



# APL/Pork CRC Roadshow

September/October, 2009

## Feedgrains

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## **Feedgrain used by the pork industry**

- The cereal grain used in Australian pig diets is 38% wheat, 30% barley, 14% sorghum and 13% triticale (ABARE, 2007)
- More than 1 million tonne cereal grain is used by the Australian pork industry.



## ***There is a lot of variability in the nutrient value of grains***



- The energy value of grains can vary by up to about 4 MJDE/kg, within a cereal grain.
- The traditional measures of test weight and % screenings bear little resemblance to the nutrient value of feed grains.

# Variation in the energy value of feed grains in different livestock (PGLP)

Measurement	Wheat	Barley	Oats	Triticale	Sorghum
<b>Cattle <i>ad libitum</i></b> (MJ ME/kg DM)	12.2-13.1 (12.7) <i>n=8</i>	12.2-13.2 (12.5) <i>n=7</i>	10.8-13.4 (12.3) <i>n=6</i>	12.9-13.2 (13.1) <i>N=2</i>	10.2-13.1 (11.1) <i>n=7</i>
<b>Pig</b> (MJ DE/kg DM)	14.2-16.9 (15.0) <i>n=33</i>	11.9-16.1 (14.4) <i>n=38</i>	-	12.3-16.5 (14.9) <i>N=8</i>	15.5-16.6 (16.2) <i>n=18</i>
<b>Broiler</b> (MJ AME/kg DM)	12.4-15.6 (14.1) <i>n=36</i>	11.2-13.7 (12.5) <i>n=38</i>	12.6-14.6 (13.5) <i>n=3</i>	11.0-14.6 (13.9) <i>N=14</i>	15.2-16.5 (15.7) <i>n=18</i>

## *How much is one MJDE/kg worth?*

Industry sector	\$/t
Pig	14.30
Broiler	26.90
Layer	24.07
Feedlot cattle	14.20
Dairy	7.48

Typical Australian diets & ingredient prices – Wheat ~ AU\$200/tonne

# ***So What?***

- **Can we measure such differences on energy value between grains rapidly?**

# *Well, yes we can-*

- Using NIRS calibrations developed by GRDC and industry bodies/companies over 7- 8 years.
- One of biggest breakthroughs in area of grains and animal nutrition in the last 10 years.

## ***Commercial laboratories providing feed analysis of grains using AusScan NIR calibrations***

- Symbio Alliance – Brisbane, Qld
- Milne AgriGroup – Perth, WA
- George Weston Technologies- Sydney, NSW
- SGS Agritech – Toowoomba, Qld

## ***Pork CRC program of developing and breeding grains specific for the pork industry***

- We have continuing projects on triticale and peas.
- We have a project on barley that has 18 months to run –related to northern NSW and southern Queensland.
- We are starting a new project on wheat and barley across Australia



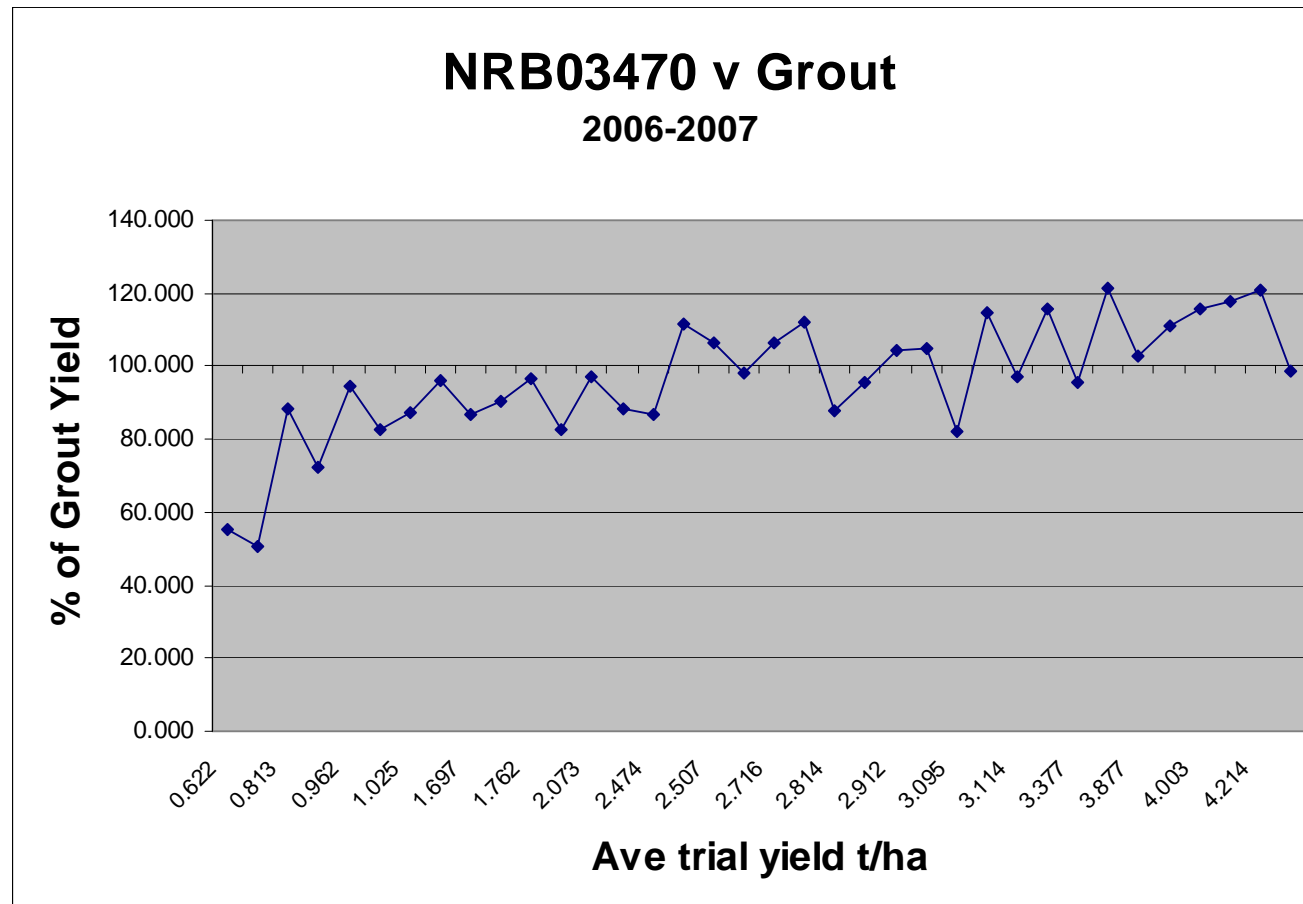
## Pork CRC: Plant Breeding projects



- Each project has three components
  - Using **new plant breeding technologies** such as double haploid breeding, microspore culture, hybrid development and fast track “shuttle” breeding to deliver superior varieties.
  - **Develop best practice protocols** and agronomy packages.
  - **Develop marketing systems** so that pork producers capture some of the benefits of these new improved varieties of cereals and legumes



# Barley breeding



- Released in 2004, Grout has already achieved a significant market share and is a useful “benchmark”.
- NRB03470 (or Shepherd) has a distinct advantage in the higher yielding sites above about 2.5 t/ha.

# Barley variety trials near Toowoomba (tonne/ha)

<i>Site</i>	<i>Felton 2007</i>	<i>Macalister 2007</i>	<i>Lundavra 2008</i>	<i>Pittsworth 2008</i>
Variety				
Shepherd	1.51	2.58	3.33	3.31
Grout	2.05	2.46	4.81	2.26
Fleet	1.49	2.17	2.58	2.75
Gairdner	1.15	2.17	3.54	2.59



# Completion of barley breeding work



- Shepherd was bulked up in the 2008 growing season and AWB Seeds released Shepherd in 2009.
- ND19119-5 is expected to be released in 2010:
  - Higher grain size and higher DE content (13.0 MJ/kg)
  - Yields relatively high in drought affected trials.
- Further yield studies with Shepherd and ND19119-5 in 2009+:
  - Northern regions in association with pork producers; Biloela, Kingaroy, Pittsworth and Lundavra.
- Further engagement with commercial agronomists and pork producers.



# ***Legumes - Peas***

## 1A-104, 1A-105 Pea breeding program

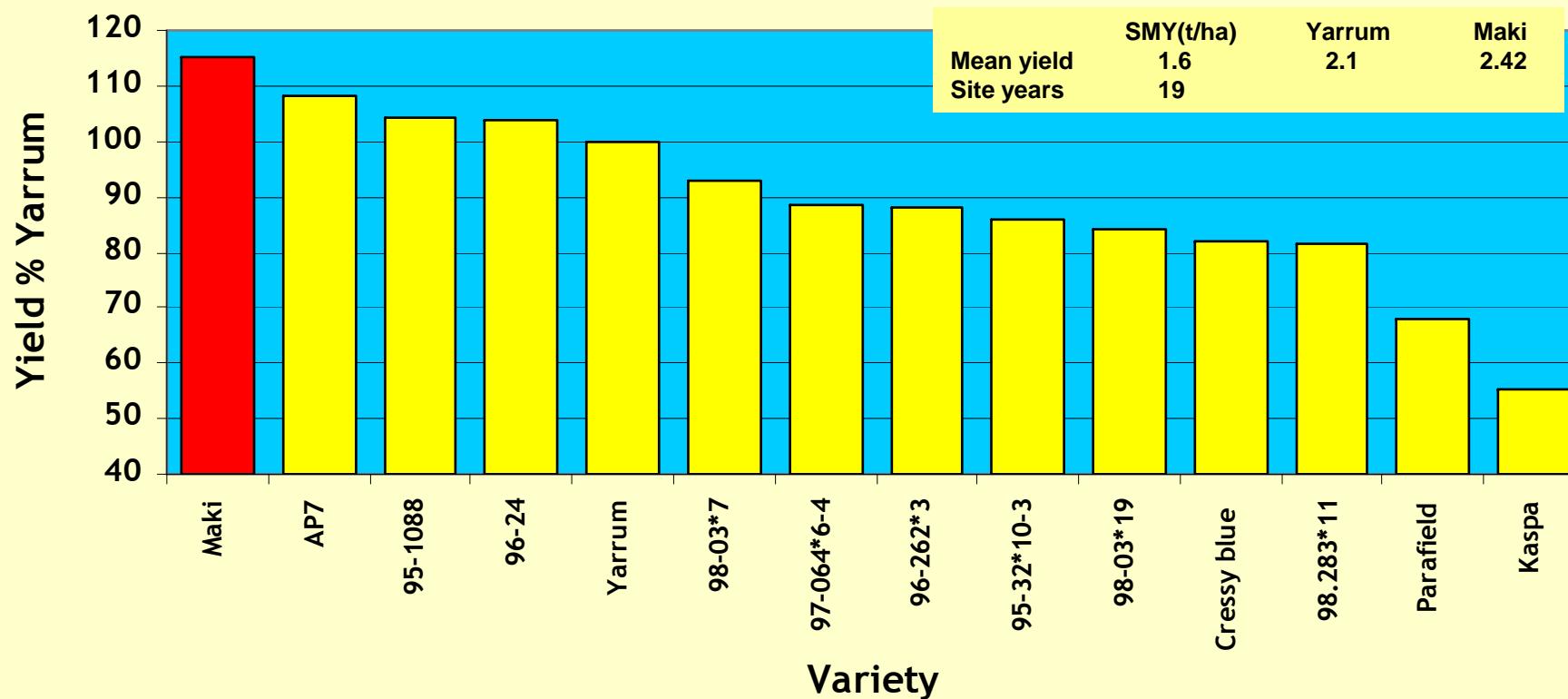
- University of Sydney have a strong field pea evaluation and breeding program at PBI, Narrabri.
- Plant Breeding NZ are providing new lines and “shuttle” breeding program to accelerate production and release of varieties.
  - Provides access to NZ lines and potential high ME lines.
- Strong agronomy and extension program that is linked through Pulse Australia and Qld DPI&F

# Update on Peas

- One new variety (Maki) was released in 2009 by AGT Seeds.
- Two-three new varieties will be released in 2010
- New varieties have marked yield advantages over current varieties
- Promotion and development of the field pea industry in northern Australia.
- An excellent research team

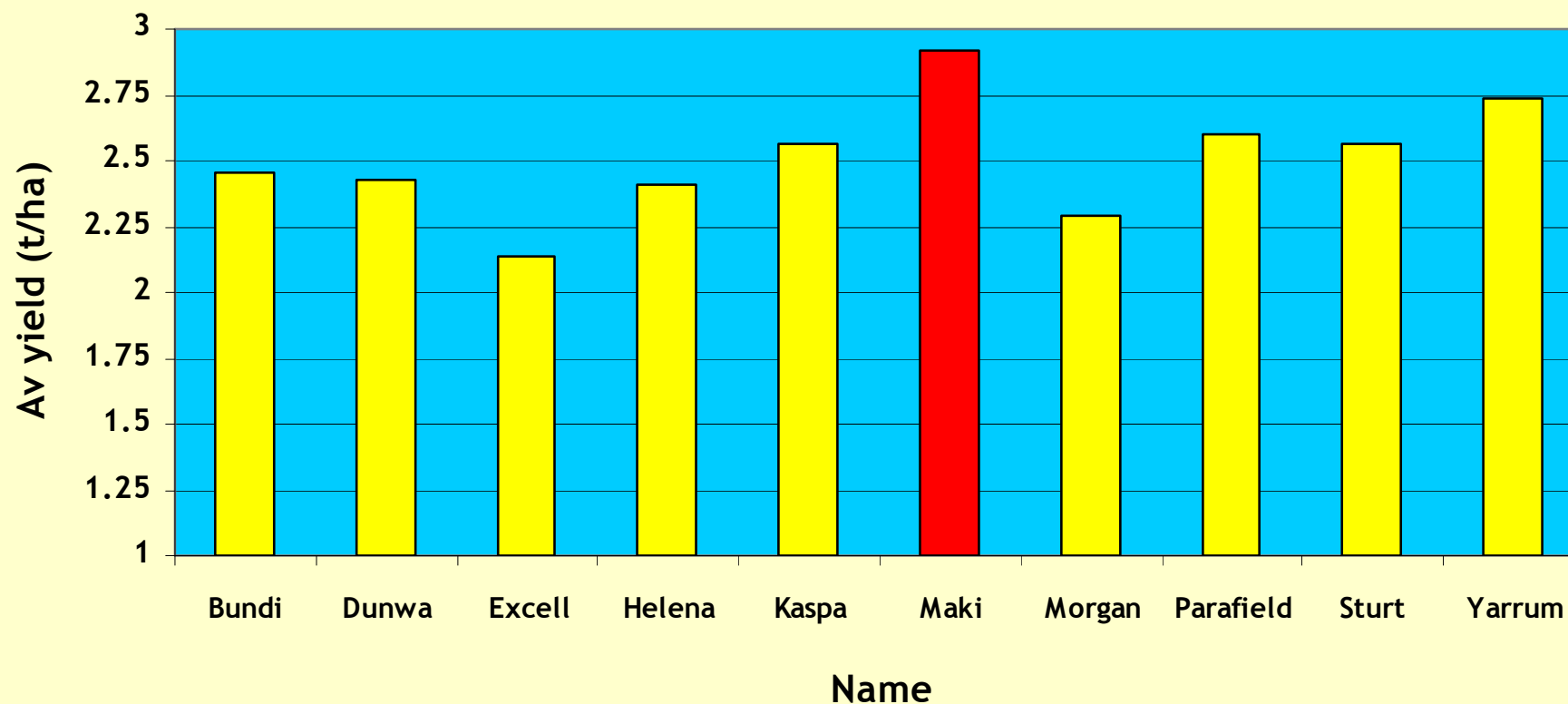
# REGIONAL YIELD PERFORMANCE - NSW NORTH 2006 TO 2008

Mean yield (all sites) S4 - 2006 to 2008

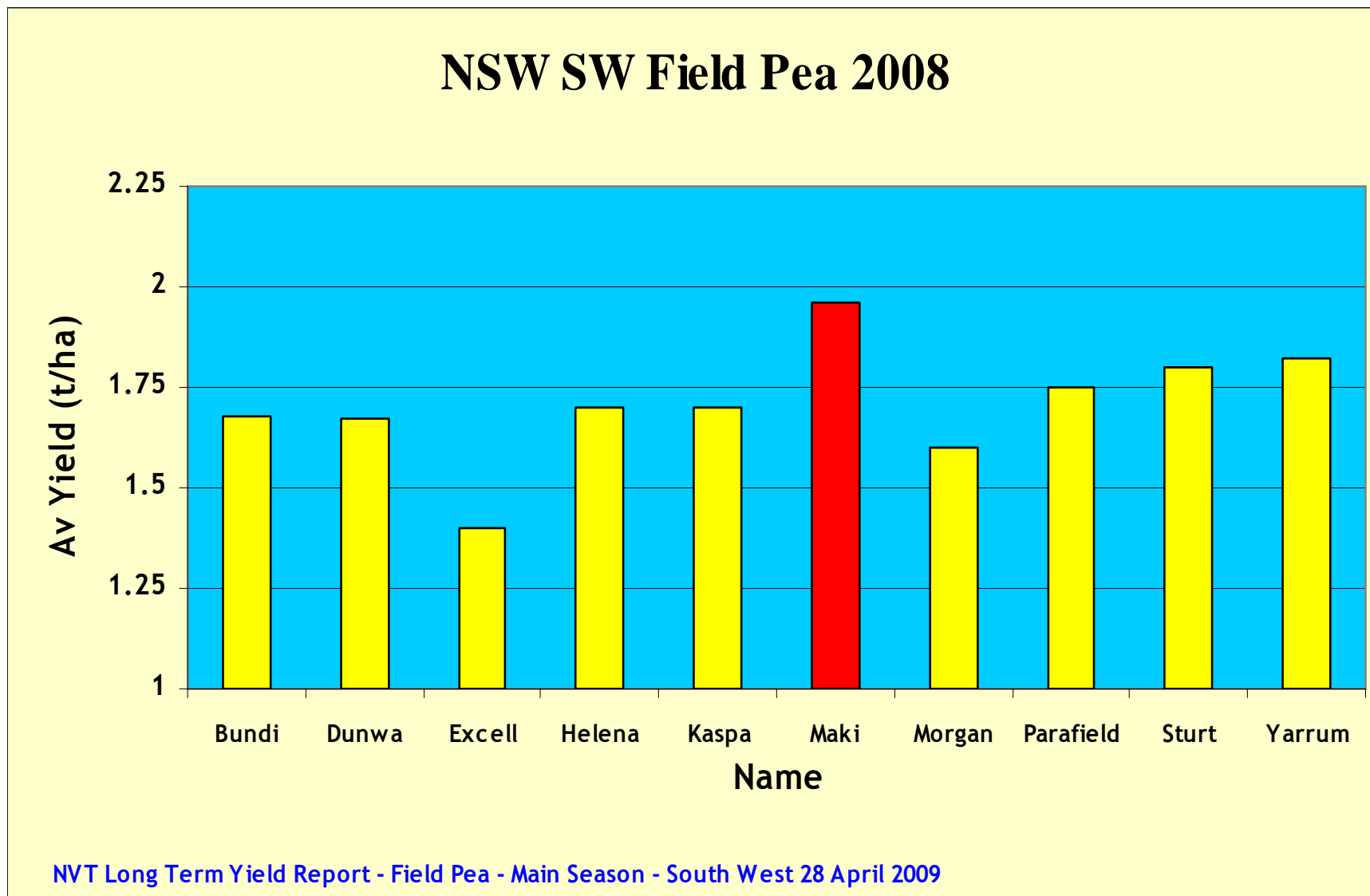


# REGIONAL YIELD PERFORMANCE - NSW SOUTH EAST (Young-Albury)

## NSW SE Field Pea 2008



## REGIONAL YIELD PERFORMANCE - NSW SOUTH WEST (Leeton-Deniliquin)





# Uni Sydney, PBI Narrabri FIELD DAY LAUNCH OF "MAKI", October, 2008





Maki in August at Biloela, that is expected to out-yield adjacent chick peas despite the very tough season



# Triticale Breeding

- The main production areas of triticale are in NSW (50%) and Victoria (30%)



# 1A-102 Triticale breeding program



- Two new varieties, JRCT74 and JRCT101 have been identified as superior varieties in DE content and yield.
- JRCT74 (Berkshire) is being bulked up this season for larger scale commercial release in 2010 (Waratah Seeds).
- Berkshire is being grown by pork producers (under contract arrangements or directly) for harvest in 2009 in NSW (Rivalea and Windridge), Victoria, SA and WA.
- Develop controlled marketing systems between grain growers and pork producers.

# *Comparison of triticale varieties*

Triticale	Summary of yield trials, 2005-2007, (% of Tahara)	DE content (MJ DE/kg)
Berkshire	116	14.5
JRCT101	119	14.2
Kosciusko	107	13.9
Tahara	100	13.9
Jaywick	112	
Hawkeye	111	

The average (and range) of the DE content of 237 samples of triticale collected from the 2007 variety trials was 13.71 (13.2-14.5) MJ/kg

## Triticale variety trials in Victoria in 2007 and 2008 (tonnes/ha)

<i>Trial site</i>	<i>Rutherglen 2007</i>	<i>Yarrawonga 2007</i>	<i>Rutherglen 2008</i>	<i>Yarrawonga 2008</i>
Variety				
<b>Berkshire</b>	<b>3.96</b>	<b>1.00</b>	<b>3.47</b>	<b>1.98</b>
Hawkeye	3.96	1.11	3.19	2.11
Jaywick	3.69	1.17	3.18	1.91
Canobolas	3.85	0.62	3.49	2.14
Tahara	3.50	1.03	3.36	1.67

## Triticale variety trials in South Australia in 2008 (tonnes/ha)

<i>Trail site</i>	<i>Narracoorte</i>	<i>Snowtown</i>
Variety		
<b>Berkshire</b>	<b>6.07</b>	
Hawkeye	5.87	1.65
Jaywick	5.94	1.52
Canobolas	5.87	1.84
Tahara	5.77	1.46
<b>JRCT101</b>	<b>6.18</b>	

# *Effects of grains on feed: gain in weaner pigs (First project involving 40 grains)*

<i>Grain</i>	<i>Feed: gain</i>
Sorghum 1	1.57
Sorghum 2	1.42
Wheat 1	1.42
Wheat 2	1.22
Barley 1	1.37
Barley 2	1.24
<b>Triticale 1</b>	<b>1.35</b>
<b>Triticale 2</b>	<b>1.09</b>



# Wheat breeding

# ***New-Wheat and barley breeding program***

- Project has been developed by Intergrain (WA), DAFWA and Murdoch University and began on July 1, 2009.
- Based upon high yielding, soft wheat varieties of wheat that are not suitable for bread making.
- Similar strategy will be used involving plant breeders, agronomists, grain growers and end users (feed mills and pork producers)
- Initially, NIRS scan over 100 high yielding varieties to identify the high DE varieties.
- In 2009, over 100 wheat lines and 25 barley lines were planted in 19 sites in WA, SA, Vic and NSW.



# Sowing high yielding wheat and barley lines in 2009



- Western Australia
  - Ballaying, Darkan, Meckering, Bullaring, Dandaragan, Katanning, with bulk-up of lines at Dandaragan
- South Australia: 4 sites
- Victoria: 4 sites
- NSW: 5 sites
  
- Berkshire and Shepherd as well as “control” varieties have been planted at each site for comparison.



# Feedgrain Update Summary



- Pork CRC has a major focus on reducing the cost of grains
- Use of NIR technology is an important component
- Developing high yielding and high energy cereal grains and pulses in pork producing regions.
  - Barley (Shepherd), triticale (Berkshire), and field peas (Maki) released in 2009.
  - Further varieties will be developed
- Concentrate on peas and barley in northern Australia. Wheat, barley and triticale in other areas.
- Pork producers and grain growers who want to grow/use these new varieties should contact the respective seed company and/or the Pork CRC.