



HD Long-Life Beer

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Australian farmers are set to become major global suppliers of a new variety of barley that extends the shelf life of beer.

PIP COURTNEY, PRESENTER: Australia is set to become a major global supplier of a specialty barley that extends the shelf life of beer.

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After more than a decade in development, the new malting variety is being grown commercially in South Australia.

It's showing a lot of promise as a good yielding crop. But as Kerry Staight reports, it also comes with some challenges.

KERRY STAIGHT, REPORTER: It's crunch time for Mark Branson's barley. And he's got an impressive track record he wants to maintain. For the last 13 seasons, the Stockport farmer has made the premium malting grade every year but one. And the crop before this topped them all.

MARK BRANSON, BRANSON FARMS, STOCKPORT: It averaged 6.5 tonne a hectare and there was patches going over 8 tonne and it all made malting, so I was absolutely rapt last year. Great variety.

KERRY STAIGHT: That variety is called Charger. In 2012, Mark Branson planted the first large-scale crop in Australia on his **property** north of Adelaide. After it outperformed his other barley varieties, the early adopter of all things new was keen to get it in the ground again.

MARK BRANSON: Yes, I thought, "You beauty. Here we go." I've got a good malting variety, good high yield potential and a good growing area for it to grow in."

KERRY STAIGHT: It's not just its potential in the paddock, but its influence on the end product that makes Charger stand out. The variety, which is owned by European brewing companies Carlsberg and Heineken, extends the shelf life of beer.

TIM COOPER, COOPERS: What it does is over a period of time stops the flavour deteriorating. That staleness sort of flattens the flavour of the beer, so the nice sort of flavours that you enjoy like the estery flavours, the fruity flavours in the beer and the hoppy flavours become sort of dampened down by this sort of papery characteristic.

KERRY STAIGHT: Tim Cooper runs the Adelaide-based brewery contracted to make this longer-life beer for the Australian market.

Does this variety change the flavour of the beer at all?

TIM COOPER: No, it doesn't change the flavour of the beer at all. Some of the flavour comes from the malt, but otherwise from the hops and the fermentation process.

KERRY STAIGHT: And he says being able to maintain those flavours once the beer leaves the brewery is a big step forward, especially for producers of lager.

TIM COOPER: All beer is subject to this same staling process. However, stronger-flavoured beers like ales and stouts and so forth don't show the flavour deterioration quite as much as the more delicately-balanced lager beers.

KERRY STAIGHT: How much longer does the beer last?

BIRGITTE SKADHAUGE, CARLSBERG RESEARCHER: Well you can actually expect at least a 50 per cent longer freshness of the beer, so again, it is something that's having a significant impact on the quality of the beer and especially in warm climates like you have here in Australia.

KERRY STAIGHT: The key to producing ale that ages better is to reduce how active one particular enzyme is during the malting process.

That enzyme is called lipoxygenase and it converts fats in the grains into the stale papery flavour. So Carlsberg has spent more than a decade searching for a barley with lipoxygenase enzymes that don't work properly.

BIRGITTE SKADHAUGE: After having screened more than 15,000 lines, mutated genase lines, we actually identified one barley line which were lacking this enzyme activity.

KERRY STAIGHT: Birgitte Skadhauge runs Carlsberg's research team in Copenhagen. After finding a barley with lazy enzymes, the trait which is known as null-lox, was bred into several malting varieties. And those varieties are now used to make all the **company's** premium beer that's **sold** in Europe.

At the same time, the research team has been working with the University of Adelaide to come up with an Australian version of the null-lox barley.

BIRGITTE SKADHAUGE: You should not forget that we are actually transferring to some degree European genetic backgrounds to Australia and we have to find the best suited ones for those special conditions you have here.

JASON EGLINTON, UNIVERSITY OF ADELAIDE: The first materials that we worked with really couldn't have been grown commercially within Australia, certainly not with any profitable success.

KERRY STAIGHT: But the new Australian variety, Charger, has changed all that. It's a cross between a European null-lox line and Gairdner, a malting barley that's well-established here.

JASON EGLINTON: We've seen the yield potential being very competitive with the current leading malting barley varieties and we've seen some very positive characteristics in terms of resistance to powdery mildew, resistance to leaf rust, but then we've seen some other challenges.

KERRY STAIGHT: One of the biggest challenges is the fungal disease net form of net blotch.

While Mark Branson's first batch of Charger escaped relatively unscathed, the pathogen did damage last season's crop, even though he used fungicides.

This is a particularly bad part of the crop, it's a bit thicker.

KERRY STAIGHT: So what does the disease actually do to the plant?

MARK BRANSON: Just takes the green leaf area of the plant away and then stops photosynthesis happening and basically that means stopping grain fill, so you might end up with small grains rather than thick plump ones, which maltsters like.

KERRY STAIGHT: Net form of net blotch is just one of a whole suite of barley diseases the South Australian Research and Development Institute is studying.

The fungus has the potential to wipe out around 70 per cent of a crop.

HUGH WALLWORK, SARDI: Well this is the most damaging disease or worrisome disease that we work with, partly because of the yield loss, but also because it is so hard to control with fungicides. But my concern is that if there were large areas grown for varieties like this, then the amount of disease built up would be so enormous, the fungicides would be very hard to use. Because the fungicides only really work if you get in really early and keep using them through the season.

KERRY STAIGHT: Hugh Wallwork has been assessing the risks emerging barley varieties pose to farmers for more than two decades. In the past, he would have been reluctant to recommend Charger because of its poor resistance to net form of net blotch. But these days he's not ruling it out, as it isn't the only barley struggling to fight off the aggressive disease.

HUGH WALLWORK: Well this is one disease of particular interest to us because it is changing very rapidly. It really was not a problem 20 years ago. It's only really emerged in the last 15 years and has gradually been getting worse because the pathogen is actually changing, it's mutating and previously resistant varieties are now becoming susceptible.

KERRY STAIGHT: While net form of net blotch is the biggest threat, last season dished up a smorgasbord of unfavourable conditions for many growers of Charger. Poor soil moisture early on, a very wet winter and several hot windy days in spring knocked the crops around. And for Trevor Day, the result is a far cry from what his neighbour Mark Branson achieved the year before.

What will you get out of this?

TREVOR DAY, MACAW PEAK, RIVERTON: We'll get feed barley out of this this year, so nothing at all. It's just - it's a trial. It's for the industry, and at the end of the day, it may benefit later on, but at this stage it'll end up as feed barley for us.

KERRY STAIGHT: The fourth-generation grower and former chairman of the Australian Barley **Board** has trialled more than 10 experimental varieties over the years. Many have been short-lived. But while Charger didn't make the grade first time round, he doesn't believe it's a reflection of the variety, with most malting barleys struggling to get over the line last season.

TREVOR DAY: Unless there's something else around, I would think we'd probably give it another year. But if we can get the yield out of it and the consistency, I mean, the demand is there.

KERRY STAIGHT: Trevor Day and Mark Branson were among nine farmers across South Australia contracted to grow charger last season. And while Mr Day didn't have much luck, his neighbour's crop did scrape through after the breweries decided to accept an inferior malting grade.

MARK BRANSON: To get malting means a lot to us. Hopefully I'll keep the run going of getting malting most times up here at Giles Corner. And very relieved that it's made it.

KERRY STAIGHT: It might not have been an ideal season for growers, but for barley breeders, it was very informative.

JASON EGLINTON: From our point of view, certainly nice to see it put under a little bit more pressure, typical of the Australian production environment, the sort of spring conditions that Australian varieties really do have to perform under.

KERRY STAIGHT: The conditions have also tested out the tens of thousands of potential malting varieties the university assesses each year. Among them is the next generation of Charger. And harvest results show version two not only yields well, but is more resistant to net form of net blotch.

MARK BRANSON: When it becomes available, I'll be itching to get it, yes, for sure. Anything that's got disease resistance is certainly a plus for variety.

KERRY STAIGHT: The up and coming generations may not need a full-sized harvester just yet, but the brewing **company** has big plans for the best-performing small plots. While last season's **commercial** crop of Charger yielded less than 2,000 tonnes of malting barley, it's hoped that figure will top 200,000 tonnes as the new and improved lines are released.

Carlsberg aims to send more than a few bag loads of that barley overseas. In fact the **company** wants to turn Australia into a major grain source for its Asian breweries.

BIRGITTE SKADHAUGE: You have excellent quality, you have very big barley acreages and in other parts of the world barley is actual becoming quite - a smaller crop because there's a lot of competition with other crops.

TREVOR DAY: The Asian market's growing, the **Chinese** beer market's growing, even the Indian beer market is growing and that's where the people are and you're talking billions instead of the few million that we've got here, so, yeah, that's where we want to go.

KERRY STAIGHT: To get there, what performs well in the field also has to deliver in the brewery and that's what Adelaide University is assessing in here, albeit on a much smaller scale.

JASON EGLINTON: A key to a brewer is the level of malt extract - effectively, the amount of soluble material that they can extract from the malt, which is effectively their yield. So in growers terms, it's like yield. How many tonnes of beer can they get from a tonne of barley?

KERRY STAIGHT: Back at the big beer house, the Australian **company** Coopers likes what it sees in Charger and hopes to extend the shelf life of its own brand as well as the brew it packages for Carlsberg.

TIM COOPER: They represent about several per cent of our beer and we will obviously talk with them when the time is right for them to see whether we can use the barley ourselves because I think it is an important improvement.

KERRY STAIGHT: Extra growers are also coming on **board** with plans to more than double the Charger cropping program this year. As for the farmer who planted the new variety first, well, he's already charging his glass in anticipation of a bright future.

MARK BRANSON: What a great story. I just love it. To have a beer that's going to go throughout Asia from the barley that I started growing, it's really good and part of the reason why you're in farming, because you get these opportunities occasionally.

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