CSIRO SMALL SCALE VARIETY TRIALS FOR 1998/99 AND 1999/2000

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The CSIRO Advanced Lines Trial (ALT) has been run cooperatively by CSIRO and DPIQ for 26 years and is used as the last stage in our breeding line evaluation. Early generation testing following single plant selection involves unreplicated progeny rows at the Australian Cotton Research Institute, further progeny row tests and multiple row replicated trials at a limited number of farm sites. At each stage, lines with poor seedling vigour, disease susceptibility, poor fibre quality or low yield are removed from further testing. The ALT involves 13 irrigated sites in all major cotton growing regions in Australia. Management is normal commercial practice including full insect control.

Entries in the ALT include promising breeding lincs and commercial standards. Ingard varieties are included in the ALT even though the trials are conventionally sprayed. Their performance indicates yield potential relative to their conventional counterparts and also gives an indication of the insect pressure experienced. Plots consist of three or four rows from 10 to 14 metres long and four replications are used. The centre rows of all plots are harvested with a modified picker, the seed cotton weighed and a subsample is taken for ginning at Biloela or Narrabri and fibre quality analysis at Narrabri. The most promising lines are retained in the scheme and also seed increased. In this way, by the time good performance is confirmed, sufficient seed is available for large scale testing and final seed increase for commercial use.

Results and Discussion

There were some similarities between the last two seasons in growing conditions and in the pattern of varietal performance. Both seasons had some cool periods, though the 1998/99 season was generally warmer than 1999/2000, especially in the first half of the season. Heavy insect pressure and the new 'bunchy top' syndrome had large impacts on yields and varietal performance in 1998/99. In 1999/2000 the diseases verticillium wilt and fusarium wilt were widespread.

To aid in interpretation the trial sites have been grouped into regions: cool (Breeza and Brookstead), central (Warren, Narrabri, Merah North, Collarenebri, Moree and Boggabilla), west (Bourke and St George) and north (Theodore, Biloela and Emerald).

The overall highest yielders over the past two seasons were the important commercial varieties, Siokra V-16 and Sicala 40, which performed well in all growing regions, though relatively better in the cool and central areas. The next best conventional overall performers were the new experimental okra leaf, Line 798, and the recently released okra leaf variety, Siokra V-17. Other good conventional variety yield performances came from two new experimental lines - 442 and 1243. These are both vigorous growing normal leaf types with good disease tolerance and they showed similar broad adaptation although they are intended for warmer regions north and west of Moree. The soon to be released normal leaf variety, Sicot 72, also showed broad adaptation. Sicot 70 is a new full

season variety with fusarium resistance comparable to our best current variety, Sicot 189. It provides another option for fusarium situations and has better yield and adaptation than Sicot 189 in eastern locations. Another paper in these proceedings presents data on these new varieties. As expected the early maturing, Siokra S-101, yielded well in cool environments but was less well adapted to longer season conditions while the hot area type, Sicot 53, showed the opposite pattern.

Table 1. Mean yields of important varieties and new breeding lines over the 1998/99 and 1999/2000 seasons as a percentage of overall or regional means.

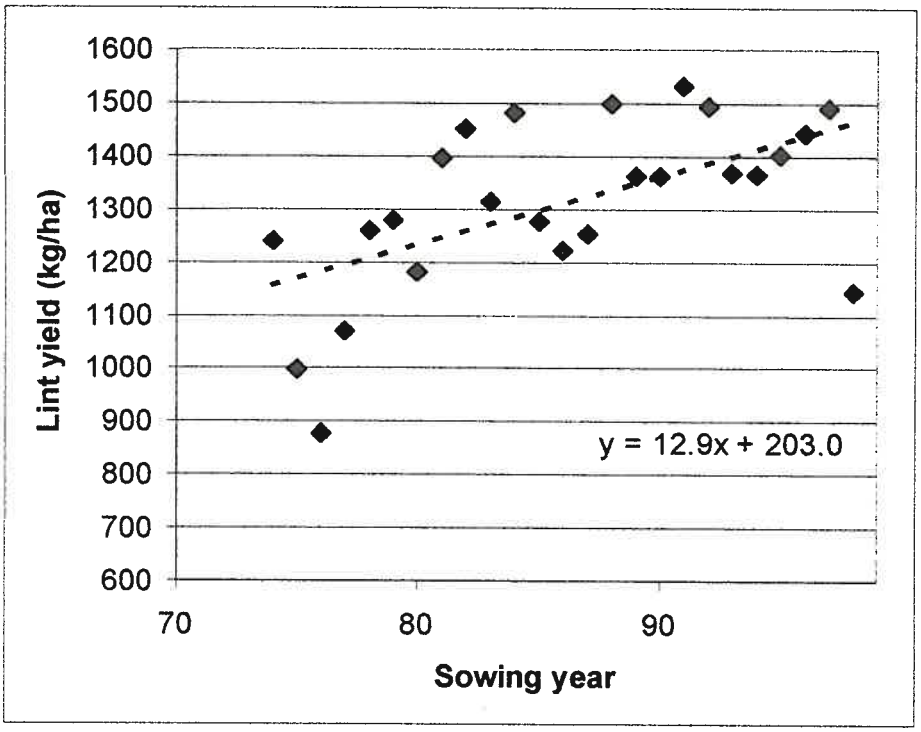
Variety	Mean	Cool	Central	West	North
Siokra V-16	108	117	107	103	104
Sicala 40	107	113	108	103	102
Line 798	107	111	106	108	102
Siokra V-17	106	120	107	107	98
Line 442	106	104	106	107	105
Line 1243	105	106	105	105	106
Sicot 72	105	103	105	107	104
Siokra S-101	100	113	101	100	93
Sicot 70	100	103	99	104	98
Sicot 53	99	92	96	102	106
Siokra 1-4	98	97	95	94	100
Sicot 189	97	85	97	101	101
Sicala V-2	96	98	94	98	95

Sicot 189 and Sicala V-2 had relatively lower performance then the new varieties. That result demonstrates the progress in yield potential in new varieties and also how the seasons have affected performance. Sicala V-2 had some sites in 1998/99 affected by 'bunchy top' and the cool season in 1999/2000 disadvantaged Sicot 189 in some southern sites. Both the varieties are still very important commercially as they have high levels of resistance to all diseases.

The yield pattern with long term control varieties from 1974 (Namcala and DP16) illustrates an interesting demonstration of progress in yield over the past 26 years in Australia (Figure 1). This regression shows that improved management (insects, weeds, soil, water, etc) has increased yield on average by 13kg lint/ha/year, or 335kg/ha over 26 years.

In Table 1, the yield of Siokra V-16 was 32% or 555 kg/ha higher than Namcala and DP16 in the same trials. Therefore in total with management and variety there has been 335 + 555 = 898 kg/ha (or 4 bale/ha) yield increase in the past 26 years.

Figure 1. The lint yield of DP16 and Namcala in CSIRO advanced line trials in the past 26 years. Each point represents the mean of all locations (generally 13) from central Qld to central NSW.



Conclusions

The yield results from the last two seasons of the ALT demonstrate that good yield progress is still being made in our breeding effort with a number of the new varieties and lines progressing to the release stage. The breeding program is continuing with special emphasis on developing two-Bt gene lngards of new lines and to source for improved fusarium resistance.

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