



SEPWA and Liebe's Young Growers' Tour Report

2008

Participants

Twenty-four young growers mainly from SEPWA and the Liebe Group participated in a tour to Perth in July 2008.

DAY BY DAY ITINERARY

Day 1: Sunday 20th July

- Travel to Perth
- Meet and greet dinner

Day 2 Monday 21st July

- CBH Kwinana Grain Terminal for site visit
- Mash Brewery for site visit and lunch
- Rabobank Sundowner at the hotel

Day 3 Tuesday 22nd July

- CBH Metro Grain Centre and Australian Grain Centre visit for site visit
- Joe White Malting for site visit

Day 4 Wednesday 23rd July

- Department of Agriculture and Food South Perth to see plant breeding facilities and quality control labs.
- Miller's Food (Flour Mill) for site visit
- Fremantle Prison Tour and dinner at Sail and Anchor Brewery

Day 5 Thursday 24th July

- Rural Media Association Breakfast
- Separate itinerary (SEPWA):
- Summit for site visit and tour
- Nufarm for tour and sundowner
- Separate itinerary (Liebe Group):
- Wellard Feedlot Baldivis for site visit
- CSBP Labs in Bibra Lake for site tour
- Alcock Brown Neaves Group for site visit and off farm investment presentation
- Sponsors' dinner at Soprano's Ristorante and Pizzeria in South Perth

Day 6 Friday 25th July

- Final breakfast at hotel, with tour debrief and return home.

The Young Growers' Study Book is attached.

OBJECTIVES OF THE TOUR AND HOW THEY WERE MET

1. To increase the knowledge of young growers concerning the impact of grain quality standards on end use products and how growers can achieve standards and improve grain quality.

Participants visited manufacturing companies including Joe White Malting, CBH Kwinana Grain Terminal, CBH Metro Grain Centre and Australian Grain Centre and Millers Food (Flour Mill) and received presentations from key personnel, which enabled the growers to gain a greater understanding of the requirements of particular grain qualities to achieve the highest standard of production for end-use manufacturing.

2. To increase growers' knowledge of the different ways in which grains are value added and made into different products.

By visiting organisations which value-add grains, the growers gained a greater understanding of specific requirements of particular value adding business, the impacts of not meeting specifications and the requirements to make a venture successful. This was achieved by visiting - Wellards livestock feedlot in Baldivis, Mash Brewery and CBH Group Metro Grain Centre.

3. To strengthen relationships between growers within and outside the region. Also encourage greater participation of the younger members in SEPWA and Liebe Group. This was achieved through various planned social activities and interaction in the evenings (ie meet and greet dinner, brewery visit, Fremantle Prison Tour, Rural Media Breakfast, Sponsors dinner and the Rabobank sundowner). This trip was targeted at younger growers and the tour leaders actively sought individual participation throughout the study tour (ie see Learning Diary) encouraging leadership within the group.

The trip was so successful that the Liebe Group and SEPWA are planning to run another joint young farmers tour to Victoria in 2009.

4. To expand growers' networks of people including researchers, other farmers and people associated with value adding and breeding grains.

This objective was achieved by providing each participant networking opportunities and a comprehensive contact details list for each of the tour participants and the various industry experts visited and networks created through a trip such as this one.

COMMUNICATION OF THE OUTCOMES OF THE TOUR

Liebe and SEPWA representatives wrote a media release together about what participants learned on the tour and tour outcomes. Reports will be placed in Liebe and SEPWA newsletters and websites, Grower Group Alliance newsletter, local papers and rural media for WA.

Gemma Walker was interviewed twice on the ABC Radio Rural Report and Lyndon Mickel was interviewed for the RadioWest Rural Focus programme.

A number of tour participants are invited to speak at a SEPWA and Liebe Group Major event to reach local growers and SEPWA and Liebe Group members

Tour Learning Report and Diary will be placed on the Liebe Group and SEPWA websites.

Participants' Tour Diaries.

CBH Kwinana Facility

By Jeff Pearse

The Young Farmers' Study Tour for 2008 was kicked off by a visit to the CBH Kwinana Grain Terminal. Site Operational Managers Justin and Garry guided the group through all facets of the facility.

The tour began at the Rail Unloading Facility which is the primary receipt method of grain at the terminal. Four conveyors transport grain from two unloading grids at a maximum rate of 4,000tph to the elevators. Total in loading from trains can vary from 3-9 million tonnes a year depending on the season and availability of ships. In downtimes the facility is regularly maintained and cleaned for quarantine purposes. It takes only 15 minutes to change the type of grain received.

The terminal has a maximum storage capacity of 1,032,700 tonnes. This is made up of 2 horizontal storage sheds which can hold 523,900t (one of which has 3 compartments to separate grain types), 248 vertical storage cells which can hold 390,400 and 4 open bulkheads which act primarily as emergency storage.

The tour then headed to the viewing point on the 12th level of the Main Workhouse. From there the entire operation could be seen along with the rest of the Kwinana industrial area to the north. It was interesting to get a feeling of just how close the ever encroaching residential areas are immediately to the south of the terminal. Managing environmental and noise pollution was identified as a major priority for Justin and his team in being able to carry out operations continuously whilst ensuring nearby residents were unaffected. An example of this was the direction trains came into the facility which ensured the engines were rarely used adjacent to the residential areas hence reducing noise in the area. The use of an 18km long dust extraction system which removes about 20 tonnes of dust per day was another method CBH used to improve environmental conditions. A private mussel farm near the ship loading jetty made good use of any remaining dust from the area.

The tour proceeded through different levels of the Main Workhouse looking at the different conveyers and elevators along with the sampling area. For every 33 tonnes loaded onto a ship a 5 kg sample is obtained and tested in the onsite lab. This enables CBH to guarantee the quality of the grain being loaded. It is also useful to prevent contamination from possible human error during loading. Ships are loaded via four 291m long conveyors which have a maximum out loading capacity of 5,000tph. Ships range from about 20,000t which would normally be sent to Japan to ships that go to Saudi Arabia which regularly get up to 70,000t. The tour ended with a quick look at the main control room. From there the CBH personnel can monitor all aspects of the terminal and have direct contact with the Patrick's stevedores who are contracted to perform the ship loading.

The group also visited the Granary Museum located on the 6th level of the Main Workhouse. Housed in the museum was an extensive collection of memorabilia representing a timeline of grain receipt in WA with a general theme being 'From Bag to Bulk'. In the early days grain export was an intensively laborious task with each bag being manually lifted from the paddock virtually all the way to the port. One newspaper article showed the headline, '1 Man, 1 Day, 140 tons'. This described the feats of one very fit wheat lumper from Miling

that moved 140 tons (1725 bags) of grain on his own in one day. So each advance in technology and ingenuity was a major breakthrough for the industry.

Some examples of these are described below.

The Clarke Shovel made clearing out a shed a much easier task. The simple use of a gearing system with pulleys attached to a shaped piece of corrugated iron allowed operators to mechanically sweep clean a shed.

The Country Portable Elevator enabled the grain receival industry to expand into the regions making offloading and loading of grain significantly quicker.

Bulk Heads were a significant advance in grain storage which meant receival points didn't need to build more, large expensive sheds. A bulk head could be quickly built and store huge amounts of grain.

These are just some of the many significant advances made by the inventive workforce of the CBH throughout the development of the wheat and grains industry in WA.

The SEPWA-Liebe Group tour of the CBH Kwinana Grain Terminal was informative and thorough. Even though at times it was difficult to hear what Justin and Garry had to say the group was given access to all parts of the facility. The tour gave all participants a greater understanding of where our product ends up after we have delivered it to our local receival point and how it is sent to the rest of the world.

Mash Brewing

By Gemma Walker, Aaron Bridger and Flash Freeman

The Mash Brewery, located in the Swan Valley, provided an insight into the use of wheat and barley. Mash use a variety of different malts here from several different sources. Mash's main base malt is kirin malt from Kirin malting in Welshpool. This is a mixture of two varieties – Baudin and Hamelin. They source the grains all from W.A. from lots of regions – especially South – areas like Esperance and around there. This is a very pale coloured pilsner malt – Mash use it in all of their beers with differing proportions ranging from 10 % and upwards. Overall, it is a good quality malting barley with a light colour and good extract.

For the Mash ale malt, they use is a pale ale malt from Victoria. This variety is Gairdner which Ben, the Mash brewer, believes has been around for a very long time. Mash use this malt in their pale ale, stout and any specialty ales that they brew.

For the Haze (wheat beer), Mash use an Australian wheat malt which is the Rosella variety. This is from Victoria and is excellent quality. A typical wheat beer contains 50% malted wheat and 50% malted barley.

Mash also use a lot of specialty malts – most of them from Weyerman malting in Germany. These are some of the best malts you can use anywhere in the world. These include munich, cara-munich, chocolate malt, acidulated malt, Vienna, etc. We add these for colour and flavour - usually only about 5-15% depending on the beer.

Mash's batch size is 1200 L which supplies the bar in the restaurant, plus the outlet in Bunbury as well as about 10 pubs around Perth where Mash beer is on tap.

CBH Metro Grain Facility and Australian Grain Centre

By Chris O'Callaghan

The tour of CBH facility in Forrestfield outlined the process of handling grain and preparing it for export.

The facility has approximately 4 million tonnes of wheat per year come in and go out of the centre and there is 70 staff members on site to ensure this happens efficiently.

Due to the deregulation of marketing structures, and smaller quantities required by the various grain acquirers, a massive amount of wheat is exported in shipping containers and a large new container-loading facility has been recently built as a result. Around 500 to 1000 containers are loaded every week.

The new container loading facility has the capacity to load 25 tonne into a container in about 2 minutes. There are 2 sizes of containers, 20ft and 40ft however they do not fill the larger containers with much more grain than the smaller containers due to weight restrictions. Trucks are constantly being loaded around the clock and they are mainly exported to South Africa, Japan, and many Asian countries.

The tour then continued on to the new Lupin processing building. The primary aim of this is to prepare Lupins to a standard fit for human consumption. The plant dehulls the lupins and splits it into a protein portion and a fibre portion. The building cost \$12 million and will process 200000 tonnes of lupins annually. This will add long-term value to the lupins industry.

Grain is also moved out of the facility by rail, generally to the Kwinana facility for shipping. The rail trucks are loaded at 1200 tonne/hour which means trains literally do not have to stop moving to wait to be filled. During the harvest period the trains are constantly being loaded to free space at the facility. This process needs to be efficient as the centre is always about 95% full and has little room to move in this regard.

Large magnets are used to physically clean metals out of the grain. Grain is passed through the magnets at around 1000 t/hour. Spanners, nuts and bolts, fencing and many other contaminants are extracted from the grain.

All grain is also cleaned at separate plants that gets rid of any white heads and other foreign materials. Some farmers are using this facility to clean their canola rather than do it on farm.

Bags of grain are also filled and loaded at CBH Forrestfield. Approximately 40 containers filled with bags are exported every month.

Australian Grains Centre

This quality testing facility is to ensure quality is kept to standard throughout the supply chain.

The first part of the process is the wet lab. This is where grain is tested for chemical residues such as insecticides and herbicides. This lab also tests for variety information to ensure that what they are testing is in fact the variety it is supposed to be.

All of the states infratech analysers are referred back to this centre in Forrestfield. Any faults in any of the states machines can usually be fixed from this lab.

The machines that measure protein are worth about \$90000 each. They work by pelletising the wheat germ and then incinerating them at extremely high temperatures. From this Nitrous gasses are released and protein can be calculated from the amount of gas released.

Falling numbers test is performed by turning the wheat germ into a slurry by adding water. Then the resistance of this wheat slurry is measured and this resistance is converted into a

falling numbers result. This is a problem associated in higher rainfall areas when rain during harvest is common. This test is to ensure dough quality remains high – when wheat gets wet, the starch in the seed is converted to sugar to assist in germination. However when this happens poor quality dough results when the wheat is milled.

This facility hold a stack sample of every grain stack in the wheatbelt. A sample is held in a cool room so there is a quality reference for all the stacks in one location. There is about 1500 samples kept in the cool room.

Finally, CBH is developing a on-farm infratech which will be called 'SOFIA' (Small On-farm infra-red analyser). This will increase capacity for on-farm grain testing with continuing updates being available.

Report by Lyndon Mickel

Located at the Metro Grain Centre at Forrestfield, the Australian Grains Centre provides grain analysis services for the agricultural sector. Shown around the facility by Ian Sproule, one of the first things that stood out was the minimal number of staff on site. With most of the processing automated, a core full time staff of only 12 was maintained. The main aim of the AGC staff is to maintain grain quality right through the supply chain, with a large emphasis placed on traceability, especially as over 100,000 samples go through this facility in a 12 month period.

All samples from CBH bins around the state are sent to AGC, where they are placed into cold storage at a temp of 8oC to stop insect infestations and stop the requirement of fumigation. Samples remain on site for up to 12 months, so this is seen as essential. These samples are used to test that varietal stacks are as stated, and that the quality that customers require is maintained. They also handle any official disputes that are raised during harvest by growers.

Shipping samples are also kept here for reference purposes, to resolve any disputes if raised.

Testing that occurs at AGC includes varietal identification, using the DNA profiling procedure, pesticide residue, in grain and also dust from the MGC storage facility, and new variety quality assessment. With Japan testing for over 400 pesticide residues, this is important that any contamination is picked up before it is loaded onto a ship. The process that they use for the variety id is slow, as it takes 3 and a half days, and relies heavily on the skill of the tester to match the DNA charts. This is only carried out for customers and due to the test length; grower varietal id's are outsourced to keep up with demand.

The other key role that is carried out at AGC is the testing, calibration and maintenance of the machines that are used in the testing at the sample huts at harvest. There are 420 infratecs and 50 falling number machines situated throughout the state, and I'm sure most of those falling number machines are situated along the south coast of the state.

Finally, we were shown the new smaller version of the infratec, to be known as SOFIA (Small on Farm Infratec Analyzer). There are only a limited number of these available this year; however the asking price of \$18,000 may hinder the uptake by growers.

Thanks must go to Ian Sproule, and the staff of AGC for giving up their time to show us around, giving the growers on the tour a greater appreciation of what is involved in the testing of their grain.

Joe White Maltings Tour

By Adrian Perks and Gemma Walker

Joe White Maltings (JWM) was built in 1997 to the capacity of 90,000T malt per year. Stage 2 was commissioned in 2006 to expand the capacity to 200,000T per year.

Metro Grains Centre receives, stores and cleans JWM barley. It also stores and sends out JWM malt. The plant has steeped over 1,000,000T of barley from which it has produced 890,000T of malt. Twenty-four staff are employed to manage and operate the plant. A point of interest was that during the recent gas shortage, the plant shut down for about six weeks and the staff used annual leave instead of being made redundant.

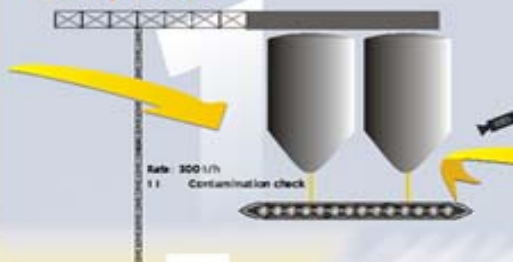
The malting procedure occurs over six stages:

- **Barley Cleaning (at MGC)**
 - Raw barley weighed
 - Scalper/aspirator – remove coarse contaminants/dust
 - Magnet – remove tramp iron
 - Gravity table – remove stones & low density impurities
 - Disc cylinder separator – length separation of long oats, heads & bearded barley & short impurities from good barley
 - Debearding – threshing of barley from heads & bearded grains
 - Uniflow cylinders – recovery of good barley from threshed material
 - Trommel grader separator – width separation of good barley from thin grain
 - Cleaned barley weighed.
- **Steeping**
 - One day duration
 - All conveyors & elevators fully enclosed
 - All barley given final scalp & aspiration prior to steeping
 - Barley batched weighed into process
 - Barley run sample collected
 - Cylindrical/conical stainless steel steeps
 - Barley transferred into steeps as slurry
 - Steep water town supply
 - Steep water chilled to 180C
 - Grain temperatures 20 –250C
 - Two wet phases, two air rests
 - Steeps auto skim
 - Continuous aeration during wet phase
 - Steep HP air cooled
 - Continuous CO2 extraction during air rests – 1 m³/T/min
 - Steep level temperature controlled by two air conditioners
 - Moisture content after steeping - 37 – 39%
 - Dry casting
- **Germination**
 - Four days duration
 - Circular stainless steel lined germination vessels
 - Steeped barley transferred into GV via belt conveyors
 - Seeger turners load/unload the GVs
 - Two variable speed fans – 16 m³/T/min
 - Spinning discs for humidification
 - Two water turns – 48 to 56 kL
 - Maximum green malt moisture 43-45%
 - Dry turns every 8 – 12 hours
 - Germination air cooled
 - Germination temperature 18 – 160C
 - Bed depth 1.4 – 1.6 metres.
 - Green malt transferred to kiln via belt conveyors

- **Kilning**
 - One day duration
 - Circular stainless steel lined kiln vessel
 - Seeger unit loads/unloads the kiln
 - Two variable speed fans – 65 m³/T/min
 - Three natural gas fuelled indirect heaters
 - Glass tube heat exchanger
 - Direct exhaust air recirculation
 - Final malt moisture 4 - 5%
 - Kilning temperatures 60 – 850C
 - Bed depth 1.0 – 1.1 metres.
 - Kiln run sample collected during kiln to analysis bin transfer
- **Malt Cleaning**
 - Capable of blending from analysis bins
 - Rotary magnets – to remove tramp iron
 - Westrup deculmers – remove culms/rootlets
 - Schmidt shaker screens – width/length separation good malt from large particles and small grains
 - Cleaned malt batch weighed
 - Cleaned malt run sample collected
 - All conveyors & elevator fully enclosed
- **Malt Outloading (at MGC)**
 - Malt given final aspiration prior to outloading
 - Malt sampled collected and inspected
 - Rail – Kwinana for bulk hold shipments
 - Export containers – bulk & bagged
 - Bulk tippers

PERTH PLANT PROCESS FLOWCHART

Barley Intake



Transfer to Steeps

- Rate: 500 t/h
- 2.1 Time
 - 2.2 Barley variety
 - 2.3 Tonnage
 - 2.4 Moisture
 - 2.5 Protein
 - 2.6 Extract Potential
 - 2.7 Diastatic Power Potential

Transfer to Germination



Steeping



- Capacity: 4 x 500
Duration: 12-20h
- 3.1 Time
 - 3.2 Temperature
 - 3.3 Humidity
 - 3.4 Dissolved Oxygen
 - 3.5 Status: Loaded/Run loaded/Wet/Air Rest
 - 3.6 Grain Level
 - 3.7 Water Level
 - 3.8 Aeration
 - 3.9 Carbon dioxide wet reaction

Germination

- Capacity: 4 x 500
Duration: 96h
- 4.1 Time
 - 4.2 Temperature
 - 4.3 Humidity
 - 4.4 Moisture: Clean Malts
 - 4.5 Water Addition
 - 4.6 Time
 - 4.7 Air Recirculation
 - 4.8 Fan Speed



JOE WHITE MALTINGS LTD.



Transfer to Kiln



Transfer to Malt Analysis Bins

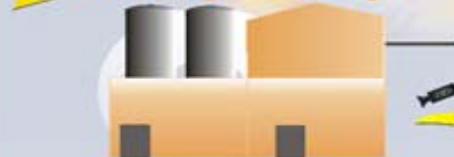
- Rate: 200 t/h
Capacity: Analysis bins 4x270
- 5.1 Moisture
 - 5.2 Extract
 - 5.3 Colour
 - 5.4 Diastase
 - 5.5 Soluble Protein
 - 5.6 Total Protein
 - 5.7 Soluble Protein
 - 5.8 Viscosity
 - 5.9 AAL
 - 5.10 Beta Glucan
 - 5.11 Alpha Amylase
 - 5.12 Beta Glucanase
 - 5.13 Viability
 - 5.14 NDMA

Kilning



- Capacity: 300t
Duration: 19h
- 6.1 Time
 - 6.2 Temperature: Air on (3 point) Air off (1 point)
 - 6.3 Ambient Temperature
 - 6.4 Ambient Relative Humidity
 - 6.5 Air Recirculation/Fresh Air
 - 6.6 Fan Speed
 - 6.7 Air Pressure Differential

Malt Cleaning and Storage



Malt Outturn



- Rate: 50 t/h
Capacity: Malts in 2x600t
Duration: 7-10 days
- 7.1 By Products
 - 7.2 Tonnage
 - 7.3 Moisture
 - 7.4 Extract
 - 7.5 Colour
 - 7.6 Diastase
 - 7.7 Total Protein
 - 7.8 Soluble Protein
 - 7.9 Viscosity
 - 7.10 AAL
 - 7.11 Beta Glucan
 - 7.12 Alpha Amylase
 - 7.13 Beta Glucanase
 - 7.14 Viability
 - 7.15 NDMA

Department of Agriculture and Food WA

By Tim Pohlner

The Department of Agriculture and Food WA is one of the most influential influences in the agricultural industry, with its primary aim to increase agricultural productivity, efficiency, and profitability. A large proportion of information which is passed onto farmers from one source or another originated out of the Department of Agriculture, so not surprisingly I found our tour of the department one of the highlights of the entire trip.

The Department of Agriculture and Food (DAFWA) focuses a lot of its attention on working with plant breeders to assess new varieties on key performance indicators. Though a lot of people working in the grain production industry focus on the key feature of new varieties being yield and disease resistance, the real important aspects of grain varieties are their end use characteristics such as malting, colour, and dough strength properties. Without these desired properties grain that is produced from new varieties may not find itself a market.

The tour of DAFWA started touring the grain quality laboratories which determine the physical grain characteristics of present and potential grain varieties. Assessing the grain characteristics of wheat is the main focus of this department. They are extensively used to screen new varieties, determining which quality category it would fall into and whether the variety meets the export customer's specifications. Traits such as dough strength, protein, colour and baking qualities are all tested within this facility. The barley laboratory examined the malting and brewing characteristics of barley varieties. The different malts which W.A.'s barley produces and what beers they are suited to, was also explained. Baudin was viewed as one of the best malting varieties which in turn is most sought after from our export customers. Sterling and Schoona have some of the worst malting characteristics of our presently grown malting barleys.

Intergrain gave a presentation to the group over morning tea, explaining that the company is newly formed and being owned by the Government of Western Australia, and the Grains Research and Development Corporation (GRDC). The grain breeders, scientists, and technicians have come across from the (DAFWA) where they have up to date bread varieties such as Wyalkatchem, Caramah, Calingiri, Arrino and Westonia. The company's new objective is to breed varieties of grains to address environmental constraints which are faced throughout the Western Australian grain growing environments. To better service the differences in environment throughout the Western Australia Intergrain has established 14 sites across the different Ag zones in W.A, with a total of 180,000 plots.

Intergrain's primary breeding focus is breeding more reliable and higher yielding varieties of wheat. Their approach is to breed for abiotic stresses which reduce yield throughout W.A. These stresses include drought, Aluminum toxicity, Boron toxicity, Drought and Water logging. As well as breeding for reliable high yielding varieties milling quality is also a primary focus on breeding new varieties. This is extremely important due to 95% of W.A wheat being exported. To best breed for grain quality, the milling characteristics of W.A's export customer's needs must be established, as well as improving basic grain quality characteristics such as hectolitre weight, screenings, black point and sprouting.

Developing disease resistant genes within new varieties is extremely important. Due to diseases constantly evolving such as rust multiple rust resistant genes must be incorporated into emerging varieties in order to get longevity out of its rust resistance ability. The three different strains of rust on wheat is the most focused on disease in wheat, though improved disease resistance for Septoria Nodorum Blotch, Septoria Tritici Blotch, Yellow Spot are also aimed for. The breeding processes which are used by the Intergrain breeders involve F2 progeny, Backcrossing, Double Haploid, and Single Seed

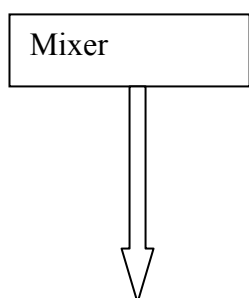
Descent. The ability to bulk breed as well as use Marker Assisted Selection Methodologies also contribute to faster and more accurate breeding.

After the talk from Intergrain finished the group proceeded to Fungal Leaf Disease Research and Development Facility. The diseases which are presently being explored due to their economic significance are Rusts which are made up of Stem, Leaf, and Stripe as well as Stagonospora nodorum blotch (SNB), Septoria tritici blotch(STB), Yellow spot, Flag smut, Powdery mildew. The plant pathologist showed the group through the steps of how they go about culturing the specific disease and then evenly infect the specific plants. The ability of the plant breeders to control the species of disease and create an even infection over the entire group of new varieties of plant means that they are a lot more confident in the level of disease resistance which they claim their new varieties have.

The Abiotic stress facility was followed on to; this facility replicated abiotic stresses which we encounter through out the grain growing regions of W.A. Abiotic stresses which have been examined include Drought, Water logging, Salinity, Frost, Microelement Toxicity, Phenology, and Sprouting. Through the large scale of genetic breeding which has historically occurred by default, breeders have been breeding for tolerances to abiotic stresses. Recently it has been identified that the wheat varieties Wyalkatchem, Westonia, and EGA Bonnie Rock have all got substantial tolerance to drought. The tolerance to abiotic stress is why at present different varieties suit different areas. The breeders explained the huge opportunity to develop better tolerant varieties to the stresses which are encountered.

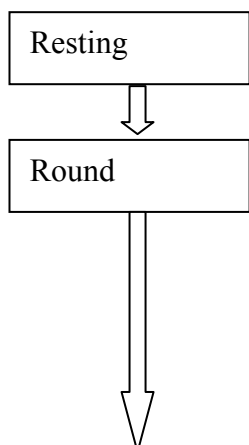
Bowvell Bakery Tour

By Clinton Hunt and Jodi Duncan



The first step in the industrial baking process is mixing and it is one of the only steps of the process which includes the use of manual labour. Flour, which is received in bulk from Millers Flour, Byford, is measured out and mixed with other ingredients to combine them and stretch the gluten in the flour. The dough is mixed at 28 degrees. A batch of wholemeal bread is mixed for approximately ten minutes while a batch of white bread is mixed for six minutes. Each bowl holds 120 kg of flour which, when combined with other ingredients, produces 205 loaves of bread.

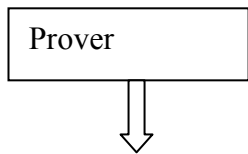
The mix is lifted by hoist and is poured into a weighing machine that cuts the right amount of dough. Loaves are weighed at precisely 770 g which results in a loaf with a final cooked weight of 680 g.



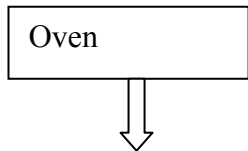
The next step in the process involves the dough being quickly shaken, after which it is rested for 20 minutes.

The dough for each loaf is then divided into four. This is an important step in the process because it prevents the final loaf product from having a rounded top thus ensuring the final product is square in shape. At this stage in the process it is worth noting that food grade vegetable oil is used for lubrication on the conveyor at all stages of the process which deal with raw dough. To preserve the quality of gluten in the dough it is necessary to keep everything

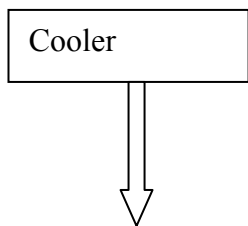
lubricated to prevent the dough from sticking and reduce the amount of handling of the dough.



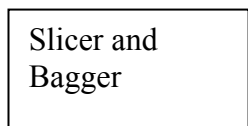
The dough then passes through the prover which produces a hot, humid environment that encourages the yeast to work and the bread to rise. It spends 45 minutes in the prover before moving onto the next stage.



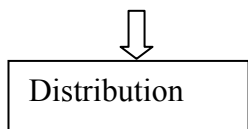
A lid is placed on each mould before cooking. The bakery contains a tunnel oven, through which the conveyor chain moves to cook the bread. The cooking time for a loaf of bread with a final weight of 680 g is precisely 23 minutes and 22 seconds!



Following cooking a magnet removes the lid from the tin, and a vacuum machine sucks the loaf of bread from the tin. The cooked loaf is placed on a mesh conveyor before it moves into the cooler. The cooked loaves then travel along the conveyor to an area where they are allowed to cool down for 2 hours, as hot bread will not slice. The cooling process is the most time consuming part of the process, however it is necessary because the bread can not be packaged while it is still warm.



The final step in the automated process involves slicing and bagging. The entire process takes four hours from start to finish. Production starts at 6am and mixing finishes at approximately 5pm however the factory does not close until 9pm when the final mixed loaves are bagged and packaged.



The bread from Bovell's Bakery is distributed throughout the metropolitan area from Quinns Rocks in the north to Mandurah in the south. The biggest customer is IGA and Supa IGA. Deliveries start at 11 pm and finish by about 6 am which is necessary because consumers wish to have access to fresh bread every morning.

Bovell Bakery only bakes bread and it bakes 14000 to 15000 loaves each day. Approximately 600 loaves per day are wasted and this wastage is blamed on faults or problems in the automated process. The wastage products are sold to local cattle farmers as a feed source. The bakery employs 20 people in roles ranging from managing staff to baking the bread. While the factory is almost fully automated, six people are required to run the factory in roles including mixing, packaging and supervision, and eight truck drivers are employed for distribution.

Miller's Foods

By Aaron Bridger

Miller's Flour Mill is situated in Boddington. This flour mill distributes bagged flour into Perth and as far out as Kalgoorlie, Esperance and Albany. They buy most wheat straight from CBH but also from the farm gate. They aim to buy the highest protein and lowest moisture wheat they can so they can wet it to 14% for extra profit. They have their own testing equipment to monitor loads and quite often blend it to clients' specifications. They buy in any variety as long as it meets APW or preferably hard grade.

The flour making business is reasonably simple:

- First the wheat goes through a seed cleaner removing all contaminants.
- It is then sorted as to its density by a vibrating platform
- A vacuuming device removes dust.
- Enough water is added to increase moisture to 14%, it is left to sit for 24 hours whilst grain intakes moisture
- It passes through fourteen different grinders which gently shave the outside of the grain and dust is vacuumed away after each.
- A big sieve removes bi-products (flakey bran, mill mix, pollard) are removed.
- The flour is then “blown” over to the mixing shed where ingredients such as sugar, salt and various additives are added before bagging
- The flour will be bagged in either 10, 12 or 25kg bags depending on clients’ requests.
- The end product is trucked out every night ready for baking in the morning.

The mill averages 3.4T of flour per hour and produces about 260T per week. The wheat is 78% flour ie 1000kg will make 780kg of pure flour. Upon leaving I noticed a missing finger on the main man. Yes, it was a bi-product of flour!

Rural Media Association Breakfast

By Ryan Meldrum

Essentially Prof Siddique’s presentation was based around the global trends of agriculture.

Siddique mentioned first of all some issues that are a concern to the human race on a global scale.

- Humans need food and therefore it is critical to maintain supply.
- Food, nutrition, bioenergy, the environment and human livelihood are global concerns.
- There are approximately 800mln people throughout the world that are suffering from malnutrition.
- Gone are the days of cheap food – prices for the end product are increasing...
- The current world food crisis IS a major problem on international, national and local levels.

He touched on the 5 major trends that are prevalent at the moment.

1. Increased population on a global scale – production of food NEEDS to increase to supply the growing population.
2. There are changing food preferences – there is a demand for increased food standards led by the economic growth of Asia and particularly China combined with the grain stocks at the lowest in history.
3. Food production must be increased in a *sustainable* way. Overall yield per Ha needs to be increased in light of the current land degradation issues. One option Siddique mentioned was to increase the WUE – as it is evident farmers are not receiving more rainfall on average.
4. Increasing cost for cropping inputs. Fertiliser has increased which is directly correlated to the increase cost of oil.
5. Climate Change – massive issue facing the world at the moment. Countries are getting drier, water flows are reducing rapidly so there needs to be a focus on adopting strategies to combat climate change on a local level – plus everyone needs to participate. Breed varieties could possibly be one option in combating climate change.

A few other points Siddique mentioned included;

- Western Australian yields are increasing on average however there is an increase in the extreme highs and lows...
- He believes the adoption of GM crops is essential. This technology is being used widely throughout the world but not in Australia.....very deep and complex issue that can cause huge debates...!
- I think an important point Siddique raised was the optimisation of inputs. It is a given that the cost of these are increasing significantly therefore it is imperative farmers get the most use from them. This can be achieved through variable rate and yield mapping technology which is beginning to play a major part in farming operations around WA and Aus.

** I quick point from me – the days of simply waiting for the break and ripping up, seeding, spraying and harvesting are long gone. Farming is such a complex business these days it requires a large amount of management – in all areas too. I think the quicker farmers (particularly the older generation) can realise this and begin to adopt new technologies that will improve efficiencies etc the better. And if not.....gross margins will get to a point where it costs farmers the produce food regardless of rainfall. **

Wellard feedlot tour

By Felipe Flores

On the 5th day of the young growers' tour the group was split into two separate itineraries, the SEPWA group went to Summit fertilisers and NUFARM whilst the Liebe Group went to Wellard feedlots and CSBP.

My group was the Liebe Group, my job was to write notes and the vote of thanks to David Kerr the livestock manager.

Before David showed us the feedlot and the shearing shed he told the group about the 20 years of Wellard's history and plans for the future, in that time David said he believes good times lay ahead for the business in the future.

I asked some questions of David about the facility

- How many sheds are here?
10 sheds
- How many hectares?
300 ha
- How many sheep did it receive last year?
700 000
- What market the most part of sheep go after here?
Asia and Middle East.
- How many staff does the feedlot employ?
Usually 15, 20 in busy time.

Then the group went to the feedlot shed and David told us that in that shed is possible to feed between 5000-6000 sheep, and now because lupins are cheaper than others foods he is using this in his feedlot.

I took nice photos on that day, in the shearing shed, the silos, the trucks arriving with sheep, really very nice.

I would like say thank you for this wonderful tour.

Wellards Feedlot Tour

By Gavin Crane

We arrived at the Wellards facility at Baldivis, and were greeted by Gary Robinson. Gary had been with Wellards for 3 months, and with Emmanuels for 8 years before that. He manages much of the live sheep export segment of Wellards business.

The facility at Baldivis is approximately 20 years old, and is where Wellards concentrates their sheep and prepares them prior to loading onto ships in Fremantle for live export. The facility can accommodate approximately 80,000 head of sheep, 60,000 of which can be shedded, with the remainder in paddocks. Sheep remain in the facility usually no longer than a week, in fact, on the day we visited, they were receiving approximately 40 roadtrains of sheep, which were to be loaded on a ship for export within the week.

The process, from receipt to out-shipping, has been worked out over years of practice. Trucks are weighed as they come in to deliver their sheep, and then back up to the unloading ramps. As the sheep are unloaded, they are counted, and inspected to ensure that they are all sound, any ones that appear sick, or show signs of disease, are drafted off. Diseases they look out for include pinkeye and scabby mouth. Once the sheep are unloaded, the trucks are weighed out. The sheep that are suitable for export are then put into sheds, and fed a ration that is produced at Wellards feed pelletising facility at Wongan Hills. The sheep are fed approximately 1.4kg of feed a day, and the facility can use up to 100 tons of feed per day.

Woolly sheep require shearing, and to this end, the facility boasts a 20 stand shearing shed. Due to the fact that many different sheep from many different properties are arriving, the shearing and classing process is as basic as possible. Approximately 15 shearers shear the sheep, with rousabouts classing the wool into basic lines, with no skirting or classing for type. The bales are branded with the name of the ship that the sheep being shorn are going to be on, for accounting purposes. As long as the wool pays for the shearing, that is all the company requires. The comment was made that if they could avoid the need to shear, they would.

The handling and preparation of the sheep is based around the idea of minimising stress to the sheep. Stressed animals do not perform well, and stress can lead to extra deaths. Gary talked about a success rate on the boats of 99.1%. That is, the average mortality rate on the boats last year was 0.9%, which they were pleased with, but always looking to improve upon.

The sheep are inspected a number of times during the day, and any ill sheep, or sheep that have died, are removed from the pens. Sheep that will not make the grade are sold to a pet food company. When the ship is ready to receive the sheep, trucks arrive, are weighed in, loaded, then weighed out, and transport the sheep to the Fremantle Port, about a 45 minute drive, for loading.

The facility has approximately 15 people on staff, and they call in an extra 5 when loading and unloading trucks. The company has a vet on staff at the main office, but they handle mainly feed formulation. For issues with livestock at this facility, they have a consultant vet they call in. The ration can change in composition depending on different factors, including the requirements of the animals, and the cost of different feed sources. Sheep are treated for scabby mouth on the source farm before being sent to Wellards, and for sheep bound for Saudi Arabia, this needs to be done by an accredited person, with treated sheep being tagged. This is a particular requirement of the Saudis.

The shed the sheep are kept in are raised, with mesh floors. Feed is delivered into troughs that form part of a dividing wall which runs down the centre of the shed, with water troughs on the outside walls. Each shed can hold between 5000 and 6000 head. There are 3 people on staff who deal with the removal of the manure from below the sheds, which is then sold in bags to the public.

Wellards currently use 4 ships for live export, two smaller ones which can hold approximately 20,000 to 30,000 dse, which mainly do cattle, and two larger ones, one with 120,000 dse capacity, and the other with 80,000 dse capacity. The company also has 2 more large ships on order. The majority of the live sheep trade is undertaken in the Middle East, with competition coming from African countries, which do not have the same transportation costs. Last year the company exported between 600,000 and 700,000 head of sheep, and are targeting 1.1 million head this year, of which 80% come from Western Australia.

The company's main competition domestically comes from Livestock Shipping, which has Jordanian connections, and Emmauels, which has strong ties with Kuwait. The strong Australian dollar has been a particular challenge, with the company dealing in US dollars. A US\$40 sheep in WA will need to fetch US\$120 for it to be profitable, and this can be difficult against competition from Africa. However, the company believes that there is a strong future in the live export trade, and this is reflected in the ordering of 2 new, state of the art ships. At all times during the tour the point was made that the welfare of the animals is the most important aspect of the operation. Not only does the company need to keep animals healthy and as stress free as possible for financial reasons, but they also genuinely care about the welfare of the animals they trade.

CSBP Testing Laboratory

By Aaron Bridger

The CSBP testing laboratory is only five years old and is one of the biggest in Australia, doing approximately sixty thousand NuLogic soil tests a year. They can also do around five hundred plant tests a day. They actually do as many tests for the CSIRO in various others as they do for farmers.

The first process is to put soil tests into a big oven to dry soil out, also Eastern States samples are heated to 80°C to kill any diseases. Three of the plant tests and six of the soil tests are very routine and are pushed through like clockwork. It seemed that most tests had nitric acid added to them and the colour change indicates results. Nitrogen is measured by the CO² following a simple test. The scientists spend more time grinding, sorting and preparing samples than the machines they use to measure them.

CSBP spends a lot of time conducting their own trials and testing procedures and constantly researching other company's results. Finally we worked out that not all scientists are strange, because Marion who conducted our tour was an absolute crack up!

Alcock Brown Neaves Group

By Chris O'Callaghan

The Alcock Brown-Neaves group comprises of 15 building companies including T&R Homes, celebration homes and others. Between all the companies, 3500 homes are built annually. The group also sees apprentices as a very important asset to the industry and hence the group hires up to 420 apprentices at any one time.

A key product they have is the "turn-key" product which is where, everything from suburb research to finance to building is taken care of by the company. This is great for those investors not wanting to spent time on doing these things themselves.

Some key advice for investors is to buy now as steel prices are going through the roof and will filter through to the building industry. It is always advantageous and safe to invest close to the city. Also advisable not to skimp on furniture or décor as this is important to keep a good resale value.