Cereal Breeding

Speed breeding - reduce the timeframe of cultivar development from 10-20 years to 6

The Technology
University of Queensland (UQ) researchers have developed a system for rapid screening of cereal crops for desirable traits. The system has been demonstrated to reduce the timeframe of cultivar development from 10-20 years to 6 years.

The system combines modern breeding techniques in a unique way, comprising: rapid generation advance under controlled conditions; efficient phenotyping methods for target traits; genomic selection using molecular markers; and innovative breeding schemes to move multiple genes for multiple traits simultaneously.

Competitive Advantages
A constant pipeline of elite cereal varieties are required to stay ahead of disease risks and to drive the productivity improvements required to support the growing global population. The cereal breeding team have developed techniques to rapidly incorporate important traits into elite varieties to produce new varieties or as introgression material for breeding programs.

Applications

| Barley       | Wheat       | Sorghum    | Maize       | Soybean    | Chickpea |

Delivery example
Argentina is the primary barley producing country in South America, ranked 8th in the world with a 2013 production of 4.3 million tonnes in 2013; the area planted has grown substantially in the past 8-9 years. In addition, 95% of the barley sown in Argentina is Scarlett variety which has favourable yields (up to 12t/h) but lacks resistance to the key diseases; spot blotch, net form of net blotch, leaf rust and scald. Uruguay and Brazil produced a combined 725,000 tonnes in 2013 and also represent a market for a variety based on Scarlett with increased disease resistance. The team at UQ has introduced multigene disease resistance into Scarlett barley. Trials are currently underway in South America and discussions are underway with a number of grain companies.

* Some commercial rights are still available for disease resistant Scarlett Barley

Figure 1: Introgression line response to Net Form of Net Blotch compared to Scarlett

IP Position
The UQ cereal breeding team has extensive capabilities and know-how relating to the speed breeding platform. UQ has various elite lines that have been produced to date.

Commercialisation opportunities
UniQuest Pty Limited, the main commercialisation company of The University of Queensland, seeks companies looking to license rights to new elite plant varieties as well as opportunities for research collaboration for the rapid development of new elite varieties with desired traits.

References
1 http://www.indexmundi.com/agriculture/?country=ar&commodity=barley&graph=area-harvested

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