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## CEREALS

Steve Shorter and Sarah Whiteman.

“Those models have really only started to kick in overseas over the past five years,” Steve says.

“All the programmes we work with now have genomic selection as a key tool in their breeding and screening trials. We can’t roll that out at scale here, yet, but we are still able to benefit because we have access to that material. One day however, we might be able to use the models they’ve built and adapt them to our conditions.”

Genomic selection can make finding desirable plant traits faster and more reliable, speeding up the rate of genetic gain for crops just as it does for animals. But when it comes to the traits themselves, one remains head and shoulders above the rest for cereals.

“Grain yield is still first, second and third!” Steve says. “If a new breeding line is not competitive for yield, there’s no point continuing with it.”

That said, yield needs to be assessed in conjunction with potential end use quality. For example, a high protein high strength bread wheat will have a lower threshold for yield than a lesser quality one which in turn has a lower bar than a feed wheat.

Disease resistance has become more important too.

“It would be good for growers to be able to dial back on intensive chemical inputs – we need to be heading in that direction and in recent times I would like to say that recent PGG Wrightson Grain cultivars possessing broad disease re- ▶

# The science of cereal breeding

The Cereal Seed business of PGG Wrightson Grain makes over 200 crosses for potential new cereal cultivars every year, as well as screening 300-400 new lines a year from several European breeding partners.

**F**eed and milling wheat comprise about 90 per cent of the in-house breeding effort, with triticale making up the rest, while all barley germplasm is imported, programme leader Steve Shorter explains.

He’s held the role for the past eight years, following two decades as a cereal breeder at Plant & Food Research Lincoln.

For most of that time, while the goals

have changed, the actual methods of choosing what to keep and what to cull in the selection and evaluation process that will often take up to 10 years from the first cross to its commercial launch have not.

The difference today is that the breeding material coming in from Europe is increasingly influenced by the introduction of new genomic selection technology.

◀ assistance have contributed to that.”

PGG Wrightson Grain’s cereal seed product development manager Nick Brooks says understanding the science and investment in research and development is vital to ensure cereal seed cultivars continue to deliver the production and quality characteristics desired by growers and end users.

Steve Shorter is joined in the breeding team by Sarah Whiteman.

For someone who didn’t even know it was a career choice a few years ago, Sarah has wasted no time learning the ropes at New Zealand’s largest private cereal breeding programme. Considering she will have to wait several years before learning how well her first selections stack up, she has committed to the long game.

Sarah joined the PGG Wrightson Grain breeding team three years ago, fresh from 12 months as a FAR graduate following a B.AgSci at Massey University.

The past three years have been quite the learning curve, not least because she is currently also working towards a Masters in Applied Science and Plant Breeding at Lincoln University.



Sarah is responsible for all of the early generation wheat lines, starting with choosing parent material, making the cross, advancing through the subsequent 3-4 early segregating generations before selecting which new lines to go into yield trials.

As a result, she says she spends a lot of time walking paddocks and looking at wheat plants. “We have 8000 plots in the pre-yield screening programme and they have to come down to 500 lines for the yield trials. That’s why plant breeders need attention to detail as well as patience and an eye for the long game.

“This is not a job for someone who can’t make decisions either. You have to be ruthless sometimes; you’ve got to get rid of a certain proportion of plants to advance the others, which was something I found quite hard at the start.”

The combination of working alongside a highly experienced breeder and doing her Masters at Lincoln has been ideal. “Steve has been a really good mentor. He has a wealth of knowledge, but he hasn’t held my hand all the way through – I’ve made mistakes and I’ve learned from those. I love the study as well, it helps to put all the pieces together.”



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