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CULTIVAR RELEASE

Sugarcane: cultivar RB937570

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Abstract - *The sugarcane cultivar RB937570 is early to medium maturing. It should be grown preferably on medium texture soils with medium to high fertility. In central-southeastern Brazil, RB937570 should be harvested between May and August. It is tolerant to the major economically relevant crop diseases, has a good shoot development after mechanical harvesting and high sucrose yields.*

Key words: Saccharum *spp., plant breeding, cultivar description.*

INTRODUCTION

The main purpose of the sugarcane breeding program of the Federal University of Viçosa (PMGCA/UFV), which is part of RIDESA (Inter-University Network for the Development of the Sugar-Ethanol Sector), is to breed new sugarcane varieties that meet the country´s sugar/energy demand. RB937570 was developed for this purpose. The main feature of this cultivar is the sucrose yield, i.e., tons of pol per hectare (TPH). The stalk yield or tons of cane per hectare (TCH) is medium. Yields are highest from crops grown on medium-textured soils with medium to high fertility. In central-southeastern Brazil, RB937570 is early to medium ripening. Therefore, the cultivar should preferably be harvested between May and August. It has a slightly decumbent growth habit, enabling a good mechanical harvesting. Moreover, it is tolerant to the major crop diseases.

Pedigree and breeding methods

In 1993, at the Estação de Cruzamento da Serra do Ouro (lat 9º 13' S, long 35º 50' W and alt 450 m asl), in Murici, Alagoas, which belongs to the Federal University of Alagoas (UFAL), the cultivars RB72454 x SP70-1143 were crossed (Figure 1). In the same year, seeds from this cross were germinated in a greenhouse of the research center for sugarcane breeding (CECA), of the Federal University of Viçosa (UFV), in Oratórios (lat 20º 25' S, long 42º 48' W and alt 494 m asl), Minas Gerais. In December 1993, in an experimental area of the CECA, hundreds of seedlings of this cross (RB72454 x SP70-1143) and of others, representing stage T1 of the breeding program, were tested in a first trial. In 1995, after plant cane selection, the first clonal multiplication was performed. At this stage (T2), genotypes and a control cultivar (RB835486) were planted in single-row plots (length 4m) (augmented blocks). During the selection, genotypes with superior traits were identified. One of these was particularly noteworthy, for exceeding the yield of the control cultivar, which was named RB937570. In the next phase (T3), new tests were conducted with the selected genotypes. Several characteristics were evaluated in plant cane, first ratoon and second ratoon cane. In 2003, RB937570 was included in the multiplication phase (MPh) of selected genotypes. The experimental phase (EPh) was initiated in 2004. Experiments with 20-24 genotypes were conducted at various locations (areas of sugar mills and distilleries) in Minas Gerais, using a randomized complete block design with four replications (Table 1). The plots consisted of five 10-m rows, with a distribution of 18 buds m^{-1}. At this stage, the genotypes

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were evaluated in relation to tons of cane per hectare (TCH), sucrose percentage in cane juice (SPC), tons of pol per hectare (TPH), response to the main diseases, as well as adaptability and phenotypic stability (Eberhart and Russell 1966).

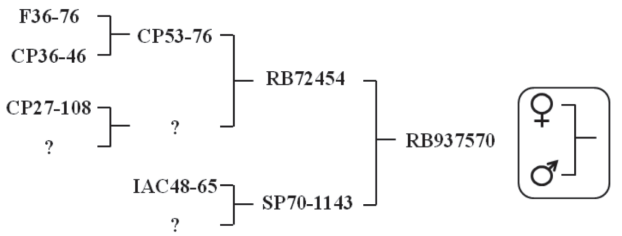


Figure 1. Pedigree of cultivar RB937570.

After the superiority of RB937570 was confirmed, several mills and distilleries began to multiply and grow the cultivar in semi-commercial areas of Minas Gerais, São Paulo and Mato Grosso. At this stage, several additional observations were made, especially related to management. Before releasing the cultivar for commercial production, results obtained from the experimental testing (cane, first ratoon and second ratoon cane) in 10 environments of Minas Gerais were analyzed (Table 1). Once the superiority and yield stability (sugar) of the cultivar was confirmed, the UFV had RB937570 registered by the National Plant Varieties Protection Service of the Ministry of Agriculture, Livestock and Supply, in September 2011.

Table 1. Coordinates of the locations of the experimental phase of the breeding program of cultivar RB937570

Municipality in Minas Gerais	**Latitude** (S)	**Longitude** (W)	**Height** (m)
João Pinheiro	17º 44' 33"	46º 10' 21"	1000
Campo Florido	19º 45' 38"	48º 34' 20"	642
Conceição das Alagoas	19º 54' 53"	48º 23' 18"	509
Araporã	18º 26' 10"	49º 11' 06"	461
Guaranésia	21º 17' 57"	46º 48' 09"	751
Canápolis	18º 43' 30"	49º 12' 16"	662
Monte Belo	18º 52' 14"	48º 52' 51"	730
Pompéu	19º 13' 28"	44º 06' 07"	657
Passos	20º 43' 08"	46º 36' 35"	745
Capinópolis	18º 40' 55"	49º 34' 11"	564

Performance

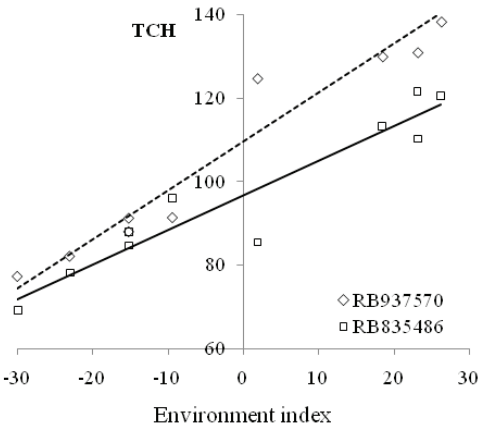
Results of experiments in mill and distillery areas showed that the performance of cultivar RB937570 was optimized when grown on medium-textured soils with medium to high fertility. The average values of the variables TCH (tons of cane per hectare), SPC (sucrose percentage in cane juice) and TPH (pol tons per hectare) showed that cultivar RB937570 performed better than the control (RB835486) in all three harvest cuts (Table 2). For TCH, the average superiority was approximately 12.8%; interestingly, the greatest difference between genotypes (superiority ~21%) was observed at the first cut (plant cane). At the second (first ratoon) and third harvest (second ratoon), superiority was 6 and 9%, respectively (Table 2). For the variable SPC, the average superiority of RB937570 compared with the control was approximately 3%, although in the harvests 1 and 2, the average of both genotypes was relatively similar (Table 2). Moreover, the greatest superiority of RB937570 over the control (RB835486) mean was found for TPH (17.75%). However, variations in the magnitude of the gain were recorded in all three harvests (Table 2).

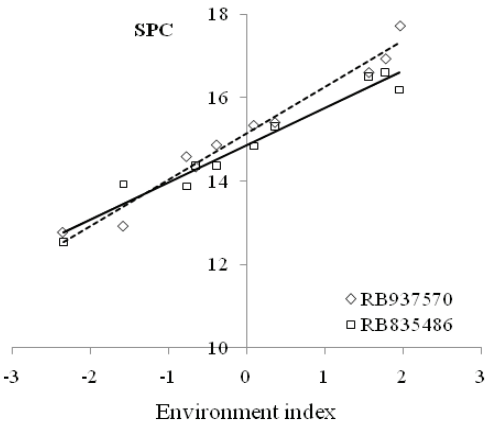
The environmental index obtained by the method of Eberhart and Russell (1966) showed that cultivar RB937570 has high adaptability and phenotypic stability for TCH. For the variables SPC and TPH, however, adaptability and phenotypic stability increased in relation to the control according to improvements of the environmental condition (Figure 2).

The maturation curve shows the sucrose accumulation in the course of the development of a sugarcane cultivar. Several factors interfere with sucrose accumulation, of which the most important are weather, soil, age of cane fields and

Table 2. Mean results of three harvest cuts in 35 experiments for the variables tons of cane per hectare (TCH), sucrose percentage in cane juice (SPC) and tons of pol per hectare (TPH)

Variables	**Cuts**	**RB937570**	**RB835486**	**Relative percentage**
TCH (t ha^{-1})	1	133.06	109.89	121.08
	2	94.51	88.90	106.31
	3	91.35	83.92	108.85
	Mean	106.31	94.24	112.81
SPC (%)	1	14.33	14.32	100.07
	2	15.24	15.18	100.40
	3	16.74	15.51	107.93
	Mean	15.44	15.00	102.89
TPH (t ha^{-1})	1	18.48	15.18	121.74
	2	14.57	13.62	106.98
	3	15.58	12.50	124.64
	Mean	16.21	13.77	117.75





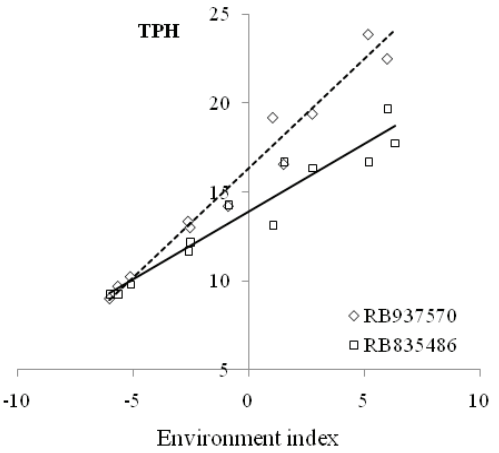


Figure 2. Mean phenotypic performance (plant cane and first ratoon cane) for the variables tons of cane per hectare (TCH), sucrose percentage in cane juice (SPC) and tons of pol per hectare (TPH) of cultivar RB937570 and control RB835486, assessed in 10 environments of Minas Gerais.

genetic trait inheritance. To determine the optimal harvest time of a cultivar in a given environment, the sucrose content is repeatedly measured during the crop development. Thus, sugarcane cultivars are classified as early, medium and late in relation to the period when sucrose reaches its maximum concentration. In central-southeastern Brazil, cultivars are classified as early, medium and late, if they reach the sucrose peak in May-June, in July-August, and in October or later, respectively.

By the methodology of sucrose determination proposed by Fernandes (2003), it was found that RB937570 is an early to medium ripening cultivar whose harvest is recommended from May to August (Figure 3). After this period, plants normally begin flowering. However, the negative effects of this natural physiological event are minimal for this cultivar; the pithiness is restricted to the palm heart, the plant top, where the green leaves of the mature plant are concentrated and which is removed at harvest.

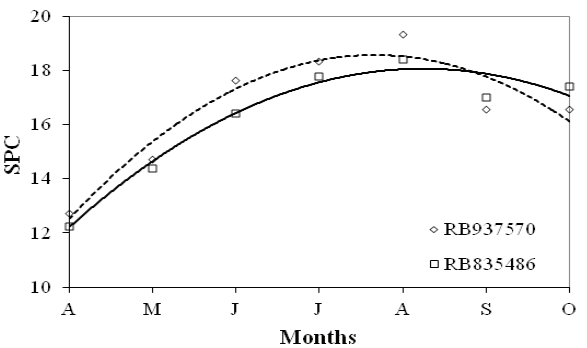


Figure 3. Maturation curve of cultivar RB937570 and of control RB835486 for the variable sucrose percentage in cane juice (SPC).

Cultivar RB937570 has a stable plant health in relation to the major crop diseases (Pin 1988). It is tolerant to brown rust (*Puccinia melanocephala* H. and P. Sydow), moderately tolerant to sugarcane mosaic virus (SCMV), sugarcane yellow leaf virus (ScYLV) and to leaf scald (*Xanthomonas albilineans* (Ashby) Dowson), and moderately tolerant to smut (*Ustilago scitaminea* H. and P. Sydow). However, it was found that smut incidence was related to cultivation in stressful environments (dry and cold, or temperature and relative humidity above 28°C and 90%, respectively). Symptoms of pokkah boeng (*Fusarium moniliforme* J. Sheld.) were observed in years with favorable weather for the disease development (low temperatures, water stress and soils with nutritional imbalance).

Other characteristics

Cultivar RB937570 has a slightly decumbent growth habit, with slightly open stools, semi-open purple-greenish sheaths, showing small part of the circular conoidal internodes arranged in a slight zigzag,

with medium size and diameter, is smooth, purple-yellowish and turns purple when exposed to sunlight. The amount of leaves is regular, the capitulum closed and the sugarcane heart medium-sized and green-purplish. Straw removal is relatively easy. The growth ring is yellow-green, medium wide and salient. The root area is narrow to medium, medium salient, yellow-greenish, with abundant root primordia, with no or a narrow leaf scar close to the bud insertion. The bud is round, little prominent, medium-sized, touching the growth ring, with narrow cushion, medium width and size of the wings, germ pore at the apex. It has hairs surrounding the bud. The bud channel, when present, is shallow. Regular presence of wax in the root node region. Leaves are light green, mean length, narrow width and curved near the tip. The auricle is unilateral, sickle-shaped and small. The dewlap is of the collar type and purple-green. The sheaths are short, arranged in a straight line, greenish, with weak presence of regular wax, deciduous fine hairs in dorsal position.

Germplasm maintenance and distribution and regions suitable for cultivation

Seedlings of RB937570 are maintained and distributed by the Department of Plant Science, Federal University of Viçosa, 36.570-000, Viçosa, MG, Brazil.

Cultivar RB937570 is appropriate for commercial production in the Southeast and Midwest of the country, provided that the restrictive environments described above are avoided.

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