Trying to capture the lucrative but elusive $400 per tonne returns of chickpea presents unique challenges for WA grain growers.

WA’s low overnight inland temperatures interfere with early pod set in chickpea to cut yield by up to 15 per cent and rob growers of over $60/ha. Attempts to avoid cool conditions during flowering by delaying sowing pushes pod fill into the dry weeks of October, where moisture is too scarce to sustain good production.

This double jeopardy has prompted research at WA’s Centre for Legumes in Mediterranean Agriculture (CLIMA) to develop more robust varieties that flower earlier and set pods while moisture is abundant. These new varieties will also incorporate better resistance to ascochyta blight.

“WA is currently planting less than a sixth of the area to chickpea that it could sustain, which represents a lost opportunity given that the crop is our highest paying pulse,” University of WA researcher, Heather Clarke, said.

“However, with a new approach at CLIMA, we are developing ‘Eskimo varieties’ with a better cold tolerance.”

Chickpea sets seed when a tube is sent from pollen’s landing point on the flower’s reproductive surface to the egg 10mm below. However, when the average daily temperature dips below 15°C these tubes shudder to a stop before reaching the egg.

Previous attempts to breed varieties able to withstand cooler temperatures involved observing chilling tolerant plants in the field and attempting to bulk up these varieties.

Unfortunately, few chickpeas have chilling tolerance, making this process of elimination time inefficient.

“To speed up the development of chilling tolerant varieties for WA producers we pollinate plants under controlled low temperature stress and retain only the survivors from generation to generation in the breeding program,” Dr Clarke explained.

“This approach takes much of the guess work out and helps control other factors such as exposure to light, moisture and humidity, which can interfere with reproduction.”
Working with germplasm from India and Syria, with some existing chilling tolerance, this Grains Research and Development Corporation supported project has already developed locally adapted lines which will tolerate average temperatures of 13°C.

At this critical level, the extra two degrees in chilling tolerance could result in pods setting two weeks earlier to broaden the planting window for WA growers.

In addition to chilling tolerance, some of the advanced lines are also showing greater tolerance to ascochyta blight than standard varieties such as Sona and Heera.

While these varieties undergo field evaluation before release to WA growers, Dr Clarke has also developed molecular marker technology to help hasten the ongoing bid to drive the tolerable temperature for chickpea even lower.

Successfully identifying markers linked to chilling tolerance could help future researchers use gene maps to identify and cross tolerant plants without the need to work through so many generations in the glasshouse and field.

ENDS

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MEDIA CONTACT: Dr Heather Clarke, Tel 08 9380 1648

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