

# ‘Burgundy’ Sweetpotato

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‘Burgundy’ sweetpotato [*Ipomoea batatas* (L.) Lam.] was developed by the Louisiana Agricultural Experiment Station to provide an orange fleshed, red-skinned cultivar with superior storage root shape, high sucrose content, disease resistance, and southern root knot nematode resistance. ‘Burgundy’ produces excellent numbers of uniform plants in the plant production beds. ‘Burgundy’ can be harvested up to 10 d earlier than the Beauregard cultivar (Rolston et al., 1987) in the California production region. The two cultivars are similar in harvest days in the Gulf South production region. The roots are elliptical and consistent in shape in varied soil types. It has a superior shape and yields are similar to the red-skinned Diane cultivar for the U.S. #1 grade (5.1 to 8.9 cm diameter, 7.6 to 22.9 cm long) in California. ‘Diane’ is the current dominant red-skinned cultivar in California, and it has a propensity to produce longer roots in the sandy soils typical for the production area; ‘Burgundy’ does not.

Initially identified and evaluated as ‘LA04-175’, the cultivar is named after the deep burgundy–maroon color of its skin.

## Origin

‘Burgundy’ originated in 2004 as a seedling from an open-pollinated polycross nursery consisting of 15 lines from the previous

year under the line designation ‘LA04-175’. The female lineage is ‘NC96-61’ from the North Carolina State University Sweetpotato Breeding Program. The male parent is unknown.

## Description

‘Burgundy’ has green-stemmed vines corresponding to color charts as 2.5 G (green) Y (yellow) (5/6) (Munsell® Color, New Windsor, NY) at the apex. The numerical and letter designation for color represents the hue and the fraction represents value or chroma. Vines gradually turn purple [2.5R (red) P (purple) 2/8] over 30 to 40 cm from the apex to the crown of the roots. The ‘Burgundy’ canopy biomass appears similar to the Beauregard cultivar; ‘Diane’ has a greater canopy biomass in comparison with ‘Burgundy’. Unfolded immature leaves are dark green with a bronze cast [10 G (green) Y (yellow) (2/4)] for the upper and green for the lower surface [5 G (green) Y (yellow) (5/6)] and change gradually over one to two nodes to a green upper [5 G (green) Y (yellow) (3/4)] and lower [5 G (green) Y (yellow) (5/6)] surface. Mature leaves at five nodes from the apex have an acute apex and mostly a cordate base and a slightly serrated leaf margin. This contrasts with the ‘Diane’ variety, which has deep palmate, trifoliate leaves and thick petioles. Mature leaves are similar in size to that of ‘Beauregard’. The petioles are green [7.5 (green) Y (yellow) (4/4)] with a purple [2.5 R (red) P (purple) (3/4)] marking at the base of the leaf junction with the petiole, and the coloration extends into the leaf veins. ‘Beauregard’ has no red hue to the veins and has green vines.

A typical inflorescence of ‘Burgundy’ has two clusters of six flowers per peduncle. Individual flowers are ≈4 cm long from the

base of the calyx, and the corolla is 4 cm wide at the opening. The inner and outer limbs of the corolla (corollas outermost area, distal from the calyx) are very light purple [10 P (purple) (6/4)]. The darker inner throat of the corolla appears purple [7.5 R (red) P (purple) (4/6)]. Stigmata appear purple [7.5 R (red) P (purple) (4/6)]. The five stamens are inferior to stigmata and attached to the ovary. Storage roots are elliptical without lobing and consistent in shape. The skin is red [10 R (red) P (purple) 4/6]. The ‘Burgundy’ cortex is 4 to 5 mm in depth and similar to ‘Beauregard’. The flesh of ‘Burgundy’ is uniform deep orange [5 Y (yellow) R (red) 7/10], similar to ‘Diane’ and more intense than ‘Beauregard’ [10R (red) 6/6]. Dry matter content is ≈22% and similar to ‘Beauregard’ using methodology of La Bonte et al. (2000).

## Disease Reactions

‘Burgundy’ was compared with ‘Beauregard’ in controlled tests for resistance to common pathogens affecting sweetpotatoes. It is intermediate to resistant or similar to ‘Beauregard’ for soil rot caused by *Streptomyces ipomoeae* (Person & W.J. Martin, Waksman & Henrici). ‘Burgundy’ and ‘Beauregard’ were resistant to fusarium wilt or stem rot caused by *Fusarium oxysporum* Schlecht. f. sp. *batatas* (Wollenw.) Snyder & Hans. ‘Burgundy’ was highly resistant to race 3 of southern root-knot nematode, *Meloidogyne incognita* (Kofoid & White, 1919); ‘Beauregard’ is susceptible. Similar to ‘Beauregard’, storage roots of ‘Burgundy’ were found to be susceptible to bacterial soft rot caused by *Dickeya dadantii* Samson et al. (= *Erwinia chrysanthemi* Burkholder, McFadden & Dimock). ‘Burgundy’ was susceptible, whereas ‘Beauregard’ is intermediate to *Rhizopus* soft rot caused by *Rhizopus stolonifer* (Ehr. ex Fr.) Lind. Reaction to viruses has not been determined; however, a significant change was noted in the length:diameter ratio (L:D ratio) between roots from virus-tested plants and those from older plants in California tests (Table 2). ‘Burgundy’ G1 was more round than ‘Burgundy’ G0. ‘Diane’ had the greatest L:D ratio in the study and these results are consistent with a characteristic long storage root. ‘Burgundy’ Russet Crack symptoms have not been observed.

## Insect Resistance

‘Burgundy’ is currently under trial for relative insect resistance, but it has not demonstrated any unusual propensity to insect damage in numerous on-farm trials. It ranked higher in percent uninjured roots in comparison with ‘Beauregard’ clone B-63 and significantly higher in comparison with ‘Beauregard’ clone B-14 in 2013 National Sweetpotato Collaborators Group Entomology trials conducted by D.M. Jackson (USDA Vegetable Laboratory, USDA, ARS, Charleston, SC).

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## Production

'Burgundy' was compared with the industry standard, 'Beauregard' (mid-South and California) and 'Diane' (California only) in randomized complete block trials with three or four replications at various locations in Louisiana, California, Arkansas, Alabama, and Missouri. Trials covered a range of planting dates and growing days (mostly 110 to 120 d). 'Burgundy' produced total marketable yields comparable to 'Beauregard' in five trials and exceeded 'Beauregard' in two trials for the important U.S. #1 grade (Table 1). Gulf and mid-South trials in 2013 similarly demonstrated no differences in yield in six of seven trials for U.S. #1 grade (data not shown). In California, 'Burgundy' had similar or significantly better total marketable yield in comparison with 'Diane' in six of seven trials, whereas 'Diane' exceeded 'Burgundy' in two trials for U.S. #1 grade (Table 1). Replicated plots have shown 'Burgundy' to have consistent yields for middle- and late-season plantings. Yield declines appeared within norms in poor environments. 'Burgundy' has harvestable roots  $\approx 115$  to 120 d after planting in most production areas, which is a typical development time for sweetpotatoes and comparable to 'Beauregard'; however, in California, it has developed full maturity earlier than 'Beauregard' or 'Diane' by up to 10 d in production fields. In seven trials, the yield of Jumbo grade (larger than U.S. #1 in diameter or length or both and without objectionable defects). 'Burgundy' ranked higher in five trials in comparison with 'Beauregard' in 2013; however, data statistically do not support greater or lesser amounts of Jumbos in comparison with 'Beauregard' or 'Diane'. Total yield differs little among the three varieties and demonstrates 'Burgundy' is competitive. In California, plants derived from older generations of seed stock used to produce the crop have a tendency to be more round than desired; the L:D ratio was significantly different between G0 and G1 seed stock (Table 2) based on 2012 measurements. Still, the typical shape of 'Burgundy' is considered superior to its main competitor, 'Diane', by the industry in California (C.S. Stoddard, University of California Cooperative Extension—Merced County, CA). 'Diane' is typically slender and can be difficult to pack; it has an L:D ratio significantly higher than other cultivars. In total, these data reflect consistent high yield characteristics for 'Burgundy'. Plants of 'Burgundy' from propagation beds are prolific and similar to 'Beauregard'. Storage quality is good and comparable to 'Beauregard' and superior to 'Diane'; roots are sound and marketable after 6 to 8 months of storage.

## Quality Attributes

The most salient culinary characteristic of 'Burgundy' is the sugar content in cured, baked roots. Roots stored from

Table 1. Yield by grade of 'Burgundy' in replicated trials.

Cultivar	Avg yield (Mt·ha <sup>-1</sup> ) <sup>z</sup>			Total marketable
	U.S. # 1	Medium	Jumbo	
<b>2005</b>				
<i>Chase, LA, midseason<sup>y</sup></i>				
Burgundy	25.1 a <sup>x</sup>	5.4 a	5.6 a	36.0 a
Beauregard	24.0 a	3.1 a	18.8 a	46.0 a
<b>2009</b>				
<i>Livingston, CA, midseason</i>				
Burgundy	25.4 a	5.5 ab	22.6 b	53.7 b
Beauregard	16.1 b	4.1 b	43.8 a	63.9 a
Diane	22.2 a	8.1 a	21.5 b	51.8 b
<b>2010</b>				
<i>Livingston, CA, midseason</i>				
Burgundy	12.2 b	5.0 b	8.0 b	25.3 b
Beauregard	11.4 b	4.8 b	12.7 a	28.8 b
Diane	24.2 a	13.9 a	8.9 b	47.0 a
<b>2011</b>				
<i>Livingston, CA, late season</i>				
Burgundy	22.1 a	10.9 b	7.9 a	40.9 a
Beauregard	11.2 b	11.2 b	7.5 a	26.5 b
Diane	8.1 b	17.5 a	5.3 a	31.0 b
<b>2012</b>				
<i>Grand Prairie, LA, midseason</i>				
Burgundy	22.0 a	9.1 a	1.3 a	32.4 a
Beauregard	21.3 a	8.9 a	1.2 a	31.4 a
<b>2012</b>				
<i>Livingston, CA, midseason</i>				
Burgundy	20.5 a	8.1 a	1.6 a	30.1 a
Beauregard	18.9 ab	8.6 a	0.3 a	27.9 a
Diane	16.1 b	8.3 a	0.3 a	24.7 a
<i>Atwater, CA, midseason</i>				
Burgundy	14.94 b	8.90 b	44.65 a	68.48 a
Diane (G1)	20.02 a	21.04 a	18.24 b	59.30 a
<b>2013</b>				
<i>Livingston, CA, midseason</i>				
Burgundy	23.1 a	6.5 c	6.7 a	36.2 a
Diane	27.7 a	10.0 a	5.2 a	42.9 a
Beauregard	27.7 a	7.7 b	6.6 a	42.0 a
<i>Atwater, CA, midseason</i>				
Burgundy	21.7 a	8.2 b	28.6 a	58.6 a
Diane (G1)	26.3 a	12.9 a	13.4 b	52.7 a

<sup>z</sup>Sizes of roots: U.S. #1: 5.1 to 8.9 cm in diameter, 7.6 to 22.9 cm long; medium (canner): 2.5 to 5.1 cm in diameter, 5.1 to 17.8 cm long; jumbo: larger than U.S. #1 in diameter or length or both and without objectionable defects.

<sup>y</sup>Early-season plantings (through 15 May), midseason plantings (16 to 30 May 16), late-season plantings (1 June into July).

<sup>x</sup>Values within the same column for a given planting followed by the same letter are not significantly different at a level of significance,  $P = 0.05$ . Means separation by Duncan's multiple range test.

Table 2. Storage root length-to-diameter ratio of various cultivars, Livingston, CA, 2012.

Cultivar, generation <sup>z</sup>	n <sup>y</sup>	Length		Length:diameter ratio <sup>x</sup>
		cm	diameter cm	
Diane G2+	61	22.1	6.2	3.6 a
Burgundy G0	57	17.9	6.7	2.9 b
Covington G2	40	17.3	6.4	2.8 bc
Beauregard G2	30	17.0	6.5	2.7 bc
Beauregard G1	35	16.0	6.7	2.5 cd
Burgundy G1	53	13.6	6.2	2.2 d

<sup>z</sup>Generation refers to the number of years after virus testing.

<sup>y</sup>n = number of roots sampled.

<sup>x</sup>Values within the same column followed by the same letter are not significantly different at a level of significance,  $P = 0.05$ . Means separation by Fisher's protected least significant difference.

3 months in 2012 were baked at 190 °C for  $\approx 2$  h. Sucrose content in baked 'Burgundy' (4.4 mg·g<sup>-1</sup>) on a fresh weight basis

(fwb) was nearly twice that found in baked 'Beauregard' (2.3 mg·g<sup>-1</sup> fwb). In contrast, 'Beauregard' had nearly twice as much

maltose ( $4.89 \text{ mg}\cdot\text{g}^{-1}$  fwb) as 'Burgundy'. However, maltose is perceived 30% to 50% less sweet than sucrose (<http://food.oregonstate.edu/sugar/sweet.html>). Total sugar content was slightly less than in 'Beauregard' using methodology of La Bonte et al. (2000). 'Burgundy' requires similar baking time in comparison with major orange flesh type cultivars.

#### Availability

Limited quantities of foundation seed (root) stock will be commercially available for the 2014 crop season. Requests for roots should be made to the Sweet Potato Research Station, P.O. Box 120, Chase, LA 71324 or through a licensed certified seed grower. Intellectual property protection will be sought.

#### Literature Cited

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