

## CULTIVAR RELEASE

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### RB002504 – New early-maturing sugarcane cultivar

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**Abstract** – Due to the high sucrose content, RB002504 is indicated for harvesting in the early harvest period, from September to November, in the Northeastern region of Brazil. Planting on medium texture soils is recommended. The cultivar is highly responsive to ideal production environments and resistant to the major sugarcane diseases.

**Key words:** *Saccharum* spp, management, breeding.

### INTRODUCTION

The Inter-University Network for the Development of Sugarcane Industry (RIDESA - [www.ridesa.com.br](http://www.ridesa.com.br)), is a productive partnership of 10 Federal Universities (UFS-CAR, UFRPE, UFAL UFRRJ, UFV, UFG, UFPR, UFS, UFPI and UFMT) with the common goal of developing genetically improved RB (Republic of Brazil) cultivars (Daros et al. 2010).

The RIDESA through its Genetic Improvement Program of Sugarcane (PMGCA) offers, for the productive sector, new cultivars that show early, medium and late maturation with resistance to the major diseases of the crop and planting recommendations for different conditions of soil and climate, for South-Central (Daros et al. 2010, Carneiro et al. 2011), Southeast (Silveira et al. 2012) and Northeast (Melo et al. 2014) regions of Brazil.

The sugarcane breeding program of the State of Pernambuco (PMGCA/RIDESA/UFRPE) is based at the Experimental Station of Sugarcane of Carpina (EECAC), which has contributed considerably to the development of breeding methods and strategies of the crop.

### CHARACTERISTICS OF THE CULTIVAR

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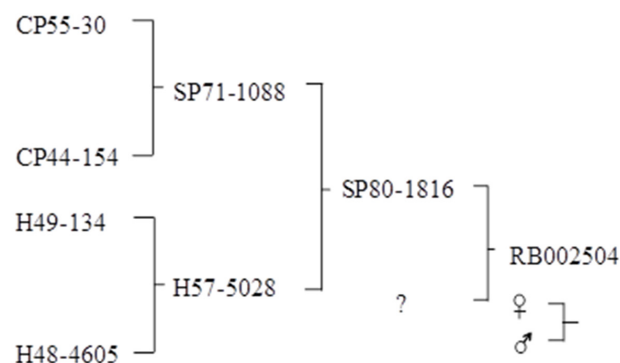
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The ratoon tillering of the cultivar from burnt and green-harvested cane is good, the fiber content average, and maturity early, with high processing yield at the beginning of the harvest. To maximize the sugar content, cultivation is recommended in medium-textured soils. In the north-eastern region of Brazil, RB002504 is to be harvested from September to November.

### PEDIGREE AND BREEDING METHOD

The breeding of cv. RB002504 (Figure 1) was initiated with the hybridization of cv. SP80-1816 with multiple pollen-

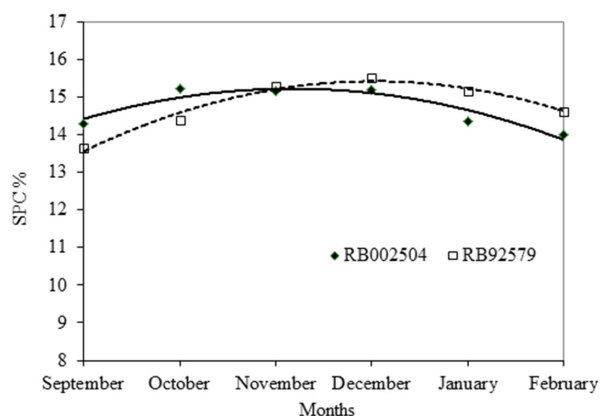


**Figure 1.** Genealogy of RB002504 cultivar.

donor parents (multiple-parent crosses), in June 2000, at the Flowering station Serra do Ouro, Murici (lat 09° 13' S, long 35° 50' W and alt 450 m asl), state of Alagoas.

In May 2001, the seeds of this and other crosses of the RB00 series were germinated in a greenhouse at EECAC/UFRPE in Carpina (lat 07° 47' S, long 35° 15' W and alt 178 m asl), state of Pernambuco. In September 2001, hundreds of seedlings of the cross (SP80-1816 x ?) and of other crossings were planted in the first trial, totaling 70,128 seedlings planted separately, spaced 0.5 m in rows spaced 1 meter apart in an experimental field of EECAC, together with the regionally most commonly planted cultivar RB92579 (control), constituting the initial selection phase called T<sub>1</sub>. In November 2002, the plant cane was harvested (first cut) and in November 2003 visual phenotypic (mass) selection was performed in individual plants of the T<sub>1</sub> phase in the ratoon crop (second cut). After selection in T<sub>1</sub>, clones were propagated for the first time and planted in the field in a single plot of two 3-m rows (augmented block design), representing the second selection stage T<sub>2</sub>, with 321 clones. In November 2004, stage T<sub>2</sub> was selected in plant cane and the 111 selected clones were planted immediately in stage T<sub>3</sub>, in four 5-m rows. The selection of T<sub>3</sub> was performed based on the data of plant cane selection in November 2005, resulting in the promotion of 96 clones to the next phase named Propagation Phase (PP) with ten 10-m rows. At this stage, the selected clones were planted in two agro-ecological environments.

In November 2006, after selection of the PP plant cane, 78 selected clones were planted in a new propagation stage called Extended Propagation Phase (EPP), in fifteen 10-m rows in three agro-ecological environments. In June 2007, after selection in the PP ratoon crop, a Trial Phase (FE) and a maturation curve (MC) with 28 clones were installed in the field, initiating the test phase in five environments of the



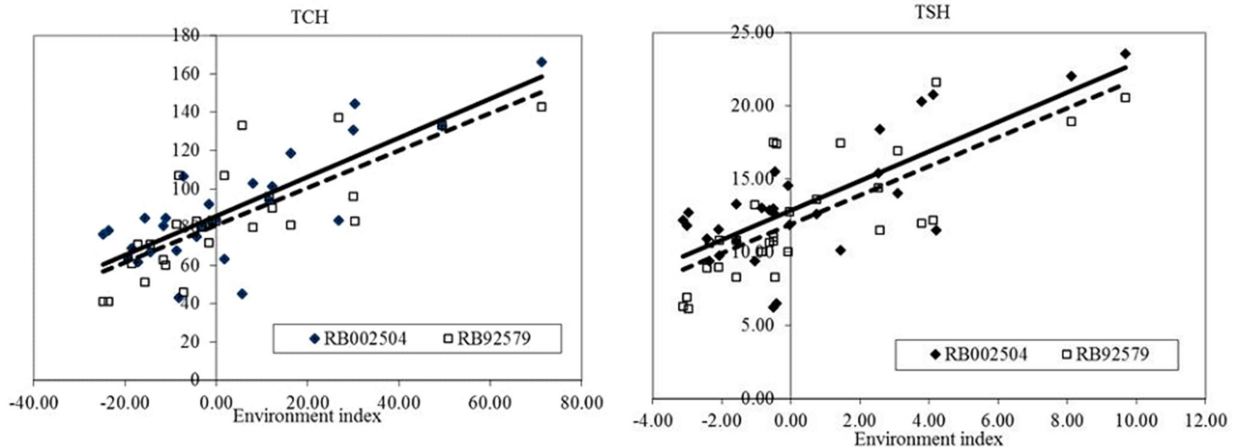
**Figure 2.** Maturation curves ripening of the cultivars RB002504 and RB92579 for the variable sucrose percentage in cane (SPC) at harvest in Pernambuco, from September to February.

rainforest of Pernambuco (between lat 7° 20' - 9° 00' S and long 34° 50' - 36° 20' W and). The 28 clones were planted in two FE fields with 14 clones per location and one MC, apart from cv. RB92579 (control), using a randomized block design in plots of five 8-m rows, with four replications.

For three growing seasons (2008, 2009 and 2010), the first, second and third cuts of the experiments were harvested, respectively, to evaluate characteristics such as tons of stalk per hectare (TSH), sucrose percentage in cane (SPC) - determined by the method proposed by Fernandes (2003) and sucrose yield (ton of sucrose per hectare - TPH), underlying evaluations of traits of processing yield, reaction to the major sugarcane diseases of the region, and of the phenotypic performance of adaptability and stability (Eberhart and Russell 1966). Moreover, the maturation stage of RB002504 at the experimental sites was compared with cv. RB92579 (Figure 2) in the period of sugarcane milling of Pernambuco, from September to February. In view of the

**Table 1.** Means of tons of stalk per hectare (TSH), sucrose percentage in cane (SPC) and tons of sucrose per hectare (TPH) of the sugarcane cultivars RB002504 and RB92579 (control) according to the harvest cut and estimated gain of the released cultivar. Mean data of 29 experimental harvests.

| Traits                    | CUT  | RB002504 | RB92579 | PERCENTAGE GAIN |
|---------------------------|------|----------|---------|-----------------|
| TSH (t ha <sup>-1</sup> ) | 1    | 103      | 96      | 7.64            |
|                           | 2    | 75       | 73      | 2.74            |
|                           | 3    | 67       | 63      | 6.35            |
|                           | Mean | 82       | 77      | 5.57            |
| SPC (%)                   | 1    | 15.07    | 14.94   | 0.87            |
|                           | 2    | 15.80    | 14.44   | 9.42            |
|                           | 3    | 11.24    | 10.84   | 3.69            |
|                           | Mean | 14.04    | 13.41   | 4.66            |
| TSH (t ha <sup>-1</sup> ) | 1    | 15.51    | 14.28   | 8.57            |
|                           | 2    | 11.85    | 10.54   | 12.42           |
|                           | 3    | 7.53     | 6.83    | 10.27           |
|                           | Mean | 11.63    | 10.55   | 10.42           |



**Figure 3.** Means of tons of stalk per hectare (TSH), and tons of sucrose per hectare (TPH) of the cultivars RB002504 and RB92579 with adjusted linear regression, according to the index of 29 experimental harvests in Pernambuco, as proposed by Eberhart and Russell (1966).

advantageous results in field tests, RB002504 (*Saccharum* spp.) was propagated intensively in areas of sugar mills of the region, where the most appropriate crop management could be tested, and was released in Pernambuco in June 2012 (Daros et al. 2010). The cultivar is protected by the National Plant Variety Protection, Ministry of Agriculture (Protection Certificate No. 20120239 - SNPC/MAP).

### Performance

The average results of 29 experimental harvests: 15 first cuts (plant cane), 10 second cuts (ratoon) and 4 third cuts (ratoon), indicated a higher processing yield in the three crop cycles of cv. RB002504 than of RB92579 (Table 1). The mean gain was 4.00 TSH (5.57%) and 0.60 SPC (4.66%). The gain was even more significant in sucrose yield per area (TPH 1.10 or 10.42%).

The maturation stage of a plant variety is represented by the accumulation of sucrose in cane juice (SPC) during the months of milling, and was determined by the method described by Fernandes (2003). For the harvest conditions of Pernambuco, the maturity performance of cv. RB002504 (Figure 2) was superior at the beginning of the harvest, indicating early maturity for processing, with best results from September to November.

In the evaluation of the processing yield, it was found that under environmental changes, according to the methodology of Eberhart and Russell (1966), based on the results of the 29 experimental harvests, RB002504 has wide adapt-

### REFERENCES

Daros E, Zambon JLC, Oliveira RA and Bespalhok Filho JC (eds.) (2010) **Liberação nacional de novas variedades “RB” de cana-de-açúcar.** AJIR, Curitiba, 64p.

ability and stability in TSH and TPH and is responsive to environmental improvement (Figure 3).

With regard to the reaction to major diseases, cv. RB002504 has good health, considering the two most important sugarcane diseases occurring in Pernambuco. It has resistance response to brown rust (*Puccinia melanocephala*) and leaf scald (*Xanthomonas albilineans*) and was so far unaffected by leaf rust (*Puccinia Kuehni*). In the Center-South of Brazil, the response to sugarcane smut (*Sporisorium scitamineum*, synonym *Ustilago scitaminea*), a disease of low incidence in Pernambuco and the Northeast of Brazil, was resistance.

### OTHER TRAITS

The cv. RB002504 has a tall, upright growth habit, green and purplish sheaths when exposed to the sun, easy detaching, a regular amount of leaves, rare flowering and lodging, rapid development, and good canopy closure in the plant and ratoon crop, although tillering is average.

### Germplasm maintenance and seedling distribution

Plants of cv. RB002504 are maintained by the clonal breeding program RIDESA/UFRPE/EECAC (Rua Ângela Cristina Canto Pessoa de Lunna, s/n, Bairro Santa Terezinha, CP 40, 55.812.010, Carpina, PE) and seedlings are propagated for distribution to producers.

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Fernandes AC (2003) **Cálculos na agroindústria da cana-de-açúcar.** 2<sup>nd</sup> ed., EME, Piracicaba, 240p.