2014

2014 Carrot Variety Trial

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Weather Summary

The summer of 2014 was slightly cooler than average, and noticeably cooler than recent years, with no days where the highs reached 90°F. Humidity and rainfall were also low, with the exception of July 4th when Hurricane Arthur dumped 3.58 inches of rain in 24 hours and brought several days of high humidity. The fall was warmer than average, and very dry, with the third-driest September on record. Disease problems were minimal on account of the dry weather and the lack of coastal storms to spread spores and virus-bearing insects from the mid-Atlantic.

Trial Description

The carrot trial included 23 varieties. Plots were 25 ft long with three rows per plot, for a total of 75 row feet. Spacing between rows was 12 inches. The trial was seeded on June 10 using a Jang Clean Seeder with an X-12 roller. Nitrogen and potassium were applied prior to planting at 50 and 200 lbs/acre, respectively using a combination of low-phosphorous organic fertilizer and potash. The trial was side-dressed on August 12 with an additional 50 lbs/acre nitrogen. Seedling emergence was rapid and generally uniform. Weeds were controlled by cultivation prior to side-dressing and canopy closure; the only problematic weed was wild strawberry. Top growth was evaluated on August 19.

Carrots were dug by hand September 11-15. Data were collected on ease of pulling, ease of topping, and weed invasion since side-dressing. Tops were removed and roots were graded in the field. Roots that were forked, twisted, or bent more than 45° were culled, as were excessively tiny roots, roots that broke during harvest, and roots with feeding damage. There were no signs of root maggot feeding, but some plots had significant rodent damage – probably voles. Both marketable and cull roots were weighed. Marketable roots were stored in mesh "onion" bags in the cooler (45°F).

Post-harvest data were collected on October 20. Ten marketable roots were randomly pulled from the bag, washed, and weighed. Notes were taken on shape and color. Roots were cut into thirds, and the center thirds (n=10) were juiced; sugar content was measured in the fresh juice using a hand-held refractometer.

Results

Top Growth: Stands were generally good, with the exception of the experimental line 2384 which had only 50% establishment. Foliage height ranged from very tall for Cordoba to quite short for Adelaide. Of the 5 entries with short top growth, only Mokum was able to achieve canopy closure with 12 inch rows. In contrast, all of the tall entries and half of the medium

height entries achieved canopy closure. Foliage color ranged from very dark green for Nelson to greenish yellow for Jeanette, but all entries appeared healthy. Six of the entries had shoulders that pushed above the soil as roots matured.

Table 1: Top growth characteristics

Variety	Pct. Stand	height	growth habit	canopy closure	foliage color	shoulder emergence
2289CR	70	medium	floppy	yes	yellow-green	no
2384	50	short	floppy	no	medium green	no
Adelaide	97	short	dense	no	yellow-green	yes
Baltimore	100	tall	upright	yes	dark green	no
Bolero	100	tall	spreading	yes	yellow-green	no
Caracas	95	medium	spreading	yes	yellow-green	yes
Cordoba	100	very tall	upright	yes	dark green	no
Fidra	100	medium	spreading	no	yellow-green	no
Jeanette	80	medium	spreading	yes	greenish-yellow	no
Mellow Yellow	100	tall	spreading	yes	medium green	no
Miami	100	tall	spreading	yes	bright green	yes
Mokum	75	short	spreading	yes	bright green	yes
Morelia	100	medium	spreading	yes	medium green	no
Nantindo	100	medium tall	upright	no	medium green	no
Nectar	90	medium	spreading	yes	yellow-green	no
Nelson	80	medium	upright	no	very dark green	no
Nerja	80	short	spreading	no	medium green	no
Newhall	97	tall	floppy	yes	medium green	no
Purple Sun	97	medium	upright	no	dark green with purple	no
Resistafly	90	tall	spreading	yes	medium green	no
Romance	75	medium	upright	no	dark green	no
White Satin	97	tall	upright	yes	yellow-green	yes
Yaya	85	short	upright	no	dark green	yes

Yield and Harvestability: Total yields ranged from 68 lbs for Romance to 151 lbs for White Satin with a median and mean of 107 lbs. Percent marketable yield ranged from 55% for Nerja to 85% for Caracas, with a median and mean of 70% marketable. White Satin had the greatest marketable yield, while Romance had the smallest. The majority of culls were forked, bent, or twisted roots; while not marketable as bunched or bagged carrots they could be used for processing. Nerja, 2289CR, and 2384 had very long roots that were challenging to dig without breaking; these varieties may be better suited to mechanical harvest with a deep undercutting bar. In contrast, Baltimore, Caracas, and Cordoba could be pulled practically without digging.

Yaya and Jeanette were not difficult to pull, but had brittle roots that snapped unless handled carefully.

Table 2: Harvest Notes

Variety	Mkt. wt. (lbs)	Pct. Mkt.	cull reasons	Ease of Pulling[1]	Ease of Topping[2]	Notes
2289CR	61	62%	forking, broken	hard	hard	long roots
2384	49	70%	forking	hard	hard	fewer broken roots than 2289CR
Adelaide	79	83%	shape	easy	easy	weak tops
Baltimore	97	67%	vole damage	very easy	good	
Bolero	84	84%	twisted, small	moderate	good	
Caracas	59	85%	small	very easy	hard	
Cordoba	88	78%	small, vole damage	very easy	good	strong tops
Fidra	89	83%	small, some twisting	easy	good	large size range
Jeanette	58	58%	shape	moderate	good	highly variable, brittle
Mellow Yellow	63	64%	small, shape	very hard	good	
Miami	80	71%	forking	moderate	good	
Mokum	77	56%	shape	moderate	good	
Morelia	95	82%	small, malformed	moderate	good	
Nantindo	89	69%	shape	moderate	good	
Nectar	69	61%	shape	easy	good	some blunt-tipped off-types
Nelson	56	70%	shape	easy	easy	
Nerja	55	55%	shape, broken	hard	good	roots break in soil
Newhall	91	76%	shape	easy	good	
Purple Sun	47	70%	forking	very hard	hard	enlarged lateral roots
Resistafly	83	68%	shape	moderate	good	variable shape and size
Romance	41	64%	forked	hard	hard	
White Satin	106	70%	shape, smalls	easy	easy	wide size range, orange off-types
Yaya	91	64%	shape, damage	moderate	easy	brittle, lots of pointed off-types

[1] Ease of pulling: very easy means that no digging was needed. Easy indicates that occasional soil loosening was sufficient. Very hard means that the entire row had to be lifted with the fork from both sides.

[2] Ease of topping: Easy tops snapped right off, hard tops had to be cut to get a smooth neck.

Root Quality: Adelaide had the smallest roots, averaging just 33 grams (1.2 oz); Nelson had the largest at 146 grams (5 oz). The average weight was 97 grams, lower than the median of 103 grams. Brix values ranged from 7.4% for White Satin to 11% for Cordoba, with a median of 9% and a mean of 9.1%. Nine of the 23 varieties had enough greening at the shoulders to be problematical, with White Satin having the most.

Table 3. Root Quality Data and Descriptions

Variety	10-root wt (g)	Brix	Root color	neck size	green shoulders	surface	straight	shape
2289CR	943	8.6	light orange	large	slight	rough	yes	medium top tapers to point
2384	1322	8.5	medium orange	medium	slight	smooth	yes	medium top tapers to sharp point
Adelaide	332	7.5	medium orange with light core	tiny	yes	rough	yes	cylinder with blunt end
Baltimore	1067	9.5	medium orange	medium	no	smooth	yes	wide top tapers sharply to point
Bolero	719	9	light orange	small	yes	rough	yes	medium top tapers to blunt tip
Caracas	1026	9.5	medium orange	large	yes	smooth	yes	very wide convex top tapers sharply to point
Cordoba	1201	11	medium orange	large	no	smooth	yes	very wide concave top tapers sharply to point
Fidra	617	8	medium orange	medium	yes	rough	yes	flat medium top tapers to rounded point
Jeanette	1117	8.2	medium or light orange with light core	large	slight	rough	no	wide top tapers sharply to blunt point
Mellow Yellow	1046	8.2	dark yellow with light core	large	yes	smooth	yes	wide flat top tapers slightly to blunt tip
Miami	1067	9.2	light orange	medium	yes	smooth	no	wide top tapers gradually to blunt tip
Mokum	1146	8.8	dark orange with light core	small	yes	smooth	no	cylinder with blunt end, slight taper
Morelia	655	9.2	light orange	small	slight	smooth	no	wide top tapers sharply to point
Nantindo	1250	9.6	medium orange with light core	medium	slight	rough	no	wide top with minimal taper to blunt tip
Nectar	824	10	medium orange	medium	very slight	smooth	no	medium top tapers to blunt point
Nelson	1463	9.5	medium orange	small	yes	large lenticels	no	fat cylinder with wide pointed tip
Nerja	858	10	light orange	medium	slight	rough	no	medium top tapers to rounded point
Newhall	1089	9	medium orange	medium	slight	smooth	no	wide top with minimal taper to blunt tip
Purple Sun	446	8.6	dark purple with light core or burgundy with orange core	large	no	smooth	yes	medium top tapers sharply to point
Resistafly	845	11	medium orange, some yellowish cores	small	no	smooth	straight	large flat top tapers to blunt point
Romance	1028	10	light orange	medium	no	smooth	crooked	wide top tapers sharply to point
White Satin	1441	7.4	ivory	large	extensive	rough	straight	medium top tapers sharply to point
Yaya	910	9	medium orange	small	no	rough	crooked	cylindrical with blunt end

Conclusions

Under our conditions, which include a silt loam soil with moderate amounts of cobbles and stones below the surface, Cordoba was the top performer. It established well, yielded well, resisted forking and bending in response to obstacles in the soil, and was very sweet. The only negative regarding Cordoba is that the tops are quite tall; while this is good for weed suppression and photosynthesis, it makes for an unbalanced bunch. Morelia was in second place, followed by Baltimore. Morelia combined high yields with a low cull rate, which offset its moderate quality. Baltimore produced very nice carrots, and the relatively high cull rate was partially offset by high overall yields. Other varieties in the top third of the list were Resistafly, Bolero, Newhall, Nantindo, and Caracas. The overall score was calculated by ranking the numeric data (percent stand, marketable weight, percent marketable, 10-root weight and brix) and scoring the descriptive data based on the desirability of the characteristic, and then summing across the ranks and scores. Since percent stand and 10-root weight are also reflected in marketable weight, the ranks of those measurements were reduced in weight by dividing by 10 prior to summing.

Table 4: Varieties ranked by overall score

Variety	Overall score	Variety	Overall score
Cordoba	84.5	**White Satin**	59.4
Morelia	80.0	**Nectar**	58.5
Baltimore	76.0	**Adelaide**	55.3
Resistafly	74.6	**Romance**	50.5
Newhall	72.8	**Purple Sun**	44.4
Bolero	70.1	**Nerja**	44.3
Nantindo	70.1	**Mokum**	44.1
Caracas	68.2	**2384**	43.2
Miami	65.0	**Mellow Yellow**	41.9
Fidra	62.9	**2289CR**	39.2
Nelson	61.3	**Jeanette**	34.2
Yaya	60.7		