CSIRO SHORT SEASON VARIETIES

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The CSIRO breeding programs aim to produce varieties for all the different growing situations in Australia. Situations where special varieties are very important are for cooler growing areas and for Verticillium wilt infected soils. This paper will discuss our short season varieties and Sicala V1 which, although not early maturing, is adapted to the cooler and Verticillium prone areas. A discussion of our varieties developed for the mainstream production areas can be found in the paper by Norm Thomson.

Early maturing varieties can increase productivity in the cooler parts of the Darling Downs, the upper Namoi valley, the upper Macquarie valley and potentially in the more southern river valleys. In longer season areas early varieties can be useful for late planting and as a management tool to enable some earlier harvesting.

Verticillium wilt appears to be an increasingly important disease in Australian cotton growing areas. As well as the traditional problem areas on the Darling Downs, around Wee Waa and in the Macquarie Valley the disease can now be readily found in the Gwydir and McIntyre valleys, at St George and even at Bourke. While tolerant varieties are only part of a total strategy required to manage Verticillium, they can be of great importance in maintaining satisfactory yields.

Current Short Season and Verticillium Tolerant Varieties

Siokra S324 is an early maturing okra leaf type being slightly shorter and earlier than Siokra 1-4. The okra leaf confers some insect resistance, especially to mites. Like all CSIRO varieties it is fully resistant to bacterial blight. S324 is widely adapted and performs well at late plantings. It has moderate fibre quality with a key feature being a higher micronaire than Siokra 1-4, lessening the likelihood of penalties for low micronaire in poor seasons.

CS 7S which has replaced CS 6S this season is an early maturing, normal leaf variety. It is a short, compact plant, with cluster fruiting and large bolls. Of course

it is bacterial blight resistant and it also has good Verticillium wilt tolerance. CS 7S has good fibre strength and, like S324, a higher micronaire. The prime areas of adaptation of CS 7S are the cool growing areas, particularly those with a Verticillium problem. It is not well adapted to long growing season areas, especially if it suffers stress.

Sicala V1 is a normal leaf variety with very distinctive dark green colouring, a compact plant habit and large bolls. As well as possessing bacterial blight resistance, V1 stands out as the most Verticillium tolerant variety available, as demonstrated by a low proportion of plants infected, lower severity of disease symptoms amongst the plants infected and, most importantly, by maintaining high yields under disease conditions. While V1 is not early maturing it has yielded well relative to other varieties in shorter season areas, even in the absence of Verticillium. In the 1991/92 season it coped well with the Alternaria/premature senescence problems and performed well in a wide range of environments. As the Sicala name indicates V1 has very good fibre quality.

Another variety with some ability to cope with Verticillium wilt is CS 189 which is discussed more fully by Norm Thomson.

Varietal Performance

Results in large scale CSD trials at the Brookstead, Breeza and Boggabri sites for the last two seasons (Table 1) illustrate the strong performance of Siokra S324 and CS 7S in these cooler environments. The 1990/91 Brookstead and 1991/92 Breeza trials were affected by Verticillium and this is reflected in the higher yields of CS 7S and Sicala V1 compared to Siokra 1-4, which does not cope well with high Verticillium pressure.

To gain a better appreciation of the relative long term performance of varieties in these cooler environments the data from all CSD trials since 1987/88 were combined (Fig.1). Because all varieties have not been included in all trials, each is compared to Siokra 1-4, the variety common to all trials. The number of years and trials for each variety is also shown. Thus the most reliable comparisons with Siokra 1-4 are Deltapine 90 (95% of the yield of 1-4 over five seasons and eleven trials); and CS 6S and CS 7S whose results were combined since they are closely

related. Over the five seasons and eleven trials CS 6S/7S has averaged 5% more than 1-4. Siokra S324 in eleven trials and four seasons has averaged 3% more than 1-4. Less weight can be put on the comparison of V1 and 189 with 1-4 since they only have four trials in two seasons but so far they have both performed well with V1 averaging 9% and 189 5% more than 1-4. Two of the trials had significant Verticillium problems which strongly favoured V1 and 189.

Table 1. Yields of variation in CSD large scale trials in short season environments for the last two seasons expressed as a percentage of Siokra 1-4.

Variety	Breeza		Boggabri		Brookstead	
	90/91	91/92	90/91	91/92	90/91	91/92
Siokra 1-4 (b/acre)	2.4	2.8	2.8	2.9	3.0	3.3
Deltapine 90	-	-	81	98	115	-
Siokra S324	100	107	101	104	121	98
CS 7S	100	117	-	111	132	92
Sicala V1	90	112	-	-	127	102

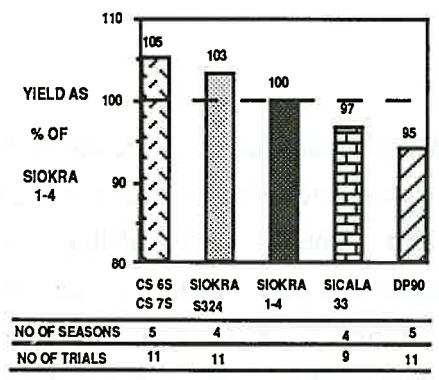

Figure 1. Short season region yield averages of large scale CSD variety trials.

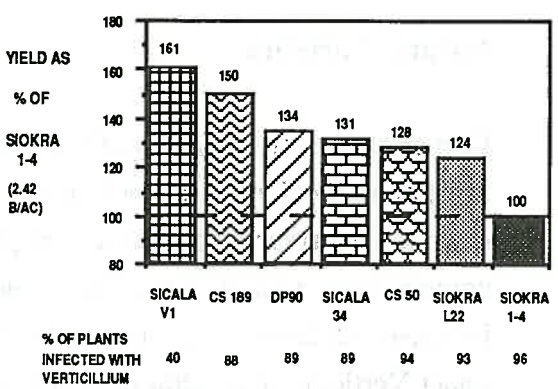

Figure 2. 1991/92 Merah North CSD large scale variety trial.

To illustrate the relative performances of varieties under heavy Verticillium pressure in a warmer environment the 1991/92 CSD trial from Merah North near Wee Waa provides a good example (Fig.2). Very high levels of the disease were present in

this trial as illustrated by the proportion of plants infected (determined by Dr Stephen Allen, NSW Agriculture). The much lower Verticillium infection levels for V1 are typical of results found on numerous occasions by Dr Allen (Table 2). Under the severe disease pressure in the Merah North trial Sicala V1 performed outstandingly, yielding 3.9 ba/acre and 61% more than Siokra 1-4. CS 189 also yielded well. As well as the Verticillium problems the trial suffered severe waterlogging and exhibited considerable boll rot and premature senescence. During the 1991/92 season Sicala V1 yielded outstandingly in the areas as diverse as St George, the Downs and the Macquarie valley.

Table 2. Proportion of plants infected with Verticillium wilt in some CSD large scale trials. Data courtesy of Dr S Allen, NSW Agriculture.

Variety	89/90 Narrabri	90/91 Brookstead	90/91 Narrabri	91/92 Merah North	Mean
Siokra 1-4	61	69	85	96	78
Sicala 33	63	48	85	86	71
Deltapine 90	44	58	73	89	66
CS 189	45	48	73	88	64
Sicala V1	35	20	41	48	36

Future Varieties

One of the major emphases of our breeding program has been the development of an okra leaf variety with Verticillium tolerance since Verticillium prone areas also often have serious Heliothis or mite problems. The first okra leaf line with a good combination of yield, Verticillium tolerance and quality (Line 176) will enter seed increase and large scale trialling in the coming season. In two seasons of testing under Verticillium conditions at Narrabri it yielded the same as Sicala V1 and 16% better than the best commercial okra leaf, L22.

Another exciting development in Verticillium tolerant varieties is the selection of very high yielding Sicala V1 types. The first of these (Line 1323) will undergo

seed increase and large scale testing next season. It averaged 8% more than V1 in two seasons of multi-site trials and had slightly better quality.

Promising advances are also being made in short season varieties with a new normal leaf type (Line 308) entering seed increase and large scale trials. Over two seasons in the shorter season areas it averaged 7% more than CS 7S.

Conclusions

Our CSIRO breeding programs are producing rapid advances in special purpose varieties for cooler growing areas and for Verticillium wilt situations. For the cooler Downs areas, the upper Namoi and upper Macquarie, CS 7S and Siokra S324 will give farmers a consistent performance even in adverse seasons. Sicala V1 also yields well in these areas but since it is not early maturing care should be taken not to plant it too late. For the more southern and drier areas such as Hillston and Tandou the picture is less clear but S324 appears to be a good performer. The use of CS 7S and S324 in an early harvest management strategy in hotter areas is feasible but should be approached with caution since 7S in particular appears prone to premature cut out under stress conditions. It should also be remembered that the difference in days to maturity between short and full season varieties will be less in a hot environment. For late plantings Siokra S324 is the best option.

Under bad Verticillium conditions in all areas Sicala V1 is the preferred choice while CS 7S does well in the cooler Verticillium areas. CS 189 is an option for moderate Verticillium levels in all areas.

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