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Protection of a new Brazilian habanero pepper cultivar, Brs Juruti

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Abstract

Plant variety protection (PVP) Act was instituted in Brazil in 1997 and regulates intellectual property concerning plant breeding. A new cultivar may only obtain legal protection if it possesses five attributes: innovation, own denomination, distinctiveness (D), uniformity (U), and stability (S) (DUS). The main objective of this work is to present the process and the results of DUS tests required for the new habanero pepper (*Capsicum chinense* Jacq.) cultivar BRS Juruti developed by Embrapa Vegetables. BRS Juruti was derived from segregating population CNPH 4159, one of the over 4,000 accessions of Embrapa Vegetables' *Capsicum* Germplasm Active Bank. The original population showed variability for fruit and plant characteristics and incidence of viruses under field conditions. BRS Juruti was obtained after five cycles of individual selection and self-pollination until progenies showed no segregation. Plants were evaluated for disease resistance for different pathogens (*Ralstonia solanacearum*, *Xanthomonas euvesicatoria*, *X. gardneri*, *Oidiopsis sicula*, *Phytophthora capsici*, nematodes and viruses - tospovirus and potyvirus) under field conditions. DUS tests were performed in two production cycles in central Brazil. In both tests, three habanero pepper cultivars were assessed: BRS Juruti, CNPH 4159 and BRS Nandaia. A total of 42 plants were grown in each cycle, with six replicates of 7 plants each. Data were collected from three plants of each plot, and a total of 18 plants evaluated for each cultivar. Morphological characterization was based on 49 descriptors established by the Brazilian Ministry of Agriculture, Livestock and Food Supply (MAPA) for implementing the DUS tests of *Capsicum*: 16 descriptors for plant, 8 for flowering, and 25 for fruit characteristics. The original population CNPH 4159 showed low uniformity in both assays, particularly for plant stem length, leaf length and width, and fruit length, with late flowering and fruit ripening. The new cultivar BRS Juruti presented high uniformity being distinct from CNPH 4159 and BRS Nandaia, and it was stable during the two evaluation cycles; it is resistant to several viruses, *Oidiopsis sicula*, *Meloidogyne javanica* and presents intermediate resistance to key bacterial diseases. The protection process in Brazil is complex and rigorous, however, fundamental to comply with the Brazilian legislation. BRS Juruti has been protected by MAPA under certificate # 20150097.

1. Introduction

The Plant Variety Protection (PVP) Act in Brazil was instituted in 1997 by Law No. 9,456/97 and it is coordinated by the National Plant Variety Protection Service (SNPC) of the Ministry of Agriculture, Livestock and Supply (MAPA). The SNPC has jurisdiction to consider requests, grants the PVP certificate, and ensures the intellectual property rights of breeders or holder of new cultivars (Santos et al., 2012).

A new cultivar may only obtain legal protection if it is an innovation and distinguishable from other known cultivar through descriptive characteristics, own denomination, homogeneity and ability to remain stable in successive generations, which must be verified by Distinctiveness (D), uniformity (U) and stability (S) (DUS) tests (Carvalho et al, 2009; Santos et al., 2012).

Currently, there are about 1265 varieties protected by SNPC in Brazil; from these, seven are hot peppers (*Capsicum* spp.), and four (BRS Sarakura, BRS Garça, BRS Juruti and BRS Nandaia) were developed by Embrapa Vegetables' *Capsicum* breeding program (Brasil, 2016).

The new habanero pepper cultivar BRS Juruti (*Capsicum chinense* Jacq.) was developed by Embrapa Vegetable to make available to the Brazilian market a red habanero adapted to Brazil, which was lacking. It is an open-pollinated cultivar developed to meet both the fresh fruit and the processing (mash) markets. In addition to high pungency (about 260,000 Heat Unit Scoville - SHU), a feature of interest to the sauce agroprocessors, BRS Juruti is very aromatic with a high vitamin C content (122 mg 100g⁻¹). It has a high yield potential, ranging from 26-49 t ha⁻¹, depending on the spacing used and the region.

The main objective of this paper is to present the results of DUS tests for the protection process of the new habanero cultivar BRS Juruti.

2. Material and Methods

BRS Juruti (Figure 1) originated from segregating population CNPH 4159, which is part of the *Capsicum* Active Germplasm Bank (AGB) of Embrapa Vegetables. The original population presented variability for fruit and plant characteristics, as well as for incidence of viruses under field conditions. BRS Juruti was obtained after five generations of individual plant selection and selfing until the progeny showed high uniformity for plant and fruit characteristics and disease resistance. In each cycle, plants were evaluated for disease resistance in controlled conditions for different pathogens: *Ralstonia solanacearum*, *Xanthomonas euvesicatoria*, *X. gardneri*, *Oidiopsis sicula*, *Phytophthora capsici*, root-knot nematodes (*Meloidogyne incognita*, *M. javanica* and *M. enterolobii*) in addition to viruses (Tospovirus and Potyvirus) under field conditions.

The DUS tests were conducted in two cycles (April to October 2013; April to October 2014), at Embrapa Vegetables, in Brasilia, DF, Brazil. In both tests, three pepper habanero type cultivars were assessed: BRS Juruti, CNPH 4159 (original population from which BRS Juruti was derived) and BRS Nandaia. A total of 42 plants were grown in each cycle, with six replicates of 7 plants each. Data were collected from three plants of each plot, and a total of 18 plants evaluated for each cultivar. Morphological characterization was based on 49 descriptors established by the Brazilian Ministry of Agriculture, Livestock and Food Supply (MAPA) for implementing the DUS tests of *Capsicum*: 16 descriptors for plant, 8 for flowering, and 25 for fruit characteristics.

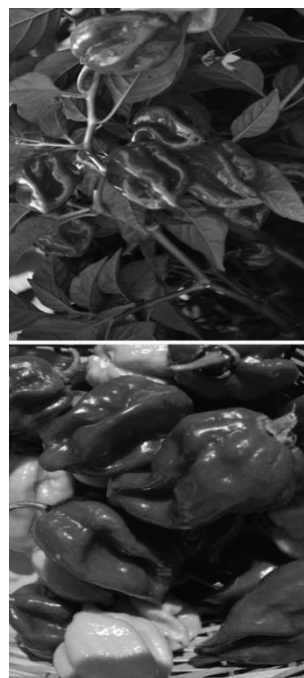


Figure 1. BRS Juruti

3. Results and Discussion

The original population CNPH 4159 showed low uniformity in both assays, particularly for plant stem length (ranging from 15 to 37 cm), leaf length (10 to 15 cm) and width (5 to 8 cm), and fruit length (3.5 to 6.3 cm), with late flowering and fruit ripening (Table 1).

The new cultivar BRS Juruti presented high uniformity of plants and fruits, being distinct from CNPH 4159 and BRS Nandaia, and it was stable during the two evaluation cycles.

BRS Juruti has field resistance to several viruses (TSWV, PVY), is resistant to *Oidiopsis sicula* and *Meloidogyne javanica* and presents intermediate resistance to *Ralstonia solanacearum* biovar 1. The protection process in Brazil is complex and rigorous, however, fundamental to comply with the Brazilian legislation. BRS Juruti has been protected by MAPA under certificate # 20150097.

Morphological Descriptors		
Cultivars	Original Population (CNPH 4159)	BRS Juruti
Plant		
Stem length	15 to 37 cm	~ 24 cm
Leaf length	10 to 15 cm	~ 14 cm
Leaf width	5 to 8 cm	~7.3 cm
Fruit		
Fruit length	3.5 to 6.3 cm	5.1 cm
Time of beginning of flowering (first flower on the second flowering node in 50% of plants)	medium 95 dias	early 85 dias
Time of physiological ripeness (fruit color change on 50% of plants)	medium 116 dias	early 109 dias

Table 1
Plant and fruit characteristics of original population (CNPH4139) and BRS Juruti based on six morphological descriptors

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