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FINAL REPORT
DEVELOPMENT OF IMPROVED COTTON VARIETIES

Code: CSP10C

This is an on-going project of breeding cottons adapted to Australian growing conditions, diseases and pests and markets.

A. REGIONAL ADAPTATION

(i) Varieties for cool eastern and southern areas.

A new short season variety, CS7S, has entered the final stage of seed increase and is replacing CS6S for 1992 plantings. CS7S is higher yielding and earlier than 6S but is otherwise similar, having normal leaf shape, short stature and large bolls. Its fibre quality is satisfactory with a key feature being high micronaire, a desirable character for cooler production areas. Good tolerance to *Verticillium* wilt is another feature.

(ii) Varieties for the central mainstream area.

Two of our varieties (CS50 and Sicala 34) in 1991/92 were in the last stage of multiplication preparatory to being available commercially in 1992. CS50 is a small bolled , small seeded variety with a high gin out-turn. It is high yielding with good quality fibre. Sicala 34 generally looks like CS50 having a similarly small boll but larger seed. It yields similarly to the high quality Sicala 33 variety but has appreciably higher (1.7g/tex) strength which means that it is nearly as strong as the renowned Namcala variety. Sicala 34 is replacing Sicala 33 completely in 1992. The following season (1993) Siokra L22 will be replaced by the more vigorous Siokra L23 since the latter has a better yield along with improved fibre uniformity of length and strength.

(iii) Varieties for "hot" outlying western and northern areas.

Another new variety developed in our program may replace CS189 in two years time. Over three seasons, the line (83203-183) has averaged four percent better yield than CS189 in these hot centres. It is slightly later maturing and thus may tolerate *Alternaria* better. Certainly in the last three seasons it has done well at Emerald where *Alternaria* commonly occurs.

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B. DISEASE TOLERANCE/ RESISTANCE

(i) *Verticillium* wilt tolerance

The commercialisation of Sicala V1 in 1991 has given farmers with a *Verticillium* problem a significant weapon to help combat the disease. Not only is it able to produce good yields under high disease pressure, the lower number of plants infected should help to slow the build up of inoculum in the soil. Good progress is being made in developing improved versions of V1 and five new selections were screened in the 1991/92 ACCT. Emphasis is also being placed on developing an okra leaf, *Verticillium* tolerant variety for *Verticillium* -prone areas where mites and/or *Heliothis* are also serious. Already one such line has been evaluated in the ACCT.

(ii)*Alternaria* Tolerance

A severe outbreak of *Alternaria* occurred at a CSD dryland trial on the western Downs in the 1990/91 season. Some varieties were badly affected but by contrast Sicala V1 was little affected and recorded by far the highest yield at harvest. As mentioned previously 83203-183 also appears to have some tolerance to *Alternaria.*

C. HOST PLANT RESISTANCE

(i) Glabrous, frego bract cultivars

The project to replace the obsolete low strength, blight susceptible Sicot 3 with a blight resistant, higher strength glabrous, frego bract type has now reached the stage where we are yield testing advanced lines. A few look promising and are being further tested and selected. Besides this material, which has a Deltapine varietal background, we are also working on the glabrous, frego bract combination in a different (Pee Dee) background since this material doesn't appear subject to the same rankness of growth and late maturity as pertains in the Deltapine background. The first yield test of this alternative material is scheduled for the 92/93 season.

(ii) Glabrous, okra leaf cultivars

The glabrous, okra combination shows good tolerance to insect pests such as *Heliothis* and mites. We are therefore pursuing their development although none, so far, have a stable enough performance to be completely acceptable

commercially. Advanced glabrous, okra leaf lines are being progressively developed and 44 were evaluated this season for the first time. Some of these performed very well and have been advanced for further testing.

(iii) In collaborative work with Dr G Fitt we evaluated a number of "insect resistant" cultivars from USA sources in a program to study pest reactions to HPR factors and to study and identify biochemicals with HPR potential. Yield results of the field trials show that our varieties perform well in comparison with the HPR-focussed germplasm even in the absence of insect protection. Nevertheless some of the USA varieties, when judged on their relative performance under pest exposure appear to contain HPR genes of interest.

(iv) *Bt* gene backcross program

The incorporation by backcrossing of three different *Bt* constructs from Monsanto into a number of CSIRO varieties has seen the completion of the second backcross for two constructs and the first backcross for the third.

D. FIBRE QUALITY

Our efforts to raise fibre quality has placed most emphasis on fibre strength. As previously mentioned, the commercialisation of Sicala 34 is a considerable advance and will give farmers a high yielding variety with a strength only about 1g/tex less than the traditional high quality variety Namcala.

Our selection program to raise the length uniformity of Siokra L22 has also succeeded: the selection Siokra L23 that is now under commercial seed increase has a 1.5% greater uniformity ratio than Siokra L22 besides better yield and strength.

The very high quality variety Sipreme, which is intermediate to Namcala and Pima in quality , has undergone further evaluation at Tandou and Bourke where there is considerable interest in Pima production. The Tandou interests are now awaiting the results of an evaluation by a Japanese firm of the fibre to determine whether they will proceed with commercial production of this high quality variety.

<u>Overall Progress - Yield and Strength</u>

Our overall progress in these key varietal attributes is summarised by Fig. 1

Now that we have a functional maturity tester we are also now placing selection emphasis on maturity and fineness. Both CS50 and Sicala 34 have a good combination of these properties.

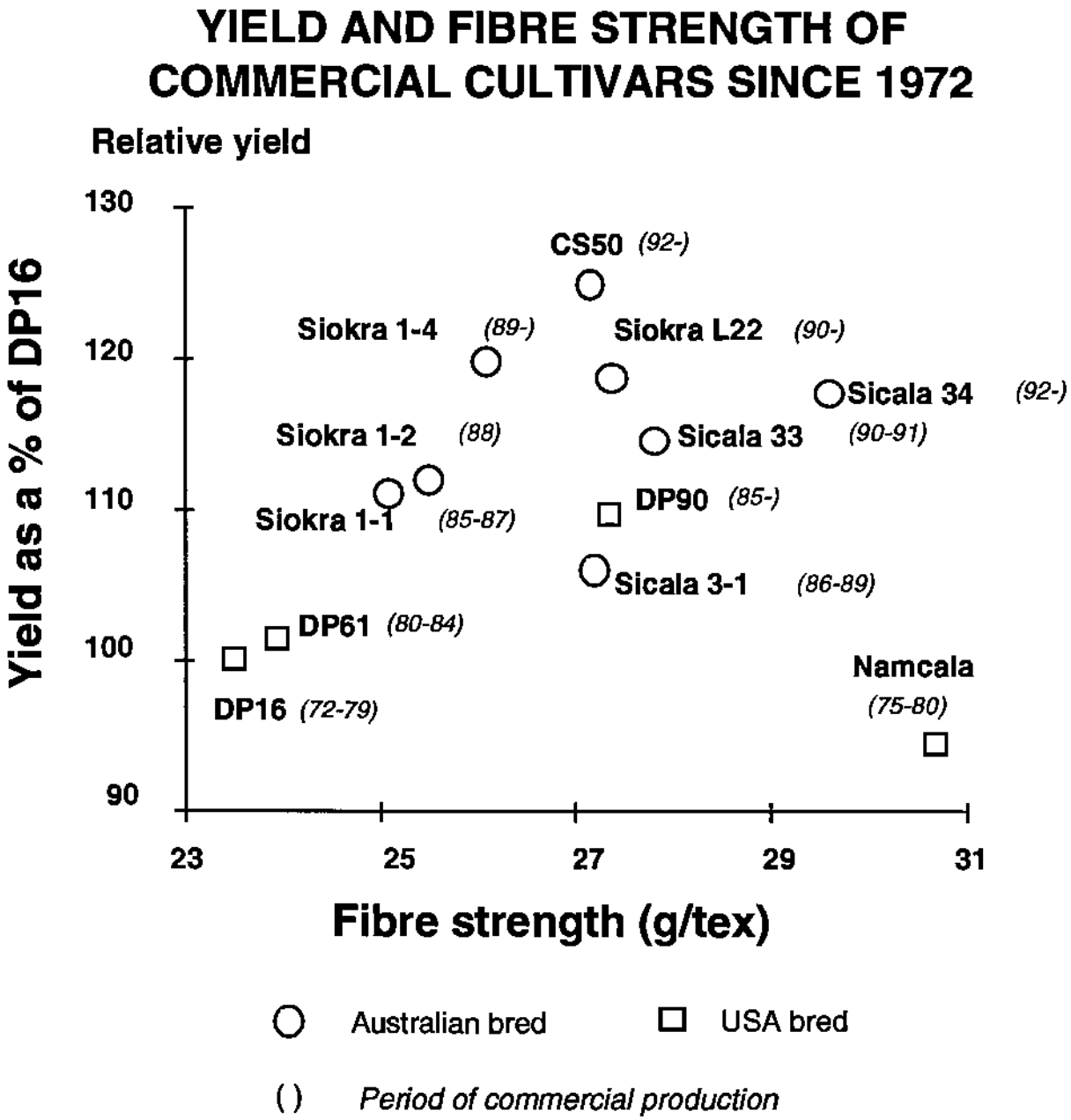

Figure 1. Commercial varieties grown in Australia over the last two decades. Overall means for 1989/90 and 1990/91 ACCT (Thomson, Reid and Mann - unpublished).