

**File: 12-30-2021 Dr. James Schnable**

**LORRIE BOYER:**

[00:00] Hello everyone, and welcome here to the daily Ag newsmaker interview. I'm Lorrie Boyer. And joining me here today is Dr. James Schnabel, and he is an associate professor at the university of Nebraska Lincoln. And Dr. Schnabel, you and I have chatted in the past, so I'm glad to have you back on here today. And the reason I originally reached out to you, and we can add anything into this interview you'd like, but you are doing some work on a new proso millet variety. So, I wanted to have you on to talk a little bit more about that and your work in that field.

**DR. JAMES SCHNABLE:**

[00:34] Lorrie, it's great to be here and yes, I'm happy to be talking about this. This is actually the work of a startup called Dryland Genetics that I helped found during my time here at the University of Nebraska working on breeding new varieties of Proso millet.

**LORRIE BOYER:**

[00:50] Alright, so where do we start with this? Where did you begin your work on this? What prompted you to work on this?

**DR. JAMES SCHNABLE:**

[00:57] So what prompted me to work on this was really just discovering millets as a crop for the first time. So, about the same time I was hired here, I was working with a wide number of different grain crops. I'd never actually worked with or heard of Proso Millet before, and was really struck by the fact that it can produce twice as much grain from the same amount of water. As I started reading more about it, understanding how important it both to the state of Nebraska and Colorado, I was really struck by the fact nobody was using modern powerful breeding techniques in this crop. And it seemed like it was a real gap and something that needed to be addressed.

**LORRIE BOYER:**

[01:36] And how long have you been researching this then?

**DR. JAMES SCHNABLE:**

[01:41] So, we started Dryland Genetics all the way back in 2014. And these are the first varieties Dryland Genetics has actually developed and released and gotten into customer's hands this last summer.

**LORRIE BOYER:**

[01:53] All right. So, let's begin talking about where you're at with things and what you have found.

**DR. JAMES SCHNABLE:**

[02:01] Sure thing. So, the challenge in any breeding program is you need to have lots of genetic diversity to be able to select for. And when we looked at the current types of Millets that were being grown in Colorado and Nebraska, they were good varieties, but there really just wasn't a lot of diversity, which makes it hard to develop new and better varieties. So, what we did at Dryland Genetics is we brought in a lot of diversity from all over the globe, got a lot of— Mixed that all together with varieties that already were well adapted to Colorado, got lots and lots of stuff that was terrible, but over time we were able to use conventional breeding, select better and better varieties, and finally get stuff that in some of our customer's hands is producing may 20% more grain from the same amount of land as the varieties farmers grow today in Colorado and Nebraska.

**LORRIE BOYER:**

[02:52] Okay. What is it called? What is a variety actually called?

**DR. JAMES SCHNABLE:**

[02:57] So the variety, we released two varieties called not very creatively DLG 240 and DLG 40, most farmers today in Colorado are probably growing a variety called Huntsman, which was developed by the University of Nebraska back in the 1990s. I would say they were much better at coming up with good and creative variety names than we have done so far.

**LORRIE BOYER:**

[03:21] All right. Fair enough. Is it actually out on the market?

**DR. JAMES SCHNABLE:**

[03:27] It is. So, we worked with— I don't remember, about 10 growers this past summer. We're hoping to work with many more in the coming year. Part of the challenge is just being able to produce the seed to sell to farmers. We have to go through a two-step process where we grow foundation seed that is inspected by the state, and then use that to grow certified seed that is inspected by the state. And then in the third year, we can sell that seed to farmers. So, the seed we're going to be selling in 2022, how much seed we could produce was determined back when we grew those foundation seed plots. So, we have to plan ahead as we try and produce more seed.

**LORRIE BOYER:**

[04:06] When you're talking about state inspections on those two categories, does it have to be state by state then?

**DR. JAMES SCHNABLE:**

[04:13] No, we're actually very fortunate in that. So, if Colorado inspects, Nebraska will also accept that and vice versa, so we need to have a state inspect it, but it doesn't have to be the same state in which the seed is sold.

**LORRIE BOYER:**

[04:27] Have you done any variety trials in Colorado to date?

**DR. JAMES SCHNABLE:**

[04:32] Most of our customers right now are in Colorado. Just because I mean, Colorado grows something like 60% of all the proso millet produced in in the USA. So, we're really happy to be working with farmers out there.

**LORRIE BOYER:**

[04:48] I didn't even know that. Wow, that's a lot. You learn some new every day. All right. And then, so can you explain what the findings are so far in those trials? Is there anything kind of eye-opening or something, you know, a little bit unique to talk about in that respect?

**DR. JAMES SCHNABLE:**

[05:08] You know, when you're doing breeding, the joke is you ask farmers the traits they care about, and what they care about is yields, yield, and yield. And so that's really what we've been focusing on with these two varieties. What we're seeing is that DLG 240 really has probably the highest yield potential of anything we've seen. There are farmers who are getting more than greater than a 40% increase in yield compared to Huntsman growing in the field next to 240, but it has a slightly longer growing season. DLG 40, the other we have out with some of our customers this year, the increase in yield relative to Huntsman is somewhat smaller, but it has a shorter growing season, which I think farmers like since it fits right into the same schedules they've established with Huntsman.

**LORRIE BOYER:**

[05:59] As I mentioned to you before we went on the air, I'm not as familiar with the proso millet industry, did not grow up in it and have been learning along the way, and probably don't talk about it as much as I should, especially given that fact that you just threw out, that 60% of the millet is grown here in Colorado. So, need to focus on a little bit more. But is it mainly irrigated or is it dryland or both?

**DR. JAMES SCHNABLE:**

[06:22] It is mainly not irrigated and that's a really why we think there's so much growth potential in this crop, is proso millet uses less water than any other grain. So, you can grow it on land where you don't water rights, where there isn't enough water

to grow dryland corn. You can throw it into a rotation with winter weed and get an extra crop out of the same land. And so, it really has potential to produce grain from land that otherwise would not be productive. And I'm really excited about that, particularly as we think about the challenges we're going to face over the next several decades with competition for irrigation water and reduced rainfall and that sort of thing.

**LORRIE BOYER:**

[07:06] Is it a good rotational crop?

**DR. JAMES SCHNABLE:**

[07:09] Yes. So, a lot of the— So, right now there are about half a million acres of proso millet growing, as I said, primarily in Colorado and Nebraska, a bit in South Dakota. A lot of that is grown in rotation with winter wheat, it can break up the weed pressure. And one of the nice things about proso millet is it doesn't really send its roots deep down in the soil, it spreads them out sideways. So, it doesn't deplete that deep water in the soil that you may want for the crop that comes after the proso millet.

**LORRIE BOYER:**

[07:35] And Dr. Schnable, I'm sorry if you mentioned this earlier, but these two new varieties, are these more for the bird seed industry or which part of the millet industry?

**DR. JAMES SCHNABLE:**

[07:47] That's actually a really good question. So, right now, a lot of the proso millet that's grown goes to the bird seed industry. The varieties we've developed can also go into that industry. What we are really excited about though is the potential to grow proso millet demand for both feed to animal production and human food. Within Dryline Genetics we've hired a chief commercial officer who's been going around talking to a bunch of food processor companies, a lot of the ones really focused on sustainability, they seem to really like this idea of a grain that uses a lot less water, in addition to being able to talk about proso millet as an ancient grain. They've just been really worried about the security of the supply chain for proso millet. And so, if we can increase the yield and we can actually start producing more of it, I think that there's a lot of demand that could be unlocked from sort of the health food and feel good market.

**INTERVIEWER:**

[08:42] That is interesting. I did know it was an ancient grain. And as you mentioned, the health food market, that's a big deal right now is the ancient grains and being more of what's called a whole food, you know?

**DR. JAMES SCHNABLE:**

Yes.

**LORRIE BOYER:**

[08:58] So, then some of the others that are out there, I wanted to ask though, with regard to feed, how are protein levels in millet?

**DR. JAMES SCHNABLE:**

[09:07] That's a very good question. So, proso and millet, the endosperm, which is the starchy part, is a little bit smaller. So, it has a little bit more protein than corn, but the amino acid ratio is very similar to corn. It's still going to be somewhat deficient in lysine. So, it really could work as a drop in substitute for corn. And now normally proso millet costs a bit more than corn, so people aren't going to be substituting it just to save money feeding to chickens or cows. But again, when you think about how much more water has to go into producing every bushel of corn and how much less water goes into producing a bushel of proso millet, we think there's a lot of potential as people start calculating. "Oh, well, if I have this egg from a chicken that's been fed with proso millet instead of corn, that egg could be saving anywhere from 10 to 20 gallons of water relative to a chicken fed on corn."

**LORRIE BOYER:**

[10:00] And I just have one more question here before we run out of time, is millet in the United States in general, is it highly exported or does most of it stay here in the country?

**DR. JAMES SCHNABLE:**

[10:11] So, there's a significant amount of export. I'm not quite sure about the percentage. A lot of that goes to Southeast Asia and East Asia where there's a much longer and deeper tradition of using proso millets directly in food. I've been to China and have nice porridges and cakes and things that use proso millets.

**LORRIE BOYER:**

[10:32] Okay. All right. Dr. Schnable, if folks want to find out more about the new varieties, do their own homework and due diligence, where's a good place for them to go?

**DR. JAMES SCHNABLE:**

[10:41] So for this probably the best place to go is the Dryland Genetics website. And that also will have an email you can reach out to and get in touch with me directly.

**LORRIE BOYER:**

[10:49] Well, thank you for your time. It's been good to chat with you. I appreciate all the information.

**DR. JAMES SCHNABLE:**

Thank you so much for having me on.

**LORRIE BOYER:**

[10:55] Dr. James Schnable, associate professor at the University of Nebraska Lincoln, my guest. I'm Lorrie Boyer.