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## Cropping

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# Mexican research lifts yields world-wide

By NEIL LYON

THE world's leading wheat scientists gathered in Mexico recently for a special Borlaug Summit marking the 100th anniversary of the birth of renowned international wheat breeder Norman Borlaug. Dr Borlaug, who died in 2009, spent much of his working life with the international wheat and maize research organisation, CIMMYT, in Mexico and was credited with developing wheat varieties that saved Mexico, India and Pakistan from famine in the mid-1900s.

He was awarded the Nobel Peace Prize in 1970 and became popularly known as the 'Father of the Green Revolution'.

The week-long program of conference sessions and field visits was held at Obregon in the Yaqui Valley in Mexico's north-west, where Dr Borlaug conducted much of his work.

The Yaqui Valley is one of Mexico's key breadbasket regions, built around a 220,000-hectare wheat-based irrigation area fringed by desert.

It is also the site of a large field station, the Norman E. Borlaug Experimental Station (CENEB), where CIMMYT scientists develop new varieties and farming systems, primarily for the developing world.

Australia has had longstanding links with CIMMYT through extensive levels of funding and the involvement of a large contingent of Australian agricultural scientists over many decades.

The majority of wheat varieties grown in Australia have

## What is CIMMYT?

- ◆ Acronym from the Spanish name of the International Maize and Wheat Improvement Centre, based in Mexico
- ◆ One of 16 internationally funded research centres around the world supported by the Consultative Group on International Agricultural Research (CGIAR)
- ◆ Holds the largest collection of wheat varieties in the world
- ◆ Majority of Australian wheat varieties originated from CIMMYT
- ◆ At the recent Borlaug Summit, CIMMYT was presented with the World Food Prize for its work in improving the quality, quantity and availability of food in the world

been derived from the CIMMYT program.

CIMMYT director general Thomas Lumpkin said Australia contributed to the work at CIMMYT "far and beyond its global per-capita size".

"Often some of our best scientists come from Australia," Mr Lumpkin said.

"Australians tend to be pioneers.

"They are robust and can handle physically uncomfortable situations.

"They are open-minded and have a 'can-do' attitude."

The CIMMYT board of trustees



chair is South Australian farmer Andrew Barr, who said the wheat germplasm that had flowed out of CIMMYT over the years had brought immeasurable benefits to Australian farming.

"Of all the places around the world where genetic resources have contributed to Australian wheat breeding, CIMMYT has had by far the biggest influence," he said.

Dr Barr said the organisation was continuing to expand on the work conducted in the 1970s and 1980s by Dr Borlaug, who developed a "shuttle breeding" program utilising high-altitude and low-country sites that gave researchers in Mexico the opportunity to grow two generations of crop in a year, vastly speeding up research.

"In more recent times CIMMYT has expanded that shuttle breeding program that was previously just in Mexico to include places in other parts of the world that contribute different things now to the genetic base in CIMMYT," he said.

"The change in the past 10 years has been the incorporation of Njoro in Kenya, near where the new stem rust race Ug99 occurred.

"It is a virulent rust and knocked over 79 per cent of the world's wheat varieties.

"Australia hasn't had stem rust Ug99 yet and we don't have some of the stripe rust races that are in Kenya, either.

"But Australian breeders now have had a chance to see how their material would fare

against a formidable opponent. "It is pre-emptive action."

Dr Barr said CIMMYT offered Australian researchers the unique opportunity to access 600 trial sites throughout the world.

"So, if we want to breed for resistance for a particular disease, we can identify the most reliable sites in the world," he said.

"We have done that for stem rust, stripe rust, leaf rust, fusarium, septoria, heat stress, drought stress, waterlogging, acid soils - all the things that affect the way a wheat plant performs.

"We don't have to make compromises.

"We can use our funding to pick the best sites where we know year-in, year-out the particular disease or event happens."

Dr Barr said the biggest challenge facing Australian wheat producers and breeders was "always rust", followed closely by the need to keep increasing yield.

He said there was debate among scientists at the summit over whether wheat yields had plateaued and whether there was any realistic chance of further yield increases, but figures showed the global rate of yield gain was being maintained at 1pc.

Neil Lyon travelled to Mexico with the assistance of the Crawford Fund and the Department of Foreign Affairs and Trade's Council on Australia Latin America Relations.

## Who was Norman Borlaug?



- ◆ Born in Iowa, US, in 1914
- ◆ Developed high-yielding, disease-resistant wheat varieties and farming practices
- ◆ Introduced dwarf wheats that helped Mexico, India and Pakistan become self-sufficient in wheat production
- ◆ Credited with saving as many as one billion people from starvation
- ◆ Became known as the 'Father of the Green Revolution'
- ◆ Won Nobel Peace Prize in 1970
- ◆ Died in 2009 aged 95

## New international wheat partnership

A NEW international partnership aiming to increase wheat yields by 50 per cent by 2034 was also launched at the Borlaug Summit on Wheat for Food Security in Mexico recently.

The International Wheat Yield Partnership (IWYP) brings together research funders, international aid agencies, foundations, companies and wheat research organisations.

CIMMYT global wheat program director Hans Braun said research focused on yield was critical for providing calories and protein to the 4.5 billion people who depended on wheat for their sustenance.

"Wherever breakthroughs are found they will be bred as rapidly as possible into elite, commercially viable seed by CIMMYT or other public-sector breeding programs and also by the private sector," Mr

Braun said.

"The potential of these breakthroughs will then be evaluated in relevant environments across the world and continually developed until those capable of achieving the desired yield gains can be released as finished varieties."

IWYP board of founding partners chair Steve Visscher said the world's population was estimated to reach 9.6

billion by 2050 and wheat production would have a crucial role to play in food security and the global economy.

"We need a collective global approach to make more wheat available," Mr Visscher said.

"It is the most widely grown staple food crop and the new varieties with increased yield will be vital to feed the world's growing population."

- NEIL LYON

## Reassess your risk profile

By CIARA CULLEN



WELCOME rain across the Wimmera and Mallee has injected enthusiasm and confidence into grain growers, providing insurance that crops have a better chance of reaching yield potential.

More importantly, it allows growers to get a good knockdown of volunteers prior to cropping.

With some growers lucky to have a few paddocks sown before the rain, now is the time to reassess rotations ensuring the ratio of cereals to break crops is adequate.

Birchip Cropping Group (BCG) research has found that wheat consistently yields more following a broadleaf break crop than following wheat or a long-fallow.

BCG research trials coordinator Claire Browne said if growers were considering changing rotations to include higher risk crops such as canola, prioritise these paddocks with high soil moisture.

Ms Browne said soil tests were worth their weight in gold as they provided an understanding of soil moisture and nitrogen status. This knowledge allows growers to refine their fertiliser strategy as rain falls and risks change throughout the season.

"As a rule, paddocks need 50 millimetres of plant available water and above 80kg of soil nitrogen to grow canola," she said.

On average, 5mm of rain will travel down 10 centimetres in sandy soils, whereas 5mm only moves down about 2.5cm in a clay soil. Additionally, water use efficiency is higher if there is stored soil water.

Aside from spreading production risk by including break crops in the rotation, additional benefits include subsequent wheat yield increases and weed and disease breaks allowing for changes in chemical modes of action.

With growers currently utilising pre- and post-emergent herbicides, strategic selection of pre-emergent herbicides is imperative.

Match the pre-emergent herbicide to the weed profile of each paddock, as well as the stubble load and position (standing or slashed).

Recent rainfalls and where more than 140mm has fallen over summer, the risk of herbicide plant backs being an issue is low in 2014.

BCG began its 2014 research program on April 1 by sowing an early wheat trial at Quambatook.

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