

# **ACALA SIERRA RR: COMBINING HIGH YIELD, HIGH QUALITY, AND HERBICIDE TOLERANCE**

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## **Abstract**

Acala Sierra RR is a new, high yielding Roundup Ready Acala cotton variety for California's San Joaquin Valley. Over two years of testing by the San Joaquin Valley Cotton Board at fifteen locations, Acala Sierra RR yielded significantly more than Maxxa by 105 pounds of lint per acre. Fiber and spinning properties of Acala Sierra RR were equivalent to those of Maxxa. Supplies of Acala Sierra RR planting seed should be adequate in 2003.

## **Introduction**

Acala Sierra RR is a new, high yielding Roundup Ready cotton variety developed by CPCSD for California's San Joaquin Valley. Approval for commercial release is expected in March 2003. To introduce Acala Sierra RR, results of various comparisons for yield, fiber quality, spinning quality, and agronomic properties will be discussed.

## **Materials and Methods**

Acala Sierra RR was developed between 1993 and 1996 through a crossing and backcrossing program between Acala Maxxa and Monsanto 1445 (a line carrying resistance to glyphosate herbicide). From 1997 through 1999, progeny were selected for yield and fiber quality. In 1999 a BC<sub>6</sub>F<sub>4</sub> line was identified as "Mon214." In 2001 and 2002, this line (renamed "C-104") was tested by the San Joaquin Valley Cotton Board in fifteen performance trails. At each location, Acala Sierra RR was compared to Maxxa (the San Joaquin Valley Cotton Board's standard Acala variety) in a randomized complete block design with four replications. In 2001, PHY 72 Acala, a widely planted variety, was also included in these tests. Yield, fiber quality, spinning quality, seed coat fragment characteristics, and agronomic characteristics were evaluated using samples obtained in 2001. Fiber properties were measured on individual instruments by StarLab in Knoxville, Tennessee. Yarn and spinning properties of combed Ne 50's count yarns were evaluated by the International Textile Center (ITC) in Lubbock, Texas. Seed coat fragment evaluations were also performed by ITC.

## **Results and Discussion**

Results of the San Joaquin Valley Cotton Board's 2001 Acala Variety Tests are shown in Figure 1. Acala Sierra RR yields were higher than those of Maxxa at all eight locations and higher than those of PHY 72 at five out of eight locations.

Figure 2 shows an over-locations yield comparison of Acala Sierra RR, PHY 72, and Maxxa grown in the San Joaquin Valley Cotton Board's 2001 Acala Variety Tests. Acala Sierra RR yields were equivalent to those of PHY 72 and significantly higher than those of Maxxa.

Results of the San Joaquin Valley Cotton Board's 2002 Acala Variety Tests are shown in Figure 3. Acala Sierra RR yields were higher than those of Maxxa at all seven locations.

Figure 4 shows an over-locations yield comparison of Acala Sierra RR and Maxxa grown in the San Joaquin Valley Cotton Board's 2002 Acala Variety Tests. Acala Sierra RR yields were significantly higher than those of Maxxa.

Figure 5 shows an over-years, over-locations yield comparison of Acala Sierra RR and Maxxa grown in the San Joaquin Valley Cotton Board Variety Tests from 2001 to 2002 (15 trials total). The mean yield of Acala Sierra RR was significantly higher than Maxxa by 105 pounds of lint per acre (1669 lbs./ac. and 1564 lbs./ac., respectively).

Fiber quality results are shown in Table 1. Acala Sierra RR exhibited fiber characteristics equivalent to Maxxa.

Spinning properties are shown in Table 2. Acala Sierra RR showed significantly better combed Ne 50's count yarn elongation with significantly fewer thins than Maxxa. Other yarn properties did not differ significantly from Maxxa.

Seed coat fragment evaluations, shown in Table 3, indicated no significant differences between Acala Sierra RR and Maxxa. As measured by "total sticky deposits," PHY 72 was significantly lower in seed coat fragments than Acala Sierra RR and Maxxa. But as measured by "fiber nep number per gram," "fiber seed coat nep number," and "yarn seed coat fragments," Acala Sierra RR was significantly lower in seed coat fragments than PHY 72.

Agronomic properties are shown in Table 4. Acala Sierra RR was slightly taller than Maxxa, but had similar internode length, total number of nodes, and total bolls.

### Summary

Acala Sierra RR is a high yielding Acala cotton variety characterized by excellent fiber and spinning properties. Seed coat fragment levels are similar to those of Maxxa. Supplies of Acala Sierra RR planting seed should be adequate in 2003.

### References

Ball, S. T. 2002. San Joaquin Valley Cotton On-Farm Variety Trial Program 2001.

Table 1. 2001 SJVCB Acala Variety Tests, Fiber Quality Traits (Starlab, Individual Instruments).

Variety	2.5% Span	Uniformity	T1	E1	Mic
	Length	Ratio			
Sierra RR	1.163 a	48.3 a	23.2 a	6.29 a	4.18 a
Maxxa	1.168 a	48.8 a	23.7 a	5.94 a	4.20 a
CV%	1.52	1.6	4	9.3	3.3

Table 2. 2001 SJVCB Acala Variety Tests, Spinning Properties (ITC).

Property	Sierra RR	Maxxa
Elongation (%)	5.28 a	5.12 b
Neps (200%) (#/km)	136.5 a	142.5 a
Thicks (#/km)	108.8 a	121.1 a
Thins (#/km)	17.9 a	22.0 b
CV (%)	15.05 a	15.18 a
Tenacity (cN/tex)	18.3 a	18.7 a
Work (gF.cm)	294.4 a	288.6 a
Break Factor (lb.Ne)	2820 a	2847 a

Table 3. 2001 SJVCB Acala Variety Tests, Seed Coat Fragment Evaluations (ITC).

Variety	Total Sticky Deposits	Fiber Nep Number	Fiber Seed Coat Nep Number	Yarn Seed Coat Fragments
	(no. per 222 cm <sup>2</sup> )	(no. per gram)	(no. per gram)	(no.)
Sierra RR	32.2 b	233.0 a	22.8 a	59.6 a
Maxxa	32.7 b	223.1 a	24.7 ab	62.2 a
PHY 72	23.8 a	266.5 b	28.1 bc	74.6 b
LSD .05	4.6	20.6	3.5	7

Table 4. 2001 SJVCB Acala Variety Tests, Agronomic Traits.

Variety	Plant Height	Height to Node	Total Nodes	Total Boll Count
	(in.)	Ratio		
Sierra RR	38.4 a	1.733 a	22.1 a	12.4 a
Maxxa	35.8 b	1.615 a	22.3 a	11.0 a
CV %	8.6	9.1	8.4	29.7

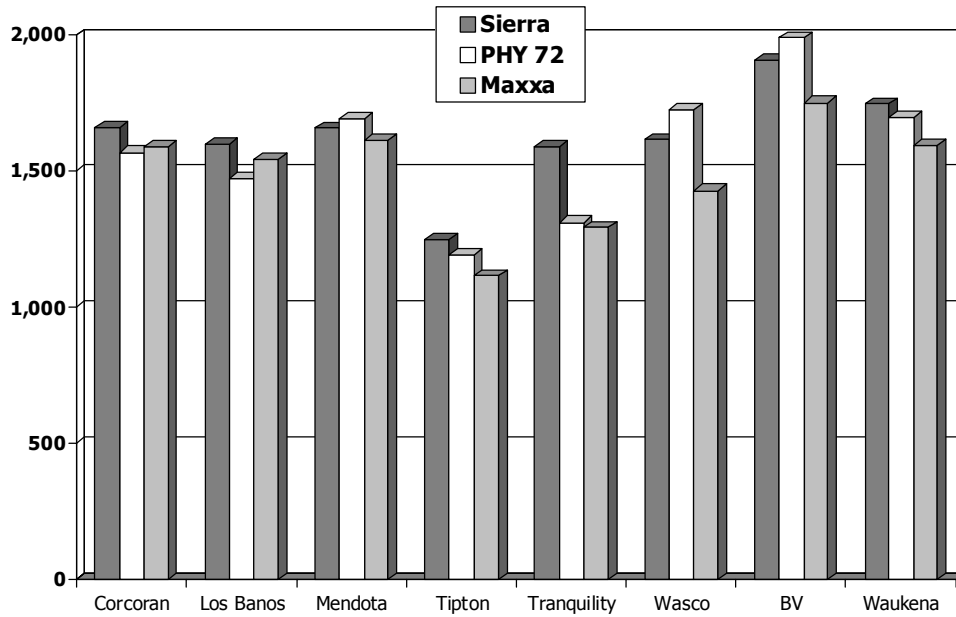


Figure 1. 2001 SJVCB Acala Variety Tests, Mean Yields By Location (lbs. lint/ac.).

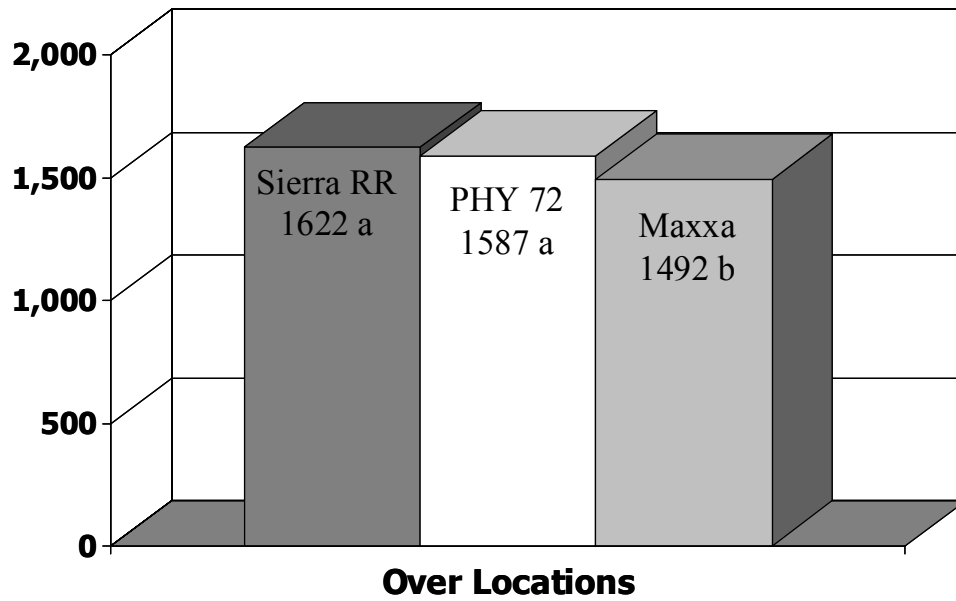


Figure 2. 2001 SJVCB Acala Variety Tests, Mean Yields Over Locations (lbs. lint/ac.).

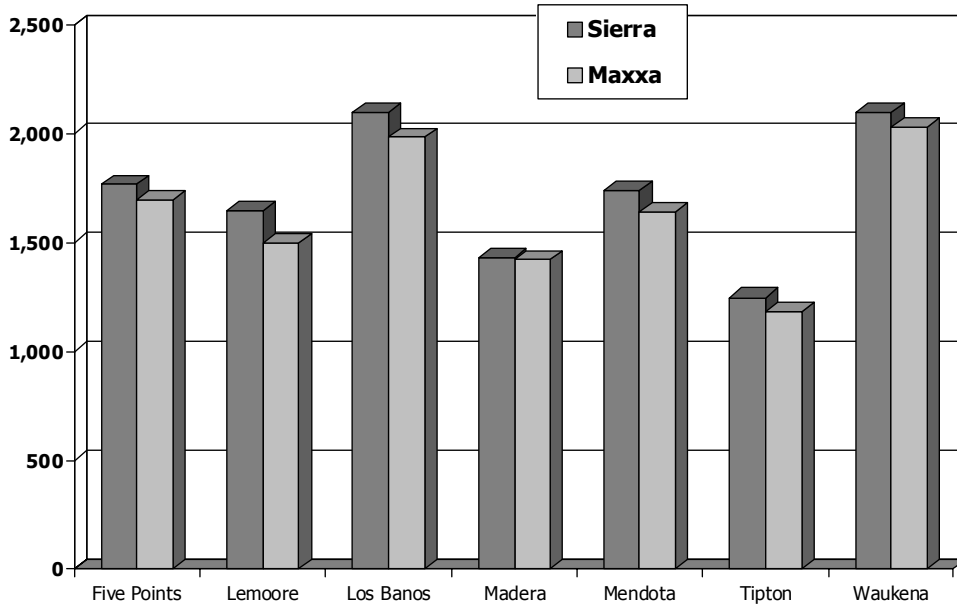


Figure 3. 2002 SJVCB Acala Variety Tests, Mean Yields By Location (lbs. lint/ac.).

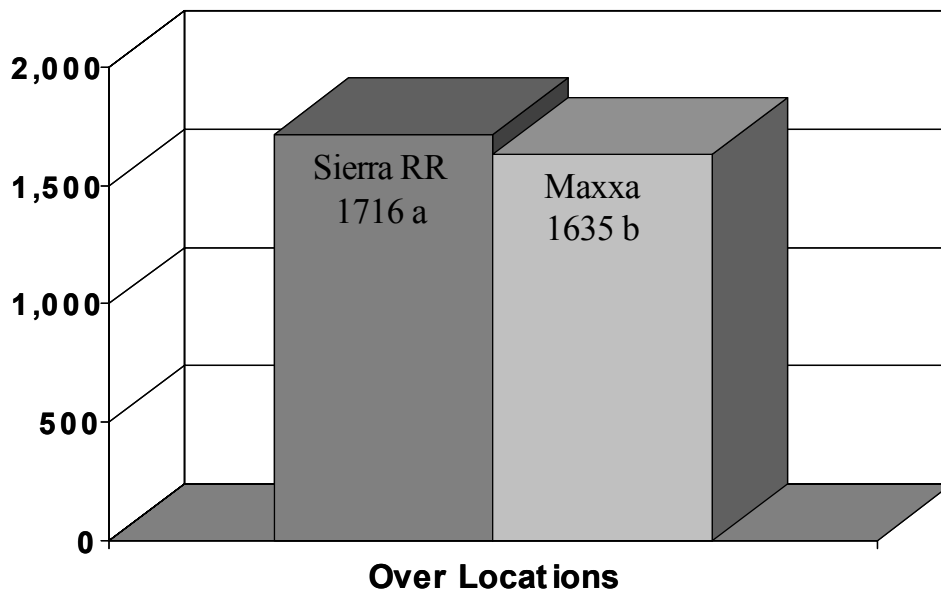


Figure 4. 2002 SJVCB Acala Variety Tests, Mean Yields Over Locations (lbs. lint/ac.).

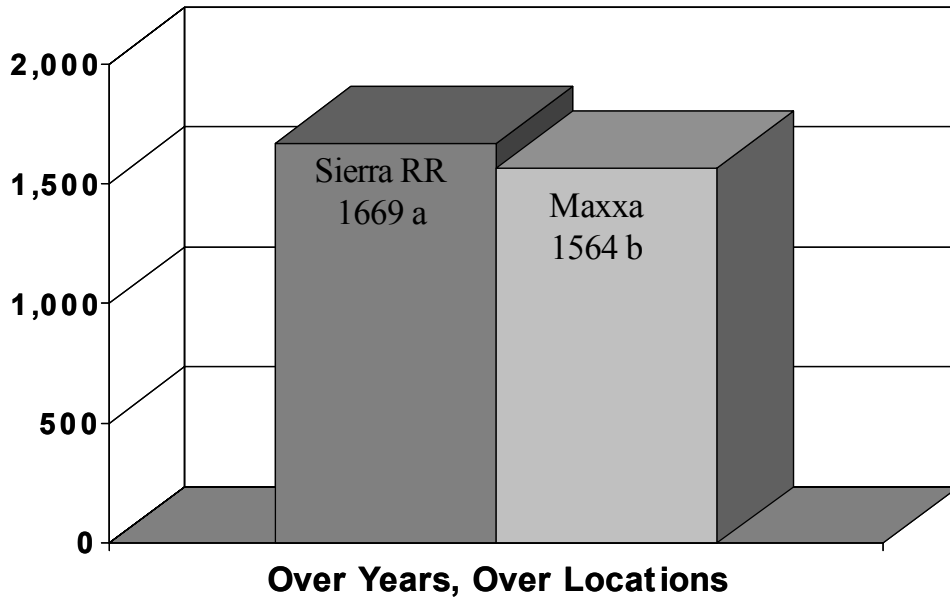


Figure 5. 2001-02 SJVCB Acala Variety Tests, Mean Yields Over Years, Over Locations (lbs. lint/ac.).