Cultivar and Germplasm Release

RELEASE OF 'CAMUY': A WHITE -FLESHED SWEET POTATO[1,2]

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'Camuy' is a purple-skinned and white-fleshed sweet potato [*Ipomoea batatas* (L.) Lam.] cultivar released in 2011 by the Agricultural Experiment Station of the University of Puerto Rico. In Puerto Rico the preference is for sweet potato cultivars with light yellow- to yellow-fleshed roots. Thus, white-fleshed Camuy was released as a special purpose cultivar.

Origin and commercial potential

'Camuy' was selected among landraces collected throughout Puerto Rico during 1998. It was collected at Luis Pujols' farm in the Cibao ward of the municipality of Camuy, Puerto Rico. 'Camuy' received the experimental designation PR98-022 and was identified as a promising genotype for commercial production after initial evaluations performed at the Isabela Substation using as check the traditional cultivar 'Miguela' (first described by Badillo-Feliciano et al., 1976) (Table 1). Its potential as a commercial cultivar was further noticed and documented by Acevedo et al. (2001), González-Vélez (2003) and Lugo-Torres and Díaz (2007). Because of its field performance and white flesh color, which is of preference in the Lesser Antilles of the Caribbean, 'Camuy' was request-

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TABLE 1.—*Mean yield, number of storage roots per plant and individual root weight for 'Camuy' and 'Miguela' sweet potato harvested 105, 120 and 135 days after planting at Isabela, Puerto Rico.*[1]

Harvest (days after planting)	Cultivar	Mean yield (kg/m of row)	Roots per plant (no.)	Individual root weight (g/root)
105	'Camuy'	1.8	4.1	136
	'Miguela'[2]	0.7	2.5	79
120	'Camuy'	3.3	5.5	184
	'Miguela'	0.9	3.1	90
135	'Camuy'	1.4	4.4	102
	'Miguela'	1.3	4.2	94

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

ed by the Agricultural Experiment Station of the University of the US Virgin Islands and incorporated into its research program (Daly and Zimmerman, 2002).

Description

The vegetative growth habit of 'Camuy' tends to be semierect and vine length is relatively compact as compared to the same attributes in 'Miguela', whose growth is predominantly prostrate with relatively long vines. The predominant foliage color of 'Camuy' is green. Following the sweet potato descriptors by CIP/ARVCD/IBPGR (1991), the mature leaf outline of 'Camuy' is deeply lobed with seven lobes. The central lobe tends to be semi-elliptic in shape. 'Camuy' produces few flowers which usually appear by the end of the growing season. The shape of the limb in flowers of 'Camuy' is rounded. Most of the flower is light purple, although its center has an intense purple color. The storage roots of 'Camuy' are concentrated at the base of the plant with negligible production of these roots along the vines. This characteristic is desirable for the mechanization of field practices, especially for a mechanized harvest. Storage roots of 'Camuy' are purple skinned, elliptical in shape and smooth with no grooves. 'Camuy' is a white-fleshed cultivar. Hunter L, a, b color scale values for the flesh of 'Camuy' and for standard yellow-fleshed cultivar 'Wanmun Large' (USDA PI 564770) are presented in Table 2.

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

		Color scale					
		L value		a value		b value	
Cultivar	Treatment to flesh	Value	Std. dev.	Value	Std. dev.	Value	Std. dev.
'Camuy'	Raw	85.45	0.9	-0.56	0.1	17.52	1.2
	Boiled	63.74	5.8	-3.04	0.4	16.82	1.7
'Wanmun Large'	Raw	84.54	4.6	1.84	0.3	25.73	1.7
	Boiled	62.28	5.5	-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 of two replications and four subsamples per replication.

Yield

In evaluating genotypes, yield for sweet potato is typically reported as the amount of mass per unit of area without taking into account root shape, which is a fundamental characteristic for marketing. The shape of the storage root of 'Camuy'—elliptic, smooth with no grooves—has been identified as a trait preferred in Puerto Rico for commercial cultivars (Acevedo et al., 2001). Although 'Camuy' produced similar amounts of mass per unit of area in field evaluations as some check cultivars, commercial yields were usually superior because of its storage root shape (Table 3). During evaluations made between 1999 and 2002, 'Camuy' was compared primarily to 'Venus' and 'Martina' because at the time these were considered the elite sweet potato lines under evaluation by the Agricultural Experiment Station of the University of Puerto Rico. Yields of 'Camuy' were usually significantly greater than those of 'Venus' and not different from yields of 'Martina' (Table 3). In large validation plots at Juana Díaz in 2003, 'Camuy' significantly

TABLE 3.—*Yield and individual storage root weight for 'Camuy' sweet potato as compared to check cultivars in experimental plots in various years and locations.*

Year	Location	Entries in test	Cultivar	Yield	Root weight
		no.		kg/ha	g /root
1999	Isabela	21	'Camuy'	37,739	274
			'Venus'[1, 2]	9,826	251
			LSD (0.05)	7,512	NS
1999-00	Gurabo	8	'Camuy'	50,940	308
			'Venus'	57,042	379
			LSD (0.05)	NS	NS
2000-01	Isabela	9	'Camuy'	43,173	253
			'Venus'	43,769	379
			'Martina'[1]	39,500	301
			LSD (0.05)	NS	64
2001	Gurabo	9	'Camuy'	20,136	506
			'Venus'	7,119	491
			'Martina'	18,509	401
			LSD (0.05)	5,340	NS
2001-02	Juana Díaz	4	'Camuy'	30,543	442
			'Venus'	14,253	332
			'Martina'	37,954	549
			LSD (0.05)	12,987	NS
2003	Juana Díaz	4	'Camuy'	30,666	510
			'Dominicana'[3]	12,909	448
			'Miguela'	5,090	392
			LSD (0.05)	24,700	NS

[1]Check cultivar.
[2]Genotype selected from germplasm available at USDA-ARS Tropical Agriculture Research Station, Mayagüez, Puerto Rico (González-Vélez, 2003).
[3]Local landrace.

outyielded 'Miguela' and had yields similar to those of 'Dominicana', the standard commercial cultivar in Puerto Rico at the time.

In a herbicide screening experiment established at two locations in 2002, 'Camuy' yielded 21,145 kg/ha at Gurabo and 33,803 kg/ha at Juana Díaz (Lugo-Torres and Díaz, 2007). At Corozal, 'Camuy' produced an average yield of 13,782 kg/ha of commercially acceptable roots for plantings performed in four different seasons (González-Vélez, 2003). This yield was not significantly different from that of 'Venus' nor from that of 'Pujols', a recently released cultivar (Ortiz et al., 2011). In a relatively large demonstration and validation plot established at Gurabo in 2008, 'Camuy' yielded 17,887 kg/ha of commercial roots excluding all culls. Yields reported herein varied according to plant spacing and were obtained by using management practices recommended by the University of Puerto Rico's Agricultural Experiment Station (1997), which in all cases included supplemental irrigation.

Average root weight

The United States standard grades for sweet potato (US Department of Agriculture, 2005) are seldom applied to sweet potato produced and marketed in Puerto Rico. The local fresh market accepts roots varying in fresh weight and size. Generally an acceptable sweet potato root on the local market is fairly smooth with few or no lobules, and weighs approximately 454 g. Across the evaluations, individual root weights for 'Camuy' ranged from 253 to 510 g (Table 3). At Corozal, average weight of the tuberous roots for four planting seasons was 373 g (González-Vélez, 2003).

Length of crop cycle

Highest yields can be obtained when 'Camuy' is harvested about 150 days after planting. Studies performed at Corozal, however, have shown that this cultivar can be harvested as early as at 120 days after planting with acceptable yields (González-Vélez, 2003). Harvesting early, however, may negatively affect sugar and starch content, which are important quality attributes for fresh non-processed sweet potato roots.

Alcohol insoluble solids

For sweet potato, the alcohol insoluble solids reflect the starch content of the roots (Walter Jr. et al., 1997). In 2003, storage roots of 'Camuy' were obtained at 150 days after planting from fields planted at Juana Díaz and Gurabo. The roots were boiled and sugar was extracted with procedures described by Hernández-Carrión et al. (2010). After sugar extraction, the insoluble solid fraction was dried and weighed to determine the alcohol insoluble solids. 'Camuy' was similar to Miguela, with alcohol insoluble solids ranging from 65% to 73%.

Tolerance to herbicides

A screening test was conducted at Gurabo in 2002 to assess the response of sweet potato experimental lines, including 'Camuy', to the herbicides clomazone, dimethenamid and clethodim. Herbicides were applied on top of beds and plants a day after planting. Clethodim was also applied 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

'Camuy' is susceptible to the sweet potato weevil (*Cylas formicarius*). Evaluations for susceptibility were made by using the methodology described by Mullen et al. (1981). After careful selection of the planting material, and under drip irrigation, no control of the sweet potato weevil resulted in damage to 38% of the commercially-sized roots. Damage

by the sweet potato weevil increased when storage roots ready to be harvested were left in the field without harvesting. The West Indian sweet potato weevil (*Euscepes postfasciatus*) was not observed affecting roots of 'Camuy' throughout the evaluations. Leaf miners and leaf rollers sometimes caused problems to the leaves, but were easily controlled with registered insecticides. 'Camuy' was selected using no nematicides. Throughout the evaluations, 'Camuy' was grown in nematode-infested fields, and damage by the reniform nematode (*Rotylenchulus reniformis*) and the root-knot nematode (*Meloidogyne incognita*) was considered negligible according to the percentage of roots affected. Thus, 'Camuy' appears to have some level of resistance to these nematodes. 'Camuy' has not been observed with virus symptoms. During curing, the fungus *Diplodia* sp. was detected affecting the roots[9]. This fungus has been associated with a commercially important postharvest rot in sweet potato (Clark and Moyer, 1988).

Adaptation to ecological zones in Puerto Rico

'Camuy' 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 'Camuy' have been obtained in on-farm validation trials in the municipalities of Aguada, Comerío, Corozal, Guánica, Gurabo and San Lorenzo.

Use

'Camuy' fulfills uses normally expected for sweet potato in Puerto Rico, which include boiled and fried root and as an ingredient in desserts.

Availability of planting material

A limited amount of propagation material of 'Camuy' (about 20 vine cuttings) for testing is available from the corresponding author (Agricultural Experiment Station at Gurabo, P.O. Box 1306, Gurabo, PR 00778. carlos.ortiz35@upr.edu). For commercial-sized seed lots, contact the Deputy Director, 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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