Cultivar and Germplasm Release

RELEASE OF 'PUJOLS': A TROPICAL-TYPE SWEET POTATO[1,2]

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'Pujols' is a tropical-type sweet potato [*Ipomoea batatas* (L.) Lam.] cultivar released in 2010 by the Agricultural Experiment Station of the University of Puerto Rico. Sweet potato is referred to as "batata" and "boniato" in the Spanish-speaking countries of the Caribbean and as "camote" in Mesoamerica. In these regions tropical-type cultivars are widely grown. Tropical-type sweet potato describes cultivars that combine white-, cream- or light yellow-fleshed roots with a sweetness between that of the non-sweet and the dessert-type (usually orange-fleshed) (Hernández-Carrión et al., 2010). Because tropical-type cultivars tend to be less moist to the mouth than their dessert-type counterpart, cultivars within this group have been referred to as dry-fleshed sweet potato (Jackson and Bohac, 2006).

Origin

Pujols was selected among landraces collected throughout Puerto Rico during 1998. It was collected at Luis Pujols's farm in the Cibao ward of the municipality of Camuy, Puerto Rico. Pujols received the experimental designation PR98-40 and was identified as an outstanding genotype after initial evaluations performed at the Isabela Substation using the traditional cultivar 'Miguela' as check (Table 1). Miguela was first described by Badillo-Feliciano et al. (1976).

Description

The predominant color of mature leaves and vines of Pujols is light green; however, at the growing points both newly developed leaves and stems are purple. This latter color

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TABLE 1.—*Mean yield, number of storage roots per plant and individual root weight for Pujols and Miguela sweet potato harvested 105 and 120 days after planting at Isabela, Puerto Rico.*[1]

Harvest	Cultivar	Mean yield	Storage roots per plant	Storage root weight
days after planting		kg/m of row	no.	g/root
105	Pujols	1.7	4.3	122
	Miguela[2]	0.7	2.5	79
120	Pujols	2.8	3.7	233
	Miguela	0.9	3.1	91

[1]Fifty-two entries were evaluated in unreplicated plots during 1998 and 1999.
[2]Check cultivar.

combination facilitates the identification of Pujols among the local commercial cultivars of sweet potato. Five-lobed leaves are most common on Pujols plants, with the central lobe usually semi-elliptic in shape. Pujols usually flowers by the end of the growing season, especially when maturity of the crop occurs from February to May. Most of the flower is light purple, although its center has an intense purple color. Storage roots of Pujols are round-elliptic in shape with purple skin. The skin tends to become light purple after cleaning. Raw flesh is light yellow, but the color intensifies after boiling. Hunter L, a, b color scale values for the flesh of Pujols and the yellow-fleshed cultivar 'Wanmun Large' (USDA PI 564770) are presented in Table 2.

Yield and harvest

The storage roots of Pujols are concentrated at the base of the plant. Production of storage roots along the vines is negligible. These characteristics are desirable for the mechanization of field practices, especially for a mechanized harvest. At Isabela in 2000, Pujols yielded 46,999 kg/ha, an amount superior to that of seven other elite genotypes in the trial (Acevedo et al., 2001). In a May 2002 planting at Gurabo, Pujols yielded 21,108 kg/ha of commercially acceptable storage roots. This yield was not significantly different from that of the top-yielding genotype. In the latter test, 76% of all harvested roots were classified as commercially acceptable (Lugo-Torres and Díaz, 2007). At Corozal, Pujols produced an average yield of 15,387 kg/ha for plantings established in four different seasons (González-Vélez, 2003). In a validation test planted in 2004, Pujols produced 22,919

TABLE 2.—*Hunter L, a, b color scale values for the raw and boiled flesh of Pujols sweet potato and the standard yellow-fleshed cultivar Wanmun Large.*[1]

Cultivar	Treatment to flesh	L value		a value		b value	
		Value	Std. dev.	Value	Std. dev.	Value	Std. dev.
Pujols	Raw	82.97	2.2	0.97	0.8	21.27	1.8
	Boiled	67.08	3.4	-2.93	0.1	16.82	2.0
Wanmun Large	Raw	84.54	4.6	1.84	0.3	25.73	1.7
	Boiled	62.28	5.1	-2.11	0.4	24.74	2.7

[1]Roots obtained from a planting done at Isabela, Puerto Rico, in 2000. Data presented is an average for two replications and four subsamples per replication.

TABLE 3.—*Mean yield and individual storage root weight for Pujols and clone PR98-022 sweet potato as compared to check cultivars in validation plots at Juana Díaz, Puerto Rico during 2001 to 2002 and in 2003.*

Year	Cultivar	Yield	Storage root weight
		kg/ha	g/root
2001 to 2002	Pujols	35,633	599
	PR98-022	30,543	442
	Venus[1,2]	14,253	332
	Martina[1]	37,954	549
	LSD (0.05)	12,987	204
2003	Pujols	52,655	623
	PR98-022	30,666	510
	Dominicana[1]	12,909	448
	Miguela[1]	5,090	392
	LSD (0.05)	24,700	208

[1]Check cultivar.

[2]Venus is a genotype selected from germplasm available at USDA-ARS Tropical Agriculture Research Station, Mayaguez, Puerto Rico (González-Vélez, 2003).

kg/ha of commercial roots excluding all culls[8]. In large validation plots at Juana Díaz, Pujols significantly outyielded cultivar Miguela and the local genotypes 'Venus', 'Martina' and 'Dominicana' (Table 3). Dominicana is the standard commercial cultivar grown in the southern coastal valleys of Puerto Rico. Yields reported here were obtained by using management practices recommended by the University of Puerto Rico's Agricultural Experiment Station (1997), practices which in all cases included supplemental irrigation.

Average root weight

An acceptable sweet potato on the local market has few or no lobules and weighs at least 454 g. In validation plots at Juana Díaz, mean individual root weights were 599 and 623 g (Table 2). At Corozal, weight of tuberous roots averaged 414 g for plantings performed in four different seasons (González-Vélez, 2003). In samples taken at Gurabo, individual root weight for commercial roots was 540 g[9].

Length of crop cycle

Highest yields can be obtained when Pujols is harvested at least 140 days after planting. Studies performed at Corozal, however, have shown that this cultivar can be harvested at as early as 120 days after planting with acceptable yields (González-Vélez, 2003). Harvesting early, however, may negatively affect sugar and starch content and flesh color, which are significant quality attributes for fresh non-processed sweet potato roots.

Starch

For sweet potato, the alcohol insoluble solids parameter is a standard indirect measurement of starch (Walter, Jr. et al., 1997). In 2003, storage roots of Pujols were obtained at 150 days after planting for fields planted at Juana Díaz and Gurabo. The roots were boiled and sugar was extracted by using procedures described by Hernández-Carrión et

[8]Díaz-Rivera, M. Sweet potato validation plots planted 9 February 2004 and harvested 7 June 2004 (personal communication).

[9]Ortiz, C. E. Field trial to evaluate elite sweet potato clones for field susceptibility to insects; planted 21 March 2006 and harvested 6 August 2006.

al. (2010). After sugar extraction, the insoluble solid fraction—the alcohol insoluble solids—were dried and weighed. Alcohol insoluble solids in Pujols are on average similar to that of other tropical sweet potato cultivars, varying from 66 to 78% (Table 4).

Adaptation to ecological zones

Pujols has been successfully grown on Oxisols, Mollisols, Inceptisols and Ultisols in Puerto Rico (Acevedo et al., 2001; González-Vélez, 2003; Lugo-Torres and Díaz, 2007). Commercially acceptable yield and storage root quality for Pujols have been obtained in on-farm validation trials in the municipalities of Aguadilla, Añasco, Corozal, Guánica, Gurabo, Isabela, San Lorenzo and Yauco.

Tolerance to herbicides

A screening test was conducted at Gurabo in 2002 to assess the response of sweet potato experimental lines, including Pujols, to clomazone, dimethenamid and clethodim. The herbicides were applied over the top of beds and plants a day after planting. Clethodim was also applied over all plots seven weeks after planting. Further details have been reported by Lugo-Torres and Díaz (2007). Neither crop injury nor phytotoxicity was observed.

Reaction to pests

Pujols is susceptible to the sweet potato weevil (*Cylas formicarius*). Evaluations for susceptibility were made by using the methodology described by Mullen et al. (1981). Damage by this insect increased when storage roots ready to harvest were maintained in the field. During on-farm evaluations storage roots of Pujols ready to harvest were damaged by the larvae of the root weevil (*Diaprepes abbreviatus*). The West Indian sweet potato weevil (*Euscepes postfasciatus*) was not observed affecting roots of Pujols throughout the evaluations. Leaf miners and leaf rollers sometimes affected the leaves, but were easily controlled with approved insecticides. Pujols was selected without using nematicides. Pujols was grown in a nematode-infested field, and a few harvested roots (about 5%) had cracks indicative of the damage by the reniform nematode (*Rotylenchulus reniformis*). Damage from the root-knot nematode (*Meloidogyne incognita*) was negligible throughout the evaluations. Thus, Pujols appears to have some level of resistance to these nematodes. Pujols has not been observed with virus symptoms.

Use

The uses normally expected for sweet potato in Puerto Rico can be fulfilled by Pujols; these include boiled and fried roots and also as an ingredient in desserts.

Availability of planting material

A limited amount of propagation material of Pujols (about 20 vine cuttings) for testing is available from the corresponding author (Agricultural Experiment Station at Gu-

TABLE 4.—*Alcohol insoluble solids for Pujols and Miguela sweet potato at two locations in Puerto Rico.*

Cultivar	Alcohol insoluble solids	
	Gurabo	Juana Díaz
	---------- % ----------	
Pujols	66.9	79.0
Miguela	68.4	67.3

rabo, P.O. 1306, Gurabo, PR 00778. carlos.ortiz35@upr.edu). For commercial-sized seed lots contact the Deputy Director of the Agricultural Experiment Station, College of Agricultural Sciences, University of Puerto Rico, Jardín Botánico Sur, 1193 Calle Guayacán, San Juan, PR 00926-1118.

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