Barley Breeding – The Challenges
Brief History of Barley Improvement

Pre 2006
• State based breeding programs funded by a combination of State/Federal (ca 60 – 65%) and GRDC (35 – 40%)

2006 – 2011
• Barley Breeding Australia
  • 3 Regional Programs funded by a combination of State/Federal and GRDC resources, supplemented with EPRs and industry contributions
Barley Breeding – The BBA era

Breeding targets based on barley production (tonne per square km)

- More than 10
- 2 to 10
- 0.5 to 2

BBA North

BBA West

BBA South
2011 -

- Private entities (InterGrain, Syngenta, Limagrain, Carlsberg, Sapporo)
  - Totally dependent on EPR’s
    - no ongoing public sector or GRDC financial support
- Public sector in transition (Uni Adel, Qld)
  - Transitional support from GRDC
Government Policy
• Government should not invest where private sector can more efficiently provide a service
  • long term decline in public investment in plant breeding

End Point Royalties
• Paid on grain delivered
  • Average rate - $2-3 /t
• Private plant breeding potentially profitable

International Investment
• Investment in private breeding programs is more attractive for multinational corporations (than investing with public sector)
Breeding programs will have:

- **National focus**
  - Benefits malting industry through the release of broadly adapted varieties
- **Increased cost efficiency**
  - Often integrated with wheat breeding
- **International linkages**
  - InterGrain – Monsanto
  - AGT – Limagrain
  - Longreach – Advanta/Syngenta
  - Dhow, Bayer – Aus investment
  - Adelaide University - Viterra
Barley Breeding Challenges

- Difficult seasonal conditions during the period 2002 – 2010 have undermined growers confidence in growing malting barley

- Industry demand for malting varieties but majority of barley used as animal feed
  - viability of the industry underpinned by feed price

- Malt quality parameters for domestic brewers distinctly different from export brewing markets
Challenges: Managing malting variety change

Decline in Gairdner and Schooner
- Impact on domestic breeding industry
  - Declining production of low fermentability varieties

Move towards Buloke and Commander
- Combination of high and mid fermentability varieties
Challenges: Managing the malting variety pipeline

High fermentability/High diastase
- WABAR2315 (InterGrain)
- VB0909 (InterGrain)
- Scope (AWB Seeds/AVS)
- WI4259 (Adelaide University)

High fermentability/Mid diastase
- WABAR2537 (InterGrain)
- VB0432 (Adelaide University)
- Henley (Edstar Genetics/Limagrain)
- Westminster (GrainSearch)
- Macquarie (TIAR)

Mid fermentability/Mid diastase
- WI3446 (Adelaide University)

Low fermentability/Low diastase
- WI4262 (Adelaide University)
- Shepherd (DEEDI)
- SYN937-5 (Syngenta/GrainSearch)

⇒ Not All These Varieties Can Be Accommodated By The Australian Barley Industry!!
Challenges: Variety Accreditation and Market Development

Breeding companies require clarity and transparency in varietal accreditation systems.

Essential to identify and support the market development of those varieties with greatest benefit to the Australian industry:
- Agronomics
- Quality
  - Market development costs of ca $500k per variety

⇒ Essential to provide value to growers in return for EPR payments
Challenges: Breeding Progress

Maintaining breeding progress in face of lower national investment in the short to medium term

- Australian national investment in barley breeding is being reduced from ca $12m per annum under the BBA model to ca $7m per annum based on current EPR returns to breeding entities
- In the longer term (10+ years) earnings from EPR’s will exceed prior public/grower levy investments

Can the efficiency improvements ensuing from privately conducted breeding compensate for the short-medium term decline in investment?

Will there be a similar level of international investment in private barley breeding entities as has been seen in wheat breeding?
Challenges: GM technologies

GM technologies

• Bioscience companies are making large investments into development of GM wheat and public sector R&D agencies are following that lead

• Subject to industry and consumer acceptance, the first GM wheats will be available to Australian growers in 10 – 15 years

Impact of GM technologies

• The advent of GM technologies in other crops have (universally) improved the profitability of those crops

Failure to adopt this technology in barley will lead to a long term erosion in relative barley profitability
Challenges: Research

Maintaining grower interest in GRDC prebreeding investment in the absence of GRDC funded plant breeding

• Often a 20 year time lag between investment and commercial outcomes

Are growers willing to invest in activities with such a long lead time?

The current interest in GM wheat is resulting in a shift in pre-breeding investment away from barley towards wheat

• This shift compounds the problems facing the long term profitability of barley

What structures are required to ensure long term, relevant investment in barley pre-breeding research?
Thank you