

Jaguar: cultivate habanero pepper for Mexico

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Abstract

The planting of habanero pepper (*Capsicum chinense* Jacq.) in Mexico is concentrated in around 80% in the Yucatan peninsula. Approximately 50% of the area dedicated to this vegetable is planted with creole materials, the rest with varieties of free pollination and a minimum area with hybrids of recent formation, developed by transnational companies, which encourages the flight of foreign currency that affects the economy of the country. For the aforementioned, the objective of this work was to obtain a variety of habanero pepper with high yield and fruit quality for the producing regions of Mexico, as a result, INIFAP developed the variety of habanero pepper Jaguar in 2009, which it begins its flowering and harvest of 70-85 and 115-120 days after sowing, respectively. It produces uniform fruits, of emerald green color that turn bright orange in total maturity, very attractive for market in both states of maturity. This variety reaches yields of around 15 t ha⁻¹ in good weather conditions and 30 t ha⁻¹ in the open air with medium to high technology. While under conditions of protected agriculture is up to 43 t ha⁻¹.

Keywords: *Capsicum chinense* Jacq., vegetable, yield.

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The traditional habanero pepper production area (*Capsicum chinense* Jacq.) is located in the Yucatan Peninsula, where about 80% of its sowing is established in Mexico, in an area that fluctuates from 750 to 950 ha (De la Cruz, 2001; Trujillo and Pérez, 2004; SIAP, 2012). Due to the high demand of the product, the establishment has begun in other regions of the country, mainly in the coastal strip of the Gulf of Mexico. Approximately 50% of the area dedicated to this vegetable is sown with creole materials, the rest with varieties of free pollination and a minimum area with hybrids of recent formation, developed by transnational companies, which causes a flight of foreign currency that affects the economy of the country (Ramírez *et al.*, 2012).

Until 2008, no domestic or foreign varieties were available commercially that met the characteristics of intrinsic quality of the true habanero (aroma, pungency and flavor), so the producer preferred to plant creole materials selected by themselves, still and when they present low production potential and high heterogeneity (CONAPROCH, 2016).

Registration of the variety Jaguar

It is owned by the National Institute of Forestry, Agriculture and Livestock Research (INIFAP), and is registered in the National Catalog of Plant Varieties (CNVV) of the National Service of Inspection and Certification of Seeds (SNICS) with the definitive registration number Num. CHL-008-101109 and breeder's title No. 0664.

Origin and development of the Jaguar variety

The development of the variety came from the collection of habanero pepper from the Bank of Germplasm of pepper of the The Huastecas Experimental Field (CEHUAS)-INIFAP, which contains materials originating in the producing areas of Yucatán, Quintana Roo, Campeche and Veracruz, collected in the decade of the 80's and the beginning of the 90's. In a first phase, the collection was evaluated and, based on its adaptation, the selection process was initiated. The genotecnic method used to obtain the variety was pedigree (Brim, 1966; Márquez, 1988), taking as a basis of selection the characteristics of plant and fruit, cycle of production and tolerance to biotic factors (bacterial stain, decay of root, viral diseases and leafminer) and extreme environment. The selected material went on to trials of yield and quality in the producing areas of Tamaulipas, San Luis Potosí, Veracruz, Campeche, Yucatán and Quintana Roo, until its commercial validation. In the final stage of the development of the variety, studies of the characteristics of fruit quality and shelf life were carried out.

After eight cycles of selection, the advanced lines HQR-5, HVr-3, HYc-11, HSE 1-1 and HUX-19 stood out. Of these, after the commercial validation process, the HQR-5 line stood out, which it was decided to release as a new variety, which obtained its definitive registration in 2009 in the CNVV (Table 1).

Table 1. Scheme that represents the process of formation of the Jaguar variety.

Year	Generation	Activities	Improvement activity
1999	P ₁	Establishment of populations with a broad genetic base of habanero pepper from the Germplasm Bank of CEHUAS; selection of higher plants and formation of balanced Compound (CB).	SM and CB
2000	F ₁	Establishment of superior populations. Stratified mass selection (SME).	SME
2001	F ₂	Selection by pedigree (SP).	SP
2002-2004	F ₃ - F ₅	Selection by pedigree (SP). Preliminary performance tests (PPR), performance tests (ER).	SP, PPR, ER
2005-2006	F ₆ - F ₇	Selection by pedigree (SP). Performance tests in localities and response to adverse factors. Validation plots (PAVAL). Studies of fruit quality and shelf life.	SP, ER, PAVAL
2007	F ₈	Final stage of evaluation, training and commercial validation of the variety.	ER's, PAVAL
2008		Demonstration plots (PADEM). Characterization.	PADEM and Characterization
2009		Registration of the variety in the National Catalog of Plant Varieties: Reg. Num. CHL-008-101109.	Registry CNVV-SNICS
2010		Seed production in different categories.	Seed production
2011		Production of commercial seed. Obtaining breeder's title: title No. 0664 effective June 9, 2026.	Seed production in coordination with the SNICS. Breeder's title

Variety description

It was carried out through the use of agronomic and horticultural descriptors.

Botanical and horticultural characteristics of the variety Jaguar

Botanical characteristics

Presents plants that grow from 80 to 90 cm in the open and up to 1.8 m in protected agricultural systems (macro-tunnels and greenhouse) with tutoring, has good foliage coverage, because the open space of the crown of the Plant fluctuates from 75 to 120 cm. It has large leaves, with a

length of 6.5 to 10.5 cm, and 3 to 4.2 cm wide. It has one to three flowers per node, which can give rise to the same amount of fruit, typical characteristic of the *chinense* species. Its flowering begins between 70 and 85 days after sowing, and its harvest of 115 to 120 days (Table 2).

Table 2. Botanical and horticultural characteristics of the Jaguar variety of habanero pepper.

Characteristics Botanicals	Reference value	Horticultural characteristics	Reference value
Height of the plant (cm)	80 a 90	Fruit color in green	Emerald green (°Hue = 123)
Breadth of foliage (cm)	75 a 120	Color of ripe fruit	Bright orange (°Hue= 54)
Length of the sheet (cm)	6.5 a 10.5	No. of locules	3.1
Sheet width	3 a 4.2	Pericarp thickness (cm)	0.24
Pubescence of the foliage	Without pubescence	Filling placenta (%)	47.9
Branch	Staggered basal	Firmness of fruit (N cm ⁻²)	58.3
No. of primary branches	5 a 7	Length of the fruit (cm)	3.8 a 5.5
No. of flowers per node	1 a 3	Diameter of the fruit (cm)	2.5 a 3
Days at the beginning of flowering	70 a 85	Long-wide relationship	1.6
Days to first harvest	115 a 120	Average fruit weight (g)	6.5 a 10

Horticultural characteristics

It produces uniform fruits, of emerald green color in green seasoning, that turn bright orange in total maturity (Figure 1), very attractive for market in both stages of maturity. It has fruits with a length of 3.8 to 5.5 cm and 2.5 to 3 cm in diameter, which meet the characteristics specified in the Mexican Standard for Fresh peppers (CTNNPAP, 2007). The fruit weight is 6.5 to 10 g and has very good firmness (58.3 N/cm²) (Table 2), which indicates that both the pericarp and the inner walls of the fruit have greater strength which gives it resistance to transport and good shelf life (Ramírez *et al.*, 2015).



Figure 1. Jaguar variety of Habanero: a) plant with its characteristic fruit load; and b) fruits in green seasoning and total maturity.

Additionally, Jaguar thrives satisfactorily in clay soils, where normally other genotypes of Habanero are affected by its production. Also, the variety is perfectly adapted to the adverse environmental conditions of the tropics, such as high temperature and humidity. On the other hand, it has high tolerance to leaf miner, bacterial stain and viral diseases, main production problems of the coastal areas of the tropic and subtropics of the country.

Production characteristics of the Jaguar variety

The harvest period of the Jaguar variety can last from three to seven months in the open, and more than two years in protected agricultural conditions, depending on the supply of nutrition and phytosanitary management of the crop. The green fruit harvest can be done every 20 days, or it can be extended up to 35 to 40 days if the market demands mature fruit. The variety reaches good yields (around 15 t ha⁻¹) in producing areas with good weather (central-southern Veracruz, Campeche, Chiapas), or in different production systems with irrigation and medium to high technology; however, it better expresses its yield potential under drip irrigation and fertirrigation systems, where it can exceed 30 t ha⁻¹ of total open-pit production, and up to 43 t ha⁻¹ under protected agricultural conditions; while the yields of commercial and regional criollo materials oscillate between 10.8 - 26.5 and 12 - 21.7 t ha⁻¹, respectively. Fruit yield trials of the jaguar variety and commercial/creole controls were conducted from 2005 to 2016 under open sky/protected agriculture conditions in different locations in the states of: Campeche, Jalisco, Quintana Roo, Sinaloa, Tamaulipas, Veracruz and Yucatan.

Conclusions

It was possible to obtain the same Jaguar variety that is considered high yield and fruit quality to be used in the producing regions of Mexico.

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