

Innovation and application — the competitive edge

By Adam Kay *et al**

The US Beltwide Cotton Conference was held in New Orleans in January. A good contingent of Australian growers, service industry personnel and researchers were on hand to listen to the wide range of presentations.

On the final two days there were 15 concurrent sessions running so participants had to be on their toes to get to the talks they wanted to hear.

Apart from the general sessions, The Beltwide counts for a number of specific “conferences” — for example, production, ginning, weeds, cotton improvement and diseases.

As usual there were updates from National Cotton Council representatives in Washington, concentrating on the lobbying they were doing for the next farm bill. There was also considerable discussion on

the WTO challenge from Brazil. The Americans are having a lot of trouble accepting the ruling.

Fibre quality had a very big airing with a number of presentations pushing the need for growers to get the true price signals about improved quality cotton. With two thirds of the US crop now exported they are slowly realising that quality is critical.

FIBRE QUALITY

The focus on fibre quality is increasing and several of the keynote speakers addressed the need for quality. This is being largely driven as a result of the increased level of export of the US crop with China being the major export destination.

The US is clearly being proactive in the Chinese market with a technical delegation to China from Cotton Incorporated and

USDA to advise them on objective measurement and the HVI. The US is actively supporting a Chinese initiative to move to full HVI testing of Chinese domestic cotton by 2010.

The need to improve fibre quality was also a focus of the Cotton Ginning Conference. Improvements are being made through the application of sensing or fibre quality measurement systems in the gin rather than radical changes to ginning and lint cleaning systems. The systems such as Uster Technologies ‘Intelligen’, the Continental Eagle ‘Eagle Eye’ and Schaffner Technologies ‘Isotester’ allow ginners to optimise colour and grade throughout a module by changing moisture levels (dryer temperatures) and the use of lint cleaners in near real time. In various

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Steve Allen on the New Orleans riverfront.

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ways these systems also enable ginners to optimise turnout and gin efficiency.

A session of the Ginning Conference was devoted to bale moisture management. Most interesting was Uster Technologies new moisture measurement technique called VLF (Very Low Frequency). The technique uses radio waves to make 30 to 50 measurements per bale and in doing so is also able to measure the moisture profile of a bale.

Particularly interesting were the moisture profiles of bales subject to water spray restoration as opposed to those subject to moisture restoration by the application of steam. Bales in the study that were sprayed had an uneven moisture profile with levels peaking in excess of eight per cent in parts of the bale despite having an average moistures of five to six per cent. Steam applications provided a more uniform moisture profile.

The implication of high moisture spots within a bale is that fibre quality (largely colour) and bale handling properties can be changed detrimentally, particularly when moisture levels exceed seven per cent. Uster recommend that the maximum



Aussie growers sample some of the delightful drinks available in New Orleans.

moisture not exceed seven per cent in any part of a bale.

WEEDS CONFERENCE

The primary focus in weed research was Roundup Ready (90 per cent of cotton in the US is RR), Liberty Link (Glufosinate tolerant varieties, reportedly due in Australia around 2006), and Roundup Ready Flex.

The introduction of RR cotton into American cotton production has significantly changed the weed species present in cotton fields. These changes are attributed to the change in the whole agronomic system (cultivation and crop selection) rather than a change in the chemistry alone.

A number of presentations presented herbicide regimes to manage RR rotation crops including RR corn and RR soybean. Many presentations reviewed herbicide programs to manage glyphosate tolerant weed species. Other weeds issues discussed included directed spray technology, twin-row planting, crop rotation and cultivation practice.

The protection of GMO weed management technology was identified as a critical aspect for future industry sustainability. The challenge for US cotton, and probably Australian cotton in the near future, will be to ensure appropriate Integrated Weed Management strategies are in place before glyphosate resistant weed species cause greater yield losses and increased economic burden than conventional systems.

There was minimal emphasis on the ecological improvement of US cotton production. The only presentation within the program with an environmental slant was, "What does the Clean Water Act have to do with Cotton Production". This is possibly an indication that environmental issues will be further considered in the future. The Australian cotton industry experience of strong environmental stewardship might be a valuable resource for US production systems when tighter regulations are enforced.

COTTON IMPROVEMENT CONFERENCE

This year, the major seed companies have released one new conventional, four Bollgard (Ingard) Roundup Ready, 10 Roundup Ready, two Bollgard II Roundup Ready, one Widestrike and two Widestrike Roundup Ready varieties. In addition there was one new Pima and one Roundup Ready Pima variety released.

The conference then moved on to technical paper sessions. Although a large number of papers were presented, there were a few general themes. Resistance to abiotic stresses (water, salt, heat and cold) received much attention, particularly in relation to developing screening methods and screening wild and exotic lines for resistance. Screening and subsequent breeding for resistance to pathogens also

received significant attention. This was mainly directed at root knot and reniform nematodes, but the recently identified Fusarium wilt race four was also discussed.

Probably the most discussed topic related to the improvement of fibre quality. This interest has largely been motivated by the closure of domestic mills, resulting in the US exporting 65–75 per cent of cotton

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production — up from 20–25 per cent just five years ago.

Currently, the base grade for cotton in the US is below the base of importing countries, so the cotton is discounted on the world market. This has created a flurry of activity in the fibre quality area. Many of the presentations involved gene expression, genomic analysis and other molecular or transgenic techniques designed to further understand fibre development or enhance fibre properties.

NEW PRODUCTS FOR US GROWERS

A tremendous overview of new products and technologies was presented by Dr Frank Carter, Senior Scientist, Pest Management, National Cotton Council. Following is a summary of his talk including information on new biotech products and conventional chemicals.

NEW BIOTECH PRODUCTS

There are five new cotton biotech products. Three are fully registered and approved by regulatory agencies. Two products are expected to gain registration/approvals within the next year. Three products are for insect protection and two are herbicide tolerant cottons.

Registered products

- Bollgard II from Monsanto (a stacked gene Bt cotton containing both Cry1Ac and Cry2Ab genes) will be readily available in 2005 in a number of varieties from various seed companies;
- WideStrike is also a stacked gene Bt cotton, containing Cry1Ac and Cry1F, from Dow Agrosciences. It will be launched in 2005 and will appear in PhytoGen cultivars in early-to-mid varieties. The Insect Resistance Management (IRM) requirements for all three Bt cotton sources (Bollgard, Bollgard II and WideStrike) are identical to those that have been in place for the original Bollgard Bt cotton; and,
- LibertyLink System is a new herbicide resistant biotech product that is resistant to glufosinate-ammonium (Ignite) herbicide. The LibertyLink product is from Bayer CropScience and will appear in FiberMax cultivars. It was introduced in 2004 and was planted to FiberMax LL varieties on about 1.5 per cent of the acres. In LibertyLink FiberMax cotton cultivars, Ignite can be used as pre-plant burn down, in over-the-top post-emergent, hooded, or post-directed applications.



Some of the Australian presenters at the US Beltwide — Stuart Gordon, Angus Crossan and Geoff Naylor.

Products expecting registration

There are two new biotech cotton products that are in the regulatory approval process. They are:

- VipCot is a Bt cotton product under development by Syngenta Crop Protection in partnership with Delta and Pine Land Company. The active Bt toxin is Vip3A which is an exotoxin produced during vegetative stages of *Bacillus thuringiensis* growth. VipCot offers broad control of caterpillar pests of cotton. IRM discussions and strategies are currently under study and development; and,
- Roundup Flex is the “new and improved” Roundup Ready cotton from Monsanto. Regulatory approval is in the late stages.

NEW CHEMICAL PRODUCTS

There are 17 new chemical products for cotton. Nine of the products are fully registered and were introduced to the market during the 2004 season or will be launched in 2005. Another eight products are expected to complete registration within the coming year.

Registered products

- Diamond is a third generation chitin inhibitor (IGR) from Crompton Corporation. Diamond, based on the active ingredient novaluron, was introduced to the cotton market in a demonstration program in 2004. Diamond is active on the lepidopteran complex, plant bugs, stink bugs, and shows suppression of whiteflies and thrips;
- Prolex is a fourth generation synthetic pyrethroid based on gamma cyhalothrin from Dow AgroSciences;

- Zeal is an insect growth regulator (IGR) for mites and aphids. It is from Valent USA and is based on the active etoxazole (V-1283). The mode of action is unclassified or unknown at this time. Zeal is best used with an adulticide early in the season because it is only active as a adult mite sterilant and will not kill mite adults — only eggs and immature stages of mites. For IRM purposes, only one use per season will be allowed on the label;
- FujiMite is another miticide from Nichino America. FujiMite, based on the active fenproximate, became fully registered in 2004;
- Ignite is the herbicide to be used in the LibertyLink System. LibertyLink and Ignite are products from Bayer CropScience. Ignite, based on the active glufosinate-ammonium, is a non-selective contact herbicide. The Ignite registration allows use on non-LibertyLink cotton during preplant burndown or under hooded sprayers. In LibertyLink FiberMax cotton cultivars, Ignite can be used as pre-plant burn down, in over-the-top post-emergent, hooded, or post-directed applications. Ignite has a new mode of action and offers quick kill of a broad range of cotton weeds;
- Valor is a new herbicide from Valent USA. Valor, based on the active flumioxazin, is used for winter weed control, pre-plant burn-down, pre-plant, pre-emergence, layby and during in-season cotton weed control;
- Envoke is another new herbicide from Syngenta Crop Protection based on the active trifloxysulfuron sodium. Envoke can be used for post-emergence weed

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control after fifth leaf and for post-directed applications. It controls most major broadleaf weeds and sedges in cotton;

- Suprend is a herbicide premix from Syngenta Crop Protection that contains trifloxysulfuron sodium, the active in Envoke. It also contains prometryn to give a product with broad spectrum weed control that provides both contact and extended control of many tough weeds in cotton; and,
- Dynasty CST from Syngenta is a three way premix for seed treatment for control of seedling diseases. The combination of the three ingredients will target Maxim for Fusarium and Rhizoconia, Apron XL for Pythium and azoxystrobin for preemergence and postemergence damping off.

Products expecting registration

There are eight products that are nearing completion of the registration process. They are:

- Carbine from the FMC Corporation is based on the active flonicamid (FMC 1785). Carbine is a new class of chemistry, the pyridinecarboxamides, and is

active against plant bugs, fleahoppers, and aphids. Carbine is expected to complete registration in mid-to-late 2005 and will be launched in 2006;

- S-1812 (No Trade Name) is a new insecticide from Valent USA, based on the active ingredient, pyradaly. It is a new mode of action that shows good control of lepidopterous pests. S-1812 is very near registration for cotton and will be in a demonstration program during 2005 with a full product launch in 2006;
- Venom is another insecticide product from Valent USA on much the same track as S-1812. Venom is an aphicide based on dinotefuran (V-1283), a neonicotinoid. Venom is very near completion of registration for cotton and will be introduced in a demonstration program in 2005 and a full product launch in 2006;
- BAS 320 I is an insecticide being developed by BASF. BASF expects registration is late 2006 with first sales in 2007. BAS 320 I shows broad activity on lepidopterous cotton pests and the company is researching activity on plant bugs and stink bugs;
- Blizzard is a new defoliant from Crompton Corporation. Blizzard is

based on the active fluthiacet-methyl and it is a PPO inhibitor with activity similar to Aim and ET. The company expects registration in early 2005;

- STAN is an acronym for Seed Treatment Against Nematodes. Syngenta expects to launch this product in 2006;
- Topsin M is an older established carbamate fungicide. There has been extensive research using Topsin M for reduction of hard lock in cotton in the humid parts of the cotton belt; and,
- Oberon is new insecticide-miticide from Bayer CropScience. Oberon is based on the active ingredient, spiromesifen which is a ketoenol. Oberon belongs to a new class of chemistry which makes it a good tool for resistance management for mites in cotton. Oberon expects to complete registration in early 2005. Oberon also shows good activity against whiteflies in cotton.

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