hannah Senior: That feels like it's a really good place to leave it and I'm sure when other people listen to this, they will be inspired by what you've said. Because I think there's some really great examples in there of doing things differently. On that note. Thank you very much Tress Walmsley, CEO of Intergrain.

Tress Walmsley: Thanks Hannah!

[Theme Music Plays]

Hannah Senior: You've been listening to Plant Breeding Stories by PBS International and I'm your host, Hannah Senior. Plant Breeding is a pretty specialist podcast topic, which can make it difficult for people who share our interest in this kind of thing to find it. So if you've enjoyed the podcast, recommend it to your friends and colleagues, and please help others in the plant science community to find it. By rating this episode and subscribing to the series. I'd love to hear from you if you want to suggest people you'd like me to interview, you can contact me on twitter @PBSInt or on Instagram @PBS_Int. Until next time, stay well.

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