

Germinating ideas

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With the ongoing drought and record low dam levels on our river systems we have seen the smallest area of cotton planted in more than 20 years. Many growers were not able to plant or chose to grow alternate crops given the price and water scenario.

The importance of cotton variety trials will be highlighted in this Germinating Ideas. Correctly conducted trials give growers and consultants the opportunity to assess the yield and fibre quality comparisons of new and existing varieties grown in fully commercial systems.

We will also look at a proposed new Fusarium and Verticillium resistance ranking scale.

Finally, with the current water debate in full swing, it is important to realise how little water the plant actually uses for growth compared to what is required for cooling. Work is underway to try to change the ratio of water use in the plant but it will be a long term project.

COTTON VARIETY TRIALS

With the possible return of a La Niña weather pattern and the prospects for reasonable winter rain to replenish dramatically depleted dams, the 2007–08 cotton growing season should see the return of many growers who have not grown or had reduced areas this season. The importance of variety trials run by the seed companies will be a valuable tool to help check what varieties to grow.

These trials are run according to CRDC protocols and audited during the season to ensure they are planted, grown and managed correctly. This ongoing auditing is very important as it gives the industry confidence in the results. There is a lot of data that has been gathered over many years of trials.

The industry is currently in a transition phase where we are seeing the introduction of Bollgard II Roundup Ready Flex, Roundup Ready Flex and also Liberty Link



A variety trial on the Darling Downs.

lines. No breeding work is being done on Roundup Ready varieties and by 2009 there will be no Roundup Ready lines available with a full changeover to the other traits.

There is currently limited data to compare these technologies side by side due to previous regulatory requirements. This year trials were planted containing the new herbicide traits along with existing ones, so we will have a full range of data to assess. This will be only one year's information.

Throughout the season there are opportunities to look at variety trials through field days, farm walks and one-on-one visits. This can be helpful at the conclusion of the trial when the results are available as you are able to compare it to how it appeared during the season.

A number of trials have been monitored throughout the season with photos, comments and data collected to update growth

charts on the 'Trials on Line' section on the CSD website.

Results from the trials are then made available on line as soon as they are ginned and classed. A full report of all trials is then made available in an annual variety trial results book that is widely distributed to everyone in the cotton industry.

Commercial variety trials are an important step in assessing the suitability of potential new releases. These potential candidates come from advanced line trials run by the CSIRO. They are included in trials as an experimental number (for example CSX 434) and all of the yield and fibre quality information is gathered prior to the final decision as to a commercial release and a name.

The ongoing breeding program is based on conventional lines and the trialing of new conventional varieties is as important as ever. Pima lines are also now trialed.

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What to look for

There are a number of things to consider when looking at trial data.

- Make sure they are CRDC approved.
- Check that they are fully randomised and replicated in random complete block design.
- Look at the yield and fibre quality information over the longer term where available. This is usually tables and graphs containing two or three year means.
- Check the scale on graphs as they are sometimes changed for particular high or low yielding crops. (The scale changes are always noted on the graph).
- Read the grower comments along with the extension comments to get a better understanding of how the crop progressed during the year.
- Check the crop summary for each trial. This includes the number of irrigations, amount of fertiliser, number of sprays, planting and picking dates and how much rain fell in crop in addition to irrigations. Other information is also recorded.

By including all of the crop inputs and data it gives you the opportunity to compare it to your own operation to help make variety choice decisions. Variety trials are done on a wide geographic spread so that they are relevant to as many regions as possible. The assistance of trial cooperators, picking contractors, and ginning organisations is important and very much appreciated to get this information out to the industry in a timely manner.

PLANT WATER USE EFFICIENCY

There has been much in the media recently about water use efficiency and growing more bales per megalitre of water. With the area of production dramatically reduced due to low allocations and low dams the importance of water and its supply and use by the industry has been in the spotlight.

Water losses on farm through evaporation from water storages over the summer months can be as high as 40 per cent. In NSW there is around 20,000 hectares of land on cotton farms used for water storage and around 18,000 hectares in Queensland. This represents a large source of water loss.


Work on covers or polymers to try to reduce this massive loss are ongoing. Design improvements of storages and transfer systems are also ongoing to help reduce evaporation and deep drainage losses.

A key point to consider in crop water

use is that a cotton plant (like most other plants) uses only around one per cent through the plant for actual growth. The other 99 per cent is used for cooling of the plant. The rush is on to change this ratio so that plants can use more of the soil available water applied through rainfall and irrigation. Speaking on a recent Web on Wednesday Interview, CSIRO's Dr Greg Constable highlighted that traditional plant breeding has given a 40 per cent increase in cotton yields but very little if any change to the water use efficiency of plants. Fibre quality, disease resistance and

yield improvements have been the major parameters improved through breeding.

Changes to the ratio of water taken up by the plant and used for growth compared to that used for evapotranspiration may best be changed by genetic modification. This would involve modifying the plants' metabolism so they can be more tolerant of stress and respire less. A small change in the ratio could dramatically change the amount of water used in crop production.

These changes could take a long time and the industry must continue to become more efficient at using the available water 

NEW F RANK AND V RANK SCALES

There is a proposal to change the system that is currently used to rank varieties for Fusarium and Verticillium resistance. The FUSCOM Resistant Ranking sub-committee has recommended this change. All material produced this year will be based on the new "0-200" system.

The problem

In recent seasons there have been some 'wild' fluctuations in the F.ranks obtained from some trials. Under the original system for calculating an F.rank it is possible to get F.ranks of up to 1900. Such values contribute to high standard errors and variable means and make interpretation of F.rank difficult.

The solution

*The F.rank of the Standard (Sicot 189) remains = 100

*An F.rank of '0' indicates completely susceptible (all plants affected substantially)

The F.rank for varieties that are more susceptible than the standard will not change and will continue to be between '0' and '100'

*Varieties more resistant than the standard will now be ranked between '100' and '200'

*An F.rank of '200' indicates completely resistant or immune (all plants survive unaffected)

The F.rank for varieties that are more resistant than the standard will appear lower than previously reported reflecting the condensed scale. The relative ranking of varieties will generally not be affected.

The result

An F.rank less than 100 indicates more susceptible than the standard. — No change!

An F.rank greater than 100 indicates more resistant than the standard. — No change!

An F.rank of '200' indicates fully resistant or immune. - Scale change from 100-1900 to 100-200.

The relative ranking of varieties for resistance will generally not be affected. — No change!

For example — Sicot F1 has an F rank of 209 (18) on the old scale. It will now be 143 (22) on the new scale. It has a relatively high F rank but it is not immune. More trial data will now be able to be used using the new ranking methodology. Full immunity will be at 200.

How?

The calculation of the F.rank differs depending on whether the survival in the test variety (T) is lower or higher than the survival in the standard variety (S). The calculation is easily done in MS Excel using an 'IF' statement:

V.rank?

V.rank calculations will be changed in the same way as for F.rank calculations.

Full information on these changes will be made widely available through the NSW DPI and the QDPI&F extension teams, seed companies, information tours and other sources.

Information supplied by Dr S. Allen CSIRO/CSD.