

Introduction

A group of 27 Australian farmers and agronomists travelled to Canada, and the US, with the assistance of a \$15,000 travel grant from GRDC, to explore innovative agricultural practices. Our main focus was on GM technology, biodiesel and no-tillage agriculture. Two Australians (Brad and Rebecca) briefly joined the tour in Manitoba or Saskatchewan. Below is also a summary of the key points from Bill Crabtree's perspective (tour leader). The technical program is outlined below this and after which there is an overview of some of the tour participant's feedback.



Front row: John Buckley, Dan Grigg, David Wreford (Canadian), Bill Crabtree, Jason Coleman, Ruda Edwards

Second row: Dot Clayton, Jill Sloane, Marcia Buckley, Val Gregg, Meeky Carter, Heather Cosgriff, John Modra, Tony and Barbara Quartermaine, Pamela Caphorn, Ron Edwards

Back row: Dix Sloss, Brad Smoker, Neil Mott, Andrew Longmire, Terry Kiley, Jo and Ian Guest, Ken Clayton, Jason Coleman, Rick Hatfield, Brian Gregg, David Swiatkiwsky, Brian Caphorn

Summary of key issues learnt:

- GM technology as used by Canadian farmers is “taken in their stride”, 83% of their canola is GM
- GM canola in Canada yields are about 75% of their wheat yields in t/ha
- We found no controversy in the field of GM science or application, despite searching for it
- Farmers believe GM technology has helped them to improve yields, manage weeds and lower costs
- The Liberty Link canola hybrids do yield 30% above the best non-TT canola lines in Canada
- Herbicide resistance is an issue that is researched less now in Canada than it used to be 10 yr ago

- Biodiesel will likely mostly come from canola, *Brassica juncea* does not yield above GM hybrids
- Government assistance, in countries like Germany and the USA, will likely underpin biodiesel
- If all the Canadian canola was converted to biodiesel it would provide 15% of their diesel needs
- Canola specialty oils are going into GM varieties – as farmers are otherwise reluctant to grow them
- We currently eat too many *trans*-fats and this has to change and canola sit well to capitalise on this
- Current Liberty hybrids are highly competitive against weeds, now considered equal to barley
- Vaccines are now being genetically inserted into lucerne in Canada – this is a new development
- Ethanol production from corn, and the US farmers move to corn could help lift wheat prices

Travel Diary for July-August 2006

24th July – Bill Crabtree’s visit to see Dr Jeff Mitchell in California

Bill gave a talk to 15 scientists and 3 farmers in the San Fernando Valley – 3 hours north of LA. The area is rich in agricultural production which is aided by cheap irrigation water. The price of water is \$US30-75 per acre foot. The valley is distinct and quite flat, being about 90 km wide by about 400 km long. The region can boast six of the ten most profitable counties in the USA.

The area produces all sorts of crops, including: almonds, grapes, tomatoes, cotton, lucerne, wheat, corn, capsicums and much more. The rainfall is only 150 mm and the irrigation water comes from the hills and the Colorado River. But for how long will this last? Tillage is predominant with few trying to adopt no-tillage. With so much water, and so affordably, most farmers see little need to conserve water. The soil is fertile and has good texture. There is a strong belief that the finer the soil is cultivated the better the crop will be, which is in contrast to my knowledge and experience.

27th July - John Deere harvester factory

The group visited the John Deere factory in Moline, Illinois. This is one of several John Deere factories in the town, this site is 70 acres in size. Harvesters are made to order and farmers are given the golden key to start their own header in the factory for the first time after the header is assembled.

Clay Mitchell of Mitchell Farms at Waterloo

Clay is an innovative farmer with a Harvard degree in biomedical science. Clay has a great inventive ability in agriculture and he farms in the most delightful environment with good soils and high rainfall. Clay uses John Deere GPS technology and has wireless technology with real time photography of his farming operations which are linked direct to his website such that people can see his activity during his farming operations live on the net with his range of cameras.

Clay is looking at ways to optimise plant growth by ensuring the crop obtains the most sunlight possible. He grows Roundup Ready (RR) soy and RR corn and mixes them with other non-herbicide tolerant crop varieties. He does this with crop orientation and strip cropping made possible by using RR. Clay plants soy on 20 inch row spacings and his corn is on 30 inch rows. Clay’s yields are significantly higher than his neighbours. It is hard to isolate Clay’s management skills to know the full value of his innovative techniques.

28th July – Monsanto at DeKalb

We were given an overview of the research work by Walter Trevisan. Monsanto invest a lot of the funds they generate from profits from farmers back into R&D that goes into helping solve agricultural problems for the farming community. An estimated \$US200 million has been re-invested. The group was impressed by the quality of staff that spoke to us, each of them were well qualified, experienced and well spoken.

We looked at the original corn plant from which corn was bred, being about a quarter the size of the current commercially grown corn plant. Obviously this plant has been significantly altered through breeding (see photo). Interestingly, the whole farm is bred with varieties that are non-GMO, this is so that the lines can go to any country, even where GMs are not yet grown – like Australia. Walter told us that there can stack a new GM trait in a corn line every year and they are up to 6-7 traits currently.

We inspected their insect and disease research laboratories. They breed insects and diseases and then infect different lines of corn with them and then rate how well the new lines tolerate the pests.

Walter told us that the glyphosate resistant bacteria (gene) was discovered growing in a soup of waste glyphosate. Bill pointed out that it was a small company that made this discovery and Monsanto purchased it from them in the early 1980's. Walter also said that he could make a GM wheat that was resistant to weevils – this would have a significant impact on wheat handling and storing in Australia.

We observed one very dirty field of non-GM corn adjacent – this was a visually quite a dramatic contrast and several of us took photos of this difference.

1st August – Mennonite site

We stopped at a Mennonite farm-site where a John Deere tractor had steel wheels for some reason. Their children are removed from public education at 14 years of age and wore old-fashioned clothing. They had lots of animals and sold lots of items, many of which were made in China, in one half of the house. It was an interesting cultural experience.

2nd August – University of Guelph, Prof Strommer

We visited Prof Judy Strommer who told us of her research to insert a leukotoxin gene (*lkt50*), through genetic engineering, into lucerne to immunise cattle against pneumonia. This is the most serious disease of cattle globally when cattle are placed in feedlots. Their work has shown good success, where high levels of the protein were achieved and expressed in lucerne. A small test with 4 cows showed it to be effective. They will now extend the trial on 30 cows to gain more reliable statistical information in the coming year.

Initially, Prof Strommer had some reservations about doing such work. A friend persuaded her that it was a worth-while research as the technology had implications for improving the health of poor people globally. Judy consented and is cautiously optimistic about this type of work – being transformed plants for immunisation opportunities. Judy told us of a colleague with whom she discusses the ethics of GM technology regularly and says it is healthy for people to share a range of views.

The research funding for the work which was from a private company was not continued and consequently government funding was used to continue the project. The company, for some reason, decided that injecting the vaccine was the way they wished to proceed. Part of the reason for their decision was likely due to long timeline it takes to do the GM research and prove up the system. Although, Prof Strommer is confident the technology works.

3rd August – David Wreford

David Wreford, retired editor of Canadian ag magazine Country Guide, helped us organise visits in Winnipeg. He then traveled with us to Saskatoon, providing commentary along the way on cropping statistics, rural population decline, local elevator and grain handling history, railway history and facts, farm market forces, the Canadian Wheat Board, biodiesel and ethanol production and economics, weather and climate issues, and general Canadian life.

David's input was particularly valuable as he grew up in WA. He obtained an agricultural science degree from UWA in the mid-1960s and has visited WA several times recently and corresponds regularly by email with Bill Crabtree.

Buhler Versatile, Winnipeg, Manitoba

It seems the changes to this company's tractor brands may now have settled down. The company has, in the past, changed ownership every few years. It has produced Versatile, Steiger, CAT, Ford, and Ford New Holland tractors – and now Versatile again. We were taken through the plant by an engineer who had been with the company for about 25 years and is optimistic about its future.

Today they mostly make tractors to order, and have been surprised by weak demand for the larger tractor (530 hp) in the past year. As well, they build the smaller Genesis tractor line from 145-210 hp. While financial pressure due to low grain prices is a factor, perhaps no-till and GMs have also contributed to this lack of farmer interest in larger tractors ☹.

MacDon header fronts

One of the most popular header fronts globally is the MacDon, built in Winnipeg and designed to fit to all types of harvester and windrower. They work closely with many of the harvester manufacturers. We were shown through their plant and show rooms – both of which were quite empty due to their summer shut-down period, but exceptionally clean.

4th Aug – Canadian International Grains Institute (CIGI)

Ex-university professor Dr. Linda Malcolmson talked us through the role of the CIGI, which is to familiarize foreign grain customers and potential customers with the many grain types and grades available from western Canada. They have visits from buyers from all over the globe. That afternoon they were hosting a group from China. They hold training courses on grain technology that may last from 1-10 days.

CWB talk

A Canadian Wheat Board official then told us what a very efficient organisation the CWB is, and how very little of the Canadian grain growers' funds are used run the organization. He said that some farmers had been elected to the CWB's board of directors with the intention of dismantling it and then, within a few months, had come to appreciate the benefits of the CWB and then become supportive. Except for feed grades in the domestic market, the CWB sells all milling wheat, durum, malt barley and feed barley produced in western Canada.

It was pointed out that the CWB sells only 40% of Canada's crops, and that the remaining 60% of the country's grain/oilseed/pulse production is sold through open-market channels. Farmers are mostly satisfied with the 60% that is not sold through the CWB. There was much discussion, vigorous at times throughout the remainder of the tour, on the value of the CWB and the AWB, particularly given the ongoing Cole inquiry in Australia.

Canola Council of Canada

JoAnne Buth and Diane Wreford gave us an overview of the role of the Canola Council. They explained the increasing value of canola to farmers, the improved genetics with superior yields, particularly with the hybrid Liberty Link GM canolas. JoAnne explained how farmer adoption of GM canola has been rapid since its inception in 1996. Now 83% of farmers grow GM canola and they report excellent weed control.

Diane mentioned the high omega-3 value of canola oil, which places it as the "healthiest" oil to use on salads. Since canola is considered the "dream gene plant" with transformations being relatively straightforward, it is anticipated that the sky is the limit with potential oil changes to the crop through time.

Diane pointed out that canola oil is free of cholesterol and *trans* fats, and the lowest in saturated fat (7%) of any common edible oil. This composition helps reduce the risk of CHD by lowering total blood and low-density lipoprotein ("bad") cholesterol. The breeding of high-oleic canola strains will make the oil more stable for frying and processing with excellent health benefits to vastly reduce the

problem of *trans* fats. Diane was expecting an endorsement from powerful USA authorities confirming these health benefits (given on 11 October 2006) from the U.S. Food and Drug Administration who authorized a Qualified Health Claim for canola oil indicating that its high level of unsaturated fats could lead to a reduced risk of cardiovascular disease.

We met up with Brad Smoker (WA agronomist currently working in Saskatchewan) just before visiting the International Peace Garden on the Canada/US border in south-western Manitoba. Brad explained how GM canola is common in Canada and how amazed he was that some Australians could believe the technology has been anything but very useful to the Canadians who are so comfortable with it.

5th August – Scott & Anne Day and family

Despite difficult personal circumstances arising from a family member's severe bike accident, Scott and Anne Day and Scott's delightful family hosted our group. They took us on a district tour, and then on a tour of Scott's own family farm. While Scott is a provincial Department of Agricultural officer, he also farms part-time with his father in the Deloraine area in SW Manitoba. On his farm Scott showed us large saline areas which have been made worse by wetter-than-average seasons lately. Kochia, a weed that grows well in these salty areas, has become resistant to SU herbicides.

Scott stopped us between two fields where he explained how one field on one side had trifluralin resistance developed in green foxtail to low rates of the herbicide, and the opposite side which had developed resistance to high rates of trifluralin. He explained that this field made important history for Manitoba back in the late 1980s.

Scott showed us a new wheat variety that was supposed to be fusarium resistant, but little fusarium was present in the dry 2006 season. We also saw some pinto beans that had a second flush of kochia which was not controlled properly in the salty area. We then saw his Liberty Link canola that ended up yielding 40 b/ac (10 b/ac more than Scott had expected); quite pleasing given that no rain fell for the whole of July. We inspected some swathed barley and then retired to check out his cheaply built wooden shed, his 500 pigs, an auger sensor, brushes for bean pick-up and beer. We had a most enjoyable evening of friendly Canadian hospitality.

6th Aug – visit to Gavin and Brian Reynolds (Welsh biodiesel farmers) north of Brandon

We inspected a home-made farm biodiesel plant. So far it has produced only small quantities from waste cooking oil collected from restaurants in nearby Brandon (a small city of 40,000 people). The Reynolds have plans to produce biodiesel commercially. They explained the conversion of vegetable oils to biodiesel well, and have been on a speaking tour throughout Canada. They are about to expand their operations if they can get government help.

They are also keen on growing European rapeseed varieties as they grow so tall. In later email correspondence, Scott said that these varieties are probably too long-season to have a fit in Manitoba.

Ethanol plant at Minnedosa

We parked out front of the expanding ethanol plant north of Brandon at Minnedosa as David Wreford discussed the merits or otherwise of biofuels. David believed that very large government subsidies will continue to be needed to make these fuels economically competitive. This plant began many years ago as a rye whisky distillery, and was then converted into a small fuel ethanol operation. Recently, with assistance from the federal and provincial governments, the owners have embarked on a major expansion.

David explained how the US government is injecting large subsidies into ethanol production, and mandating petrol/ethanol blends with the goal of expanding the domestic US market for corn. However, he pointed out that this had encouraged the Brazilians to sell ethanol (derived from cane sugar) into the US, with the result that in the 6 weeks to August 6, the value of ethanol in US fell by from \$US4/gallon to below \$US2.80/gallon.

Clear Lake

We relaxed by Clear Lake (a holiday resort in a nearby national park) and learnt how to play Canadian Football from some locals who also learnt from us how to kick an Australian football.

7th Aug – crossed into Saskatchewan

We crossed the Manitoba border into Saskatchewan and saw some sandy soils which grew lucerne. Bill explained the role of the PRFA (Prairie Rehabilitation Farm Administration) particularly after the “Dust Bowl” experience from the 1930s (also called the “Dirty Thirties”). The PFRA was created by the federal government to restore eroded lands and rural communities. Sand dunes were created during this time and now they are capable of growing only lucerne or trees.

Pat Beaujot at Seed Hawk, Langbank

We visited the Seed Hawk factory and heard Pat explain the development of his opener which began in 1992 when six bars were made and used locally. Pat explained the ability of the seeder to give precise and consistent seeding depth even over uneven ground. The seeder also has the ability to rear steer, and band liquid or dry fertiliser at seeding below and to the side of the seed. They have the largest box available at 800-bushel capacity and will build seeders to 68 foot width. Bars are made for 10- and 12-inch row spacings and have a quick pin depth setting.

Pat showed us some fertiliser and variety trials at the township of Langbank. Crops included flax, wheat, peas, canola and barley. He commented that the new canola hybrids have increased yield expectations in his dry region from 25 to 40 b/ac. If this level is not achieved, then something has likely gone wrong. This is a region where wheat typically yields 45 b/ac (3 t/ha), which means canola is now yielding about 75% as much as wheat.

Rick Patterson on the lake

In the evening we were lavishly entertained by Rick Patterson at his summer place on Katepwa Lake near Fort Qu’Appelle, and briefly introduced to his business of spraying systems and liquid fertilisers. We also met an agronomist from the newly-formed farm management consultancy AgriTrend which has an expanding business across the prairies. We enjoyed a delightful boat cruise and the younger boys had a ski. Rick and his family showed us exceptional hospitality.

8th Aug - Indian Head Research Station with Guy Lafond

Guy and his colleagues introduced us to the Green Seeker technology they are working with. Boom-mounted light sensors measure crop colour intensity, which hopefully corresponds with the plants’ N requirements. This information then activates automatic controls to adjust the rate of N delivery through boom nozzles. The result is “on the go” variable-rate N application. They are confident the system is working well and Guy believes it will have even greater importance in our Australian climate where the window to apply N is wider than in Canada.

Guy showed us new Liberty Link and Roundup Ready canola hybrids, along with lines used to produce specialty oils. We also saw some alternative crops. We discussed the poor potential of Brassica juncea (mustard) for biodiesel production. Guy said that it was unlikely that juncea would out-do the canola hybrids for yield and oil for biodiesel production.

Jim Halford from ConservaPak

Jim Halford is a no-till pioneer who invented the ConservaPak over 20 years ago. Jim spoke of the wind and water erosion that used to occur on his farm 30 years ago. We looked at long-term no-till versus short-term no-till. Jim explained how the old no-till soil was less responsive to both N and P – meaning lower rates were adequate.

Jim showed us some seeding rate trials with the ConservaPak where 3 kg/ha gave slightly better grain yields than both 4.5 and 6 kg/ha where the seed was placed at a precise depth. He also showed us some seed splitting boots.

We saw Jim's seeder with the precision it offers. The ConservaPak has a great reputation for precise seed placement and separation of seed and fertiliser. The box is elaborate and has many pipes – the hydraulic system now offers more fluid movement through the soil, with improved ability to ride over rocks.

Norbert Beaujot from Seed Master, Regina

Norbert explained how he was the designer of the Seed Hawk and Seed Master, and had formed the second company in recent years. In total, 1,000 of these seeders have been sold in North America. The Seed Master is made to 80 feet in width. It has a tracking device that senses either side of a previous furrow, and a hydraulic hitch that pulls the seeder into the desired zone. Often this is between the stubble rows to improve stubble clearance.

9th Aug – Agriculture Canada, Saskatoon

The morning was spent with six researchers at their field plots in Saskatoon. The program was kindly organised for us by Dr Ginette Seguin-Swartz who did some early research on gene flow between canolas.

Dr Gerhard Rakow's assistant talked of the new yellow seeded canola bred from *Brassica Juncea* (mustard) with 2% higher oil content and less fibre. They believe that 49% oil content in canola is possible and any more oil will likely destroy the integrity of the plant. Canadian farmers do not gain a premium for high oil content, so this may slow the development of this variety which is also herbicide tolerant. For the yellow seed variety to become a hybrid they will need to develop more lines and then test which lines are best to join to obtain the best hybrid. Consequently, it may be some time before this is commercialised.

Gerhard was the man who bred triazine tolerant (TT) canola in 1982 from a yellow seeded mustard weed which was embryo rescued into canola – a crossing of species from a corn field in Ontario! This technique is considered conventional despite massive and unknown gene changes from another species. Gerhard gave up on TT canola as it yielded 20-30% less than conventional canola varieties. This is the main herbicide tolerant variety that Australian farmers are forced to rely on and with such large yield penalties.

We met a chemist, Dr Phil Raney, who nearly died several years ago with throat cancer and who talked about breeding for mustards with varying degrees of hotness – mild, warm, hot, hot plus 1, +2, +3, +4 and +5. Dr Felicitas Katepa-Mupondwa talked about the mustard *Sinapis alba* from which they are trying to extract the genes that give tolerance to drought, heat insect and diseases. The problem is that it has poor oil content and is low yielding. All this is with conventional breeding.

Dr Bob Elliot talked about his seed size and seeding rate work and I believe he was pleased that our Australian developed approach was similar to his results of low seeding rates work and larger seed size is desirable. The seed companies have not been so keen to embrace the 3 kg/ha rates though.

Bayer Research Farm – Garth Hodges

We were fortunate that Garth flew back from holidays to meet with us for three hours. He shared his enthusiasm for the future of agriculture and he said that we need to keep abreast with soya bean developments in the breeding race. With whom we compete – not with each other (Canada and Australia). Bayer has three main canola breeding bases and they are in: Germany, Canada and Australia. Garth is excited about InVigor 5030 and 5070 – both these lines consistently yield 25-30% above the standard 45A65

We saw frantic harvesting activity on the research farm and some large plots as well where the check (control) varieties were compared with InVigor and RR lines. We saw the male and female plants flowers. The Bayer varieties looked very impressive despite some dry conditions.

Garth shared his three visions for canola. Firstly, for Liberty to incorporate the HOLLi oils (**H**igh **O**leic and **L**ow **L**inolenic). These varieties will not require hydrogenating to make them stable at cooking oil temperatures and will likely reduce bad fat uptake by 70%. Hydrogenation is a problem with current canola oil despite that fact that it is the best oil used when cold with its high omega-3's, but when used for cooking at high temperatures it becomes a trans-fat concern from the process of hydrogenation.

Secondly, Garth talked of increased oil content per hectare for the purpose of growing biodiesel and finally he said they need to keep breeding canola improvements to ensure that it is an important component in food additives and cold cooking.

10th August – Clavet Cargill canola oil crushing plant

We listened to Vuk Bozic talk of their partnership with RR and the specialty oils. We understand the price of their canola, purchased from the plant is C73 cents/L. Roy Button who travelled with us said that it costs another C30 cents/L to convert to biodiesel if a small plant is used and then depending on the distribution costs and possible government incentives or dis-incentives and the price of canola and oil will determine if and when canola is used for biodiesel. Currently in the EU there are large subsidies for this technology and diesel is sold at \$A3/L making exporting of canola oil into the EU for biodiesel currently economic for those exporting it.

Vuk told us that people should not consume more than 3-5 g of saturated fats per day and in a KFC meal there is 18 g, in Burger King there is 8 g and in MacDonalD's there is 1.8 g. This is what is driving the change for healthier fats and oils. Vuk also said that specialty oils leave no flavour in the mouth and therefore it expresses the flavour of the product that is being cooked instead.

PBI

Met biotech extraordinaire scientist Dr Wilfred Keller who is director of Plant Biotech Institute and commercialisation officer Royal Hinthier. We learnt more of the science of biotech and Wilf pointed out that there are so many genomics techniques that are being developed that grey the GMO issue. Wilf gave an example of linseed tops being dipped in Agrobacterium containing the gene of interest which were then grown in a root promoting medium and have had up to 50% success rate with gene transfer.

Royal Hinthier pointed out that the regulatory controls currently in place by government for GM crop research and development are stifling investment and progress with new crop traits. If this regulation does not relax some then progress in Canadian crops may well fall behind USA agricultural crops. Royal said there is an issue called “the billion, million and zero” – referring to one billion acres of GM crops have been grown, where one million farmers have used the technology and there have been zero incidents.

Royal suggested that at a Canadian farmer meeting four years ago which was to discuss the role of RR wheat that farmers were split on the benefits and risks and were primarily concerned with the markets possibly not accepting it. However, when the same group were presented with the idea of GM induced Fusarium resistance, which would produce safer wheat for consumers with a potential 30% increase in yield, the farmer concerns dissolved. Bill Crabtree suggested that Canadian farmers should actually test this supposed market resistance by growing some form of GM wheat and seeing what possible market \$/t penalty there might be. Royal agreed and said there would likely be none.

Philom Bios at Saskatoon

We met with Calvin Sonntag, the President and CEO of this “Philom Bios” inoculum company whose purpose is to “serve the needs of individual customers by delivering high value inoculants.” Calvin told us that the company has 43% of the inoculum market in all of North America. The company employs 72 staff and they have just entered into a joint venture with GRDC (50:50) in Australia to test their products in Australia. The company is into biotechnology as well. They boast

on average a 5-10% yield increase from their inoculums. They have P and N inoculums and they sell Agrotain for Canada.

Bill mentioned to the group previously that Provide, one of their P inoculants, had not been widely adopted by Canadian farmers despite it being available in early 1990s. This is because it costs nearly as much as the P that would otherwise be added from fertiliser and the soil bank would be lower with a Provide system compared to P applied.

11th Aug – Marty, Bill & Chev (dad) Hillies at Macklin on Sask/Alberta border

They farm 4,000 acres of canola, wheat, barley, silage, lucerne and fallow. They have a feedlot and Marty's wife works off farm to support the business. In 2006 they sowed 1,200 ac of canola which is RR (not hybrid) and has yielded 40-45 b/ac which is about 20 b/ac more than it yielded before being GM. They suspect the hybrids will give at least 5 b/ac more worth of profit and so they are considering growing them. They have a neighbour who is obtaining yields of 60 b/ac of canola hybrids.

The Hillies love the GM technology but are not too keen on the \$15/ac TUA from Monsanto, they got caught with hail damage in June 2002, just a month before Monsanto changed its policy of withholding the TUA on damaged crops. Wheat yields are typically 40 b/ac while barley is 80-90 b/ac. Their neighbours who grow the hybrids are growing 60 b/ac and they are thinking of switching, but the extra costs mean they might only make effectively an extra 5 b/ac.

Land prices are \$500-900/ac and depends on oil reserves on the farm. Farmers can obtain an oil licence as another business and with current prices there is a lot of activity. The economics of farming are currently poor and Chev said that if commodity prices did not improve within a couple of years there would be many more farmers leaving the industry. They have a cattle feedlot where they buy and sell and they have up to 500 cows at a time, currently none though.

Lacombe Research station

Met with Dr Kelly Turkington and Dr Neil Harker and discussed crop rotations, disease and weed competition. Kelly found that rotating different barley varieties gave 50% lower levels of scald as opposed to keeping the same variety each year. He also found that wide row crops produced more disease than solid seeded barley – a surprising result. The mechanism is likely because of the spores being less mobile in a dense canopy while in wide rows the wind was more able to whip up some spores from the residue on the ground.

Neil showed that the new hybrid canola's are even more competitive than barley. This contrasts what used to be the case 10 years ago before GM hybrid canola existed. Neil also talked about the superior result of the RR canola system over conventional weed control – in the order of more than doubling profitability, from \$150 to \$350/ha. In an additive trial he also found that more than one factor was needed usually to ensure respectable grain yields. The factors he experimented with were; a good variety, weed control, seeding rate and fertiliser.

A general comment that they both made was that 10 years ago canola in this area was yielding 30-40 b/ac, now they consistently yield 60-70 b/ac. A common rotation is wheat then canola and has been making the farmers a lot of money for nearly 10 years. The regular comment made by many in the Canadian agricultural industry in 1996 was that of "canola yield decline". Such talk is now a distant memory and every year new and improved varieties are being released, in 2006 over 55 varieties were submitted for release in Canada.

Neil gave Bill several scientific papers which show that:

1. RR wheat-weeds were readily controlled in a three year trial at 8 locations (Weed Science 2005)
2. RR wheat made for very clean fields and did not cause undue weed concerns (W. Science 2005)

3. RR canola was depleted rapidly in subsequent crops, to near zero in 2 years (Agron J 2006)
4. Weeds in RR systems are become scarce in Canada (Weed Science 2004)
5. Removing weeds at 4 leaf with full rates is best with herbicide tolerant canolas (W Tech 2004)
6. The InVigor hybrid is excellent at stifling weeds and lifted the yield by 22% (Can JPS 2003)

12th Aug – Peter Gamache

We met with Peter from the reduced tillage linkages who told us of the low adoption of no-till in Alberta, at about 30%. However, another 30% of farmers direct seed with high soil disturbance and there is a social-political requirement for farmers not to burn their stubble. Peter said that Flexi-coil was the most popular seeder in the region and the more dedicated no-till seeders are gaining popularity but they produce so few each year. Peter witnessed the RR wheat trials that have been grown in the region from 2000-2003 and said that the weed control and results were very good.

On other matters, we learnt that Edmonton has over 750,000 people and the “oil sands” project is injecting life into Alberta – which are located 4-5 hours NE of the city. Many farmers are offered good money to drive trucks and work on the project which is expected to produce 3.5 million barrels a day by 2015 – about 4% of current global consumption of 80 million/day. As the city grows it is consuming much of the best agricultural land in Alberta. Peter mentioned the logic of nuclear power and said that 75% of France’s energy comes from nuclear and behind Australia, Canada has the second largest supply of uranium.

Summary of Attendees views:

- All tourers reported that they enjoyed the tour, it was value for money and it had good balance
- 83% of the tourers thought it was a good idea to drop in on the big US cities on the way
- All participants (bar one) said they were more informed on GM technology as a result of the tour
- Most tourers (58%) said that there largest concern with GM technology was not having access to it
- All believed that canola yields would increase by 15-30% with the advent of Australian GM canola
- All tourers said they would use GM technology if they were given the opportunity back Australia
- On what they would like to say to the media; 37% said the press should better educate themselves
- The tour was rated highly for technical information, with 48% excellent, 35% good, 17% okay.