

CULTIVAR RELEASE

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‘BRS Vitória’ – a novel seedless table grape cultivar exhibiting special flavor and tolerance to downy mildew (*Pasmopara viticola*)

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Abstract – ‘BRS Vitória’ is a novel cultivar of black seedless table grape. Its main traits meet the most important demands from the viticulture segment in Brazil. It is recommended for cultivation in tropical and subtropical areas, with excellent horticultural performance, high bud fecundity and resistance to downy mildew, the most important disease which affects grapevines in Brazil.

Key words: Genetic breeding, adaptation, resistance, fruit quality.

INTRODUCTION

Table grapes of the vinifera-type are mainly produced in subtropical and tropical Brazilian regions, especially seeded cultivars, such as Itália and its sports (Nachtigal 2003). Consumer markets, mainly international ones, are interested in growing seedless table grapes. However, several attempts to adapt management practices for traditional seedless cultivars introduced in Brazil, such as Thompson Seedless, Centennial and Crimson Seedless were unsuccessful (Camargo et al. 1997).

Thus, vinifera-type of seedless table grape cultivars is an important demand of the local viticulture industry, especially those aiming at fruit exportation. In order to achieve yield quantitative and qualitative standards, novel cultivars would preferentially be adapted to Brazilian climatic conditions, as well as present high natural bud fecundity and quality compatible with the international market requirements.

Moreover, cultivars which are tolerant to the main pests and diseases are a common demand from the Brazilian grape productive chain. In regions favoring the incidence of diseases, such as downy mildew (*Pasmopara viticola*) and powdery mildew (*Uncinula necator*), phytosanitary control may consist of up to 30% of the production costs (Grigoletti Júnior and Sônego 1997).

‘BRS Vitória’ is a novel cultivar of black seedless table grape, whose main traits comply with the most important

demands of the segment in Brazil. The cultivar agricultural and yield performance was adequate in trials carried out in the region of the São Francisco River Valley, located in the Northeast of Brazil, in the Northwestern and Central regions of the state of São Paulo, in the Northern Paraná, and in the state of Minas Gerais. It presented excellent horticultural performance in these regions, high bud fecundity, and tolerance to downy mildew.

Breeding methods

‘BRS Vitória’ was selected from the cross ‘CNPUV 681-29’ [‘Arkansas 1976’ x ‘CNPUV 147-3’ (‘Niagara Branca’ x ‘Vênus’)] x ‘BRS Linda’, made in 2004, at Embrapa Grape and Wine, Experimental Station of Tropical Viticulture (EVT), in the Municipality of Jales, State of São Paulo. Three hundred and ninety-nine embryos were rescued from the cross, giving rise to 158 plants, which were grafted in the vineyards of Embrapa Grape and Wine-EVT. The first harvest took place in August 2007, where the original plant was selected as CNPUV 1167-133 due to its good bud fecundity, raspberry flavor, high sugar content and absence of seeds. Subsequently, from 2007 to 2012, the horticultural and grape quality traits observed in the first harvest were confirmed, along with downy mildew tolerance, which is the main grapevine disease in Brazilian tropical climatic conditions. ‘BRS Vitória’, labeled Selection 22, was also evaluated from 2010 to 2012 in the municipality of Marialva, North of Paraná, in Tupi Paulista, Northwestern of

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São Paulo, and in the municipality of Curaçá, in the state of Bahia (São Francisco River Valley); and from 2011 to 2012, in Indaiatuba and Elias Fausto, Center of São Paulo. In 2012, the first harvest occurred in the region of Jaíba, Minas Gerais, and also in Petrolina, state of Pernambuco, in the São Francisco River Valley. Grape quality and yield remained stable in the several areas where the novel cultivar was assayed.

Main traits and performance

'BRS Vitória' is a vigorous cultivar that contributes to proper vineyard formation in the very first year. It presents wide climate adaptation, expressed by its excellent horticultural performance in several regions where it was assayed. The clusters are slightly compact, requiring especial management practices, including the use of growth regulators for elongation and berry thinning with scissors. Yields can be higher than 30 t ha⁻¹, but 25 to 30 t ha⁻¹ are recommended for regions with two annual cycles, one vegetative, and the other productive. In regions where it is possible to obtain two annual harvests, it is recommended to limit yields to 16 to 24 t ha⁻¹ cycle⁻¹ in order to maintain high berry quality. Due to its high level of acidity, harvest is recommended at 19° Brix or higher. At this stage, 'BRS Vitória' berries present the best balance between sugar level and acidity, resulting in an especial pleasant raspberry flavor without astringency. 'BRS Vitória' productive cycle varies from 90 to 135 days, depending on the thermal sum in the region. The longest cycle was observed in Northern Paraná and in the Center of São Paulo, whereas the shortest occurred in Curaçá, Bahia, in São Francisco River Valley (Table 1). The thermal requirements for 'BRS Vitória' were estimated in 1,511 degree-days from pruning to harvest, and 1,375 degree-days from bud sprouting to the end of maturation, considering the trough temperature of 10 °C.

Field evaluations to determine the reaction of 'BRS Vitória' to downy mildew [*Plasmopara viticola* (Berk. & Curt) Berl] were accomplished in EVT, in January 2008 and 2009, with temperature and humidity favorable to the disease incidence. The reaction to downy mildew was

determined by the severity evaluation using a grade scale ranging from 1 to 9 (IPGRI 1997) as follows: 1: highly resistant; 3: resistant; 5: moderately resistant; 7: susceptible; 9: highly susceptible. The novel cultivar was graded as resistant (grade 3) in 2008, and highly resistant (grade 1) in 2009. Therefore, 'BRS Vitória' is conservatively classified as resistant (grade 3), the most severe grade attributed to the material during the evaluations. The current resistance level means an advance in comparison to that of other seedless cultivars available in the market.

The disease evolution in other genotypes with distinct levels of susceptibility to downy mildew was studied in 2006, from November to December, when the climate conditions in Jales, São Paulo, were extremely favorable to the pathogen development. For genotypes evaluated as resistant (grade 3), as 'BRS Vitória', the initial symptoms were observed 16 days after the arrest of fungicides application (Naves et al. 2008). Thus, it is inferred that the number of sprayings to control downy mildew in tropical regions can be reduced by the use of 'BRS Vitória' in comparison to the spraying routine program traditionally adopted for the growing of vinifera grapes. Further studies will be carried out to determine the percentile of reduction.

During the biological assays, a high level of tolerance to leaf blight was also observed. The etiological agent for the disease has not yet been identified. The cultivar is susceptible to leaf-rust (*Phakopsora euvitidis* Ono) and anthracnosis (*Elsinoe ampelina* (De Bary) Shear) during the rainy season and, also, to the attack of fruit fly [*Anastrepha fraterculus* (Wied.) (Diptera: Tephritidae) and *Ceratitidis capitata* (Wied. 1824)]. In Marialva, Paraná, the occurrence of grape ripe rot [*Glomerella cingulata* (Ston.) Sapul & Schrenk] was also observed. Upon the occurrence of favorable conditions to diseases or pests, standard control to vinifera grapes is recommended. The novel cultivar presents good tolerance to berry cracking in the presence of heavy rainfalls during grape maturation.

According to international commercialization laws, the minimal solid soluble contents may vary from 14.0 to

Table 1. Biological life cycle of 'BRS Vitória' in the evaluated regions [beginning of the cycle: pruning; end of the cycle: harvesting time (berries at 19 °Brix)]

Region	Period	Cycle (days)
Northern Paraná	January-June July-November	130-135
Central São Paulo	January-June	130-135
Northwestern São Paulo	March-June	110-125
Northern Minas Gerais	June-September	100-110
São Francisco River Valley	January-May July-November	90-95

17.5 °Brix, depending on the cultivar and growing conditions. Fruit flavor comes mainly from the balance between sugars and acids (SS/TA or maturation index). High SS/TA ratio is desirable to consumer markets, and it offers an adequate fruit evaluation parameter, being more significant than the sugar or acidity contents alone. For table grapes, the recommended ratio should be equal or superior to 20 (Bleinroth 1993). 'BRS Vitória' presents an adequate sugar content, with potential of reaching up to 23 °Brix (Figure 1). Regarding the high acidity, the harvest is recommended when the grape presents at least 19 °Brix, a point of good balance between sugar content and acidity, resulting in a distinguished special raspberry flavor with no astringent taste in the peel.

In post-harvest assays, after 20 days of cold storage (temperature of 0 °C and relative humidity of ±95%), followed by three days under shelf-life conditions, rachis' darkening and dehydration were observed. These traits influenced berry losses, which reached about 2.15%, a level considered low to intermediate. Signs of rot were not observed during storage. Moreover, the balance sugar/acid did not change, and the berries organoleptic quality was maintained. The SS/TA ratio of 'BRS Vitória' was 25.26 after the storage, indicating high potential for consumer acceptability (Figure 1).

Phytopathological status

'BRS Vitória' was screened for the presence of viral infections. In this indexing process, the main viruses causing grapevine diseases, such as Leaf roll complex

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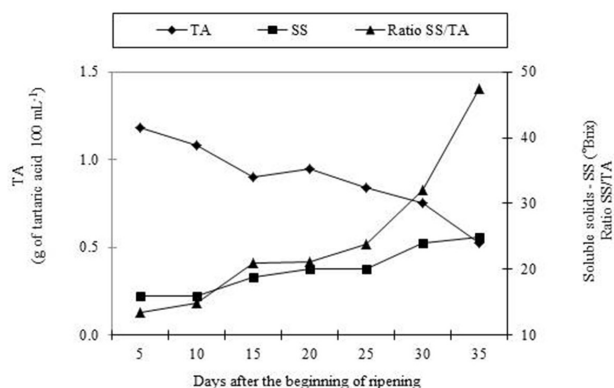


Figure 1. Total Acidity (TA) evolution, expressed as weight of tartaric acid (g) per 100 mL, sugar content, measured as total soluble solids, expressed as °Brix, and soluble solid and acidity ratio (SS/TA) during berry ripening of BRS Vitória cultivar (Embrapa Grape and Wine, EVT, Jales, SP).

and Rugose Wood Complex were considered. Diagnosis screen was based on RT-PCR (conventional or real-time) or molecular hybridization techniques. These methodologies are very sensitive and allow the detection of the viral nucleic acid in infected plants, which are discharged from the development process of producing propagative material. Thus, exclusively plants identified as healthy were used as foundation stocks to obtain propagative material for the multiplication of 'BRS Vitória'.

Information on propagative material of the novel cultivar BRS Vitória can be obtained at Embrapa Products and Market, Business Office in Campinas (www.campinas.spm.embrapa.br).

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