

Morphological variations and relationship among onion germplasm for quantitative and qualitative traits at trans-Himalaya Ladakh, India

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Supplementary data file of the research article.

Supplementary Table 1. List of onion genotypes bbring from NBPGR, New Delhi, India.

S.no.	Genotypes	Source
1	IC-0279582	National Bureau of Plant Genetic Resources
2	IC-0035182	National Bureau of Plant Genetic Resources
3	IC-0035851	National Bureau of Plant Genetic Resources
4	IC-0035856	National Bureau of Plant Genetic Resources
5	IC-0035891	National Bureau of Plant Genetic Resources
6	IC-0035940	National Bureau of Plant Genetic Resources
7	IC-0035992	National Bureau of Plant Genetic Resources
8	IC-0038823	National Bureau of Plant Genetic Resources
9	IC-0047928	National Bureau of Plant Genetic Resources
10	IC-0047940	National Bureau of Plant Genetic Resources
11	IC-0279180	National Bureau of Plant Genetic Resources
12	IC-310990	National Bureau of Plant Genetic Resources
13	IC-0338582	National Bureau of Plant Genetic Resources
14	IC-0356095	National Bureau of Plant Genetic Resources
15	IC-0369521	National Bureau of Plant Genetic Resources
16	IC-0374706	National Bureau of Plant Genetic Resources
17	IC-0374724	National Bureau of Plant Genetic Resources
18	IC-0391544	National Bureau of Plant Genetic Resources
19	IC-0392640	National Bureau of Plant Genetic Resources
20	IC-0392647	National Bureau of Plant Genetic Resources
21	IC-0440229	National Bureau of Plant Genetic Resources
22	IC-0512324	National Bureau of Plant Genetic Resources
23	IC-0524211	National Bureau of Plant Genetic Resources
24	IC-0588677	National Bureau of Plant Genetic Resources
25	IC-0039039	National Bureau of Plant Genetic Resources
26	Local cultivar	Seeds of Local Cultivar were collected from Local Market of Leh-Ladakh.

Supplementary Table 2. Morphological variation among onion Germplasm.

Lines	Plant Height (cm)		Number of Leaves/plant		Leaf Length (cm)	
	2013	2014	2013	2014	2013	2014
IC-0279582	52.68±4.93 ^f	45.10±4.79 ^{fg}	16.64±2.45 ^m	14.06±1.58 ^{kl}	32.62±2.45 ^{abcdef}	29.54±2.12 ^{abcd}
IC-0035182	54.42±5.00 ^f	46.64±5.16 ^{fg}	13.34±1.56 ^{ijklm}	11.62±1.06 ^{ghijk}	45.15±7.69 ^{fgh}	40.96±7.73 ^{bcd}
IC-0035851	49.62±4.87 ^{def}	43.04±4.73 ^{efg}	12.20±1.64 ^{efghijk}	10.02±1.39 ^{efghij}	40.31±3.46 ^{cdefgh}	36.43±2.24 ^{abc}
IC-0035856	39.55±0.84 ^{abcd}	32.56±0.83 ^{abcde}	9.74±0.76 ^{cdefgh}	7.86±0.40 ^{abcde}	35.82±5.86 ^{abcde}	32.07±5.36 ^{abcde}
IC-0035891	55.48±4.95 ^{fg}	47.90±4.88 ^{gh}	10.42±1.49 ^{defghi}	8.64±1.60 ^{abcde}	39.72±4.00 ^{bcdefgh}	37.05±6.10 ^{abc}
IC-0035940	66.22±4.51 ^g	58.64±4.44 ^{hi}	12.70±1.00 ^{ghijkl}	10.48±1.12 ^{fghij}	51.44±4.71 ^{hi}	48.67±4.69 ^{fg}
IC-0035992	48.38±7.56 ^{def}	40.80±7.24 ^{efg}	9.00±0.93 ^{bcde}	6.92±0.86 ^{abcde}	46.90±3.02 ^{gh}	44.98±3.32 ^{efg}
IC-0038823	40.40±4.44 ^{abcde}	32.64±4.43 ^{abcde}	9.34±1.23 ^{bcdef}	8.40±1.27 ^{abcde}	39.56±13.96 ^{bcdefg}	35.93±12.18 ^{abcde}
IC-0047928	47.80±4.74 ^{def}	40.01±4.73 ^{defg}	12.74±0.84 ^{hijkl}	11.82±0.68 ^{hijk}	42.60±5.07 ^{efgh}	37.93±5.79 ^{abc}
IC-0047940	45.98±4.21 ^{cdef}	38.21±4.22 ^{cdefg}	10.20±1.27 ^{defghi}	8.94±0.94 ^{bcdefgh}	42.73±3.56 ^{efgh}	38.51±4.62 ^{abc}
IC-0279180	45.02±3.76 ^{bcd}	37.26±3.76 ^{bcdef}	11.24±1.73 ^{efghij}	10.44±1.54 ^{fghij}	41.40±3.46 ^{defgh}	36.79±4.44 ^{abc}
IC-310990	40.42±6.74 ^{abcde}	32.65±6.73 ^{abcde}	10.64±1.25 ^{defghi}	9.84±1.55 ^{defghij}	37.23±6.75 ^{abcde}	35.98±6.32 ^{abc}
IC-0338582	35.54±1.30 ^{abc}	27.96±1.41 ^{abc}	9.40±2.70 ^{bcdefg}	8.84±1.78 ^{bcdefgh}	28.10±2.56 ^{abc}	27.35±2.59 ^{ab}
IC-0356095	34.67±1.33 ^{ab}	26.89±1.32 ^{abc}	7.39±0.71 ^{abcd}	6.78±0.53 ^{abcd}	27.06±4.19 ^{ab}	26.34±4.56 ^{ab}
IC-0369521	36.00±5.67 ^{abc}	28.23±5.65 ^{abc}	6.40±1.29 ^{ab}	6.48±1.25 ^{abc}	29.78±3.81 ^{abcd}	27.64±2.80 ^{ab}
IC-0374706	55.28±4.21 ^{fg}	47.52±4.19 ^{gh}	14.14±1.47 ^{klm}	12.68±1.80 ^{kl}	50.23±3.30 ^{hi}	45.86±2.67 ^{efg}
IC-0374724	34.50±3.01 ^{ab}	27.82±2.20 ^{abc}	15.44±1.27 ^{lm}	14.98±1.04 ^l	30.73±2.86 ^{abcde}	28.82±2.30 ^{abc}
IC-0391544	66.26±7.52 ^g	60.21±8.31 ⁱ	9.72±0.73 ^{bcdefgh}	9.42±1.32 ^{cdefghi}	60.27±6.80 ⁱ	57.54±6.79 ^g
IC-0392640	48.68±8.57 ^{def}	41.91±8.92 ^{efg}	11.92±0.91 ^{efghijk}	11.62±1.02 ^{ghijk}	45.56±6.81 ^{gh}	43.34±7.44 ^{cdefg}
IC-0392647	35.74±2.43 ^{abc}	29.06±4.09 ^{abcd}	6.76±0.81 ^{abc}	6.18±0.60 ^{ab}	31.62±4.00 ^{abcde}	29.86±3.75 ^{abcd}
IC-0440229	51.28±4.45 ^{ef}	45.43±3.70 ^{fg}	15.40±1.98 ^{lm}	14.26±2.28 ^{kl}	46.97±4.66 ^{gh}	44.46±4.68 ^{defg}
IC-0512324	41.22±3.05 ^{abcde}	35.34±3.19 ^{bcdef}	9.60±0.98 ^{bcdefgh}	9.22±1.12 ^{bcdefghi}	34.70±4.83 ^{abcde}	32.54±5.26 ^{abcde}
IC-0524211	33.80±2.38 ^{ab}	26.02±2.34 ^{ab}	12.58±1.09 ^{fghijkl}	12.28±1.10 ^{ghijkl}	30.84±1.99 ^{abcde}	27.10±1.40 ^{ab}
IC-0588677	31.55±3.67 ^a	23.77±3.69 ^a	5.34±1.20 ^a	5.54±0.52 ^a	24.52±7.96 ^a	24.29±7.09 ^a
IC-0039039	55.90±3.68 ^{fg}	48.12±3.69 ^{gh}	14.60±0.98 ^{klm}	14.18±2.13 ^{kl}	52.12±3.13 ^{hefghi}	46.18±3.00 ^{efg}
Local check	50.62±4.87 ^{def}	42.84±4.76 ^{efg}	12.80±1.53 ^{hijkl}	11.66±1.33 ^{ghijk}	43.33±2.29 ^{hijkl}	32.26±18.19 ^{abcde}

Range	31.55-66.26	23.77-60.21	5.34-16.64	5.54-14.06	24.52-60.27	24.29-57.54
Total	46.04±10.44	38.71±10.54	11.14±3.13	10.12±2.89	39.67±9.97	36.48±9.88

Values represented as mean ± SD; for each column, different lowercase letters indicate significantly different at p<0.05, as measured by 2-sided Tukey's HSD among genotypes. Value (Mean± SE) bearing common superscript (abcd) within column does not vary significant.

Supplementary Table 3.

Lines	Leaf width (CM)		Chlorophyll Content (CCI)		Days to Maturity	
	2013	2014	2013	2014	2013	2014
IC-0279582	0.72±0.08 ^a	0.61±0.06 ^a	40.08±1.08 ^{abcdef}	36.66±1.71 ^{ab}	133.20±0.45 ^{ab}	135.80±2.49 ^{abc}
IC-0035182	1.08±0.18 ^{ab}	1.03±0.07 ^{ab}	37.22±2.44 ^{abc}	36.98±2.60 ^{ab}	135.00±1.41 ^{bcdef}	138.60±2.07 ^{bcde}
IC-0035851	1.29±0.24 ^{ab}	1.26±0.28 ^{abc}	43.46±2.26 ^{defg}	39.42±2.44 ^{ab}	132.00±1.41 ^a	135.20±1.48 ^a
IC-0035856	3.16±0.48 ^e	3.14±0.47 ^f	41.65±2.00 ^{abcdefg}	39.44±2.27 ^{ab}	138.60±0.55 ^{hi}	140.40±0.55 ^{def}
IC-0035891	1.21±0.18 ^{ab}	1.18±0.13 ^{ab}	37.83±2.70 ^{abcd}	35.98±2.96 ^{ab}	135.00±0.71 ^{bcdef}	137.80±1.64 ^{abcd}
IC-0035940	1.10±0.15 ^{ab}	1.05±0.14 ^{ab}	46.64±1.11 ^f	43.18±0.68 ^b	135.60±1.14 ^{defg}	137.00±1.22 ^{abc}
IC-0035992	1.28±0.25 ^{ab}	0.99±0.35 ^{ab}	39.52±2.66 ^{abcde}	37.87±2.88 ^{ab}	136.40±0.89 ^{efg}	137.60±2.07 ^{abcd}
IC-0038823	2.48±0.30 ^{de}	2.25±0.21 ^{def}	44.90±3.91 ^{efg}	40.67±4.85 ^{ab}	150.40±0.89 ^m	154.20±1.30 ^k
IC-0047928	1.40±0.25 ^{ab}	1.22±0.21 ^{ab}	41.10±2.29 ^{abcdefg}	37.77±2.29 ^{ab}	133.40±0.55 ^{abc}	138.00±1.58 ^{abcd}
IC-0047940	1.19±0.31 ^{ab}	1.04±0.30 ^{ab}	37.60±2.11 ^{abcd}	34.98±2.38 ^a	133.60±0.89 ^{abcd}	137.60±0.89 ^{abcd}
IC-0279180	1.32±0.15 ^{ab}	1.08±0.25 ^{ab}	41.52±2.22 ^{abcd}	39.00±2.27 ^{ab}	133.60±0.89 ^{abcd}	137.00±0.71 ^{abc}
IC-310990	1.21±0.21 ^{ab}	1.16±0.26 ^{ab}	36.85±2.02 ^{abcdefg}	34.97±4.24 ^a	132.00±1.00 ^a	135.20±0.84 ^a
IC-0338582	2.63±0.30 ^{de}	2.43±0.37 ^{def}	39.87±2.16 ^{abcde}	36.34±2.66 ^{ab}	142.40±1.34 ^k	144.80±1.30 ^j
IC-0356095	2.91±0.40 ^e	2.71±0.51 ^{ef}	40.19±3.20 ^{abcdefg}	37.47±2.81 ^{ab}	146.60±0.89 ^l	152.20±0.45 ^{jk}
IC-0369521	2.79±0.42 ^e	2.58±0.60 ^{ef}	42.23±3.33 ^{abcdefg}	38.58±4.49 ^{ab}	146.80±0.84 ^l	149.20±1.10 ^j
IC-0374706	1.55±0.15 ^{ab}	1.32±0.24 ^{abc}	46.04±1.14 ^{fg}	40.71±2.71 ^{ab}	134.60±0.89 ^{bcde}	138.00±1.58 ^{abcd}
IC-0374724	1.02±0.15 ^{ab}	0.09±0.04 ^{ab}	37.55±2.02 ^{abcd}	34.99±2.91 ^a	131.80±1.10 ^a	135.40±1.52 ^{ab}
IC-0391544	1.20±0.08 ^{ab}	1.01±0.08 ^{ab}	39.14±2.78 ^{abcde}	38.41±2.74 ^{ab}	137.00±0.71 ^{efgh}	140.40±0.89 ^{def}
IC-0392640	5.90±1.43 ^f	5.39±1.30 ^g	41.12±4.28 ^{abcdefg}	37.75±2.67 ^{ab}	139.60±0.55 ^{ij}	143.40±0.89 ^{fgi}
IC-0392647	2.46±0.49 ^{cde}	2.16±0.45 ^{cde}	44.80±3.09 ^{efg}	42.70±3.05 ^b	137.40±0.55 ^{gh}	141.40±1.14 ^{efg}
IC-0440229	1.17±0.13 ^{ab}	0.97±0.09 ^{ab}	36.81±2.28 ^a	34.93±1.98 ^a	135.80±0.84 ^{efg}	137.60±1.82 ^{abcd}
IC-0512324	3.04±0.32 ^e	2.76±0.39 ^{ef}	43.01±1.41 ^{bcdefg}	40.79±3.83 ^{ab}	136.60±0.55 ^{efgh}	139.00±1.58 ^{cde}
IC-0524211	0.89±0.17 ^a	0.77±0.64 ^{ab}	39.98±3.45 ^{abcde}	36.85±4.04 ^{ab}	133.00±0.71 ^{ab}	135.20±0.84 ^a
IC-0588677	1.84±0.30 ^{bcd}	1.60±0.34 ^{bcd}	43.12±3.14 ^{cdefg}	39.30±4.96 ^{ab}	135.40±0.55 ^{cdefg}	137.60±1.14 ^{abcd}
IC-0039039	1.15±0.11 ^{ab}	0.99±0.13 ^{ab}	39.90±2.40 ^{abcdefg}	38.04±2.60 ^{ab}	133.60±0.55 ^{abcd}	135.60±0.89 ^{ab}
Local check	0.87±0.08 ^a	0.81±0.14 ^{ab}	41.24±2.19 ^{abcdefg}	40.20±1.66 ^{ab}	141.60±0.89 ^{jk}	144.20±1.48 ^{gi}
Range	0.72-5.90	0.61-5.39	36.81-46.64	34.93-43.18	131.80-150.40	135.20-154.20
Total	1.80±1.16	1.63±1.09	40.90±3.60	38.19±3.57	136.96±4.90	139.94±5.26

Values represented as mean ± SD; for each column, different lowercase letters indicate significantly different at p<0.05, as measured by 2-sided Tukey's HSD among genotypes. Value (Mean± SD) bearing common superscript (abcd) within column does not vary significant.

Supplementary Table 4.

Lines	Double/deformed Bulb (%)		Neck Thickness (CM)		Total Soluble Solids (%)	
	2013	2014	2013	2014	2013	2014
IC-0279582	33.10±1.92 ^{bcde}	40.58±3.29 ^{bcd}	1.45±0.13 ^{efg}	1.73±0.13 ^{def}	8.00±0.33 ^{ab}	10.35±0.37 ^{ab}
IC-0035182	56.50±4.73 ^{hi}	61.34±4.37 ^f	1.38±0.11 ^{def}	1.62±0.11 ^{cdef}	6.88±0.54 ^a	9.26±0.60 ^a
IC-0035851	74.30±9.36 ^{jk}	79.61±8.53 ^{ij}	1.24±0.06 ^{bcde}	1.59±0.08 ^{bcde}	7.91±0.47 ^{ab}	10.28±0.45 ^{ab}
IC-0035856	33.20±2.20 ^{cde}	40.27±2.60 ^{bcd}	0.81±0.12 ^a	1.15±0.11 ^{abc}	8.25±0.78 ^{ab}	10.44±0.84 ^{ab}
IC-0035891	53.60±3.21 ^{hi}	61.12±2.82 ^f	2.15±0.26 ^{jk}	2.19±0.59 ^{fg}	7.39±0.91 ^{ab}	9.79±0.84 ^{ab}
IC-0035940	69.00±4.83 ^j	72.29±3.94 ^{ghi}	1.70±0.15 ^{fghi}	2.17±0.30 ^{fg}	11.13±0.23 ^{de}	13.42±0.18 ^{def}
IC-0035992	58.80±2.64 ⁱ	65.10±3.81 ^{fgh}	1.88±0.21 ^{hij}	2.10±0.10 ^{fg}	8.02±0.70 ^{ab}	10.36±0.69 ^{ab}
IC-0038823	26.20±0.57 ^{abcde}	31.99±2.39 ^{ab}	0.86±0.31 ^{ab}	1.14±0.38 ^{abc}	6.88±0.66 ^a	9.24±0.63 ^a
IC-0047928	39.60±3.52 ^{efg}	43.78±2.53 ^{cd}	2.45±0.15 ^{klm}	2.88±0.15 ^b	7.21±0.81 ^{ab}	9.63±0.81 ^{ab}
IC-0047940	54.90±2.41 ^{hi}	63.41±4.94 ^{fg}	2.09±0.16 ^{ijk}	2.50±0.18 ^{gh}	7.50±0.74 ^{ab}	9.88±0.71 ^{ab}
IC-0279180	68.60±5.40 ^j	74.30±4.36 ^{hi}	2.60±0.09 ^{lm}	2.98±0.16 ^b	8.20±0.37 ^{ab}	10.60±0.36 ^{ab}
IC-310990	54.90±2.82 ^{hi}	61.05±4.20 ^f	2.25±0.20 ^{kl}	2.51±0.15 ^{gh}	12.56±0.29 ^{efg}	14.99±0.31 ^{fgh}
IC-0338582	26.90±1.08 ^{abcde}	33.41±1.83 ^{abc}	0.95±0.18 ^{abc}	1.44±0.21 ^{abcde}	6.82±0.98 ^a	9.20±0.95 ^a
IC-0356095	33.80±3.53 ^{def}	38.67±2.93 ^{abcd}	0.99±0.15 ^{abcd}	1.46±0.14 ^{abcde}	7.80±0.75 ^{ab}	10.19±0.75 ^{ab}
IC-0369521	32.28±3.68 ^{bcde}	35.31±5.60 ^{abc}	0.69±0.03 ^a	1.02±0.06 ^{ab}	7.18±0.97 ^{ab}	9.53±1.03 ^{ab}
IC-0374706	42.60±1.71 ^{fg}	47.63±3.39 ^{de}	1.85±0.12 ^{ghij}	2.14±0.25 ^{efg}	7.27±0.80 ^{ab}	9.67±0.79 ^{ab}
IC-0374724	40.60±4.58 ^{efg}	46.74±7.22 ^{de}	2.12±0.13 ^{jk}	2.53±0.10 ^{gh}	8.62±0.38 ^{bc}	10.92±0.33 ^{bc}
IC-0391544	48.40±1.98 ^{gh}	54.55±2.20 ^{ef}	2.42±0.17 ^{klm}	2.42±0.44 ^{gh}	7.21±1.07 ^{ab}	9.60±1.03 ^{ab}
IC-0392640	28.30±4.54 ^{abcde}	37.55±10.12 ^{abcd}	2.73±0.36 ^m	2.96±0.36 ^h	11.10±0.15 ^{de}	13.50±0.26 ^{def}
IC-0392647	24.50±4.65 ^{abc}	30.44±4.43 ^{ab}	0.73±0.03 ^a	1.11±0.09 ^{abc}	11.22±1.21 ^{def}	13.28±1.24 ^{de}
IC-0440229	29.90±1.29 ^{abcde}	33.78±3.45 ^{abc}	1.38±0.21 ^{def}	1.81±0.20 ^{def}	12.06±0.39 ^{ef}	14.59±0.34 ^{efg}
IC-0512324	23.90±3.07 ^{ab}	30.11±3.37 ^{ab}	1.03±0.11 ^{abcd}	1.27±0.08 ^{abcde}	14.06±0.75 ^f	16.25±0.46 ^h
IC-0524211	29.30±1.04 ^{abcde}	34.88±2.32 ^{abc}	1.58±0.13 ^{efgh}	2.09±0.32 ^{efg}	12.81±0.18 ^{fg}	15.22±0.13 ^{gh}
IC-0588677	22.00±2.32 ^a	28.31±3.05 ^a	0.62±0.07 ^a	0.94±0.10 ^a	11.30±0.43 ^{def}	13.70±0.43 ^{defg}
IC-0039039	79.70±6.45 ^k	88.51±4.66 ^{jk}	2.21±0.19 ^{kl}	2.49±0.25 ^{gh}	9.98±0.70 ^{cd}	12.34±0.75 ^{cd}
Local check	97.55±4.181	99.07±0.81 ^k	1.34±0.11 ^{cdef}	1.67±0.10 ^{cdef}	8.00±0.81 ^{ab}	10.47±0.83 ^{ab}
Range	22.00-97.55	28.31-99.07	0.62-2.73	0.94-2.96	6.82-14.06	9.20-16.5
Total	45.48±20.00	51.30±19.79	1.60±0.65	1.92±0.65	9.05±2.24	11.41±2.23

Values represented as mean ± SD; for each column, different lowercase letters indicate significantly different at p<0.05, as measured by 2-sided Tukey's HSD among genotypes. Value (Mean± SD) bearing common superscript (abcd) within column does not vary significant.

Supplementary Table 5.

Lines	Dry Matter (%)		Polar Diameter (cm)		Equatorial Diameter (cm)	
	2013	2014	2013	2014	2013	2014
IC-0279582	9.42±0.50 ^a	12.11±0.58 ^a	3.33±0.09 ^{bc}	2.83±0.34 ^{abc}	2.94±0.12 ^{abcd}	2.68±0.18 ^{abc}
IC-0035182	9.39±0.60 ^a	11.99±0.66 ^a	3.15±0.25 ^{abc}	2.62±0.35 ^{abc}	2.40±0.29 ^a	2.05±0.29 ^a
IC-0035851	10.18±0.70 ^{ab}	12.87±0.74 ^{ab}	3.60±0.17 ^c	3.17±0.32 ^{bcd}	3.00±0.25 ^{abcd}	2.79±0.25 ^{abcd}
IC-0035856	10.29±0.56 ^{ab}	12.83±0.14 ^{ab}	6.29±0.48 ^g	5.92±0.46 ⁱ	6.78±0.36 ^g	6.27±0.42 ^g
IC-0035891	9.27±1.07 ^a	11.60±1.06 ^a	3.12±0.24 ^{abc}	2.71±0.36 ^{abc}	3.01±0.19 ^{abcd}	2.56±0.18 ^{abc}
IC-0035940	12.75±0.51 ^{cd}	15.43±0.48 ^{cd}	3.05±0.22 ^{abc}	2.65±0.22 ^{abc}	2.52±0.31 ^{ab}	2.14±0.21 ^{ab}
IC-0035992	10.12±0.53 ^{ab}	12.71±0.12 ^{ab}	3.60±0.15 ^c	3.24±0.20 ^{cd}	3.62±0.21 ^{de}	3.14±0.22 ^{cd}
IC-0038823	8.80±1.02 ^a	11.39±1.27 ^a	5.42±0.30 ^{ef}	4.89±0.37 ^{fgh}	6.64±0.21 ^g	6.26±0.28 ^g
IC-0047928	9.13±0.87 ^a	11.82±0.95 ^a	2.98±0.26 ^{abc}	2.59±0.28 ^{abc}	2.71±0.22 ^{abc}	2.49±0.23 ^{abc}
IC-0047940	9.52±0.86 ^a	11.67±0.91 ^a	3.24±0.15 ^{abc}	2.64±0.15 ^{abc}	2.90±0.10 ^{abc}	2.58±0.13 ^{abc}
IC-0279180	10.14±0.55 ^{ab}	12.92±0.55 ^{ab}	3.21±0.30 ^{abc}	2.75±0.34 ^{abc}	3.19±0.28 ^{bcd}	2.92±0.34 ^{bcd}
IC-310990	14.33±0.21 ^{de}	16.76±0.33 ^d	3.20±0.23 ^{abc}	2.75±0.28 ^{abc}	2.89±0.11 ^{abc}	2.71±0.05 ^{abc}
IC-0338582	8.74±1.38 ^a	11.25±1.35 ^a	7.22±0.30 ^h	6.83±0.36 ^j	6.77±0.37 ^g	6.32±0.40 ^g
IC-0356095	9.94±1.32 ^a	12.28±1.06 ^a	5.96±0.27 ^{fg}	5.45±0.26 ^{ghi}	6.63±0.65 ^g	6.30±0.69 ^g
IC-0369521	9.17±1.18 ^a	11.35±1.00 ^a	6.22±0.12 ^g	5.63±0.24 ^{hi}	6.65±0.29 ^g	6.28±0.39 ^g
IC-0374706	8.87±0.92 ^a	11.66±0.98 ^a	3.21±0.07 ^{abc}	2.65±0.22 ^{abc}	3.05±0.16 ^{abcd}	2.59±0.21 ^{abc}
IC-0374724	10.10±0.26 ^{ab}	12.89±0.29 ^{ab}	3.20±0.18 ^{abc}	2.52±0.18 ^{abc}	3.09±0.15 ^{abcd}	2.80±0.16 ^{abcd}
IC-0391544	9.17±1.00 ^a	11.56±1.05 ^a	2.60±0.20 ^a	2.15±0.38 ^a	3.36±19 ^{cde}	3.08±0.18 ^{cd}
IC-0392640	13.84±0.86 ^{cde}	15.91±0.50 ^{cd}	6.04±0.60 ^{fg}	5.50±0.76 ^{hi}	7.02±0.60 ^g	6.63±0.79 ^g
IC-0392647	12.90±1.29 ^{cd}	15.42±1.42 ^{cd}	1.16±0.42 ^g	5.55±0.38 ^{hi}	5.53±0.24 ^f	5.40±0.33 ^{ef}
IC-0440229	13.94±0.29 ^{cde}	16.64±0.20 ^d	4.31±0.20 ^d	3.71±0.21 ^{de}	3.35±0.15 ^{cde}	3.04±0.21 ^{cd}
IC-0512324	15.37±0.85 ^e	17.22±0.26 ^d	5.18±0.52 ^e	4.66±0.50 ^{fg}	6.42±0.27 ^g	6.09±0.39 ^{fg}
IC-0524211	14.27±0.33 ^{de}	16.91±0.27 ^d	3.28±0.04 ^{abc}	2.61±0.20 ^{abc}	4.04±0.14 ^e	3.65±0.27 ^d
IC-0588677	13.31±0.67 ^{cd}	15.72±0.48 ^{cd}	4.87±0.43 ^{de}	4.51±0.45 ^{ef}	5.45±0.40 ^f	5.00±0.57 ^e
IC-0039039	12.05±1.09 ^{bc}	14.15±1.09 ^{bc}	2.86±0.12 ^{ab}	2.40±0.11 ^{ab}	3.35±0.14 ^{cde}	3.20±0.47 ^{cd}
Local check	9.50±0.96 ^a	12.62±0.62 ^{ab}	3.60±0.17 ^c	3.13±0.23 ^{bcd}	3.00±0.25 ^{abcd}	2.80±0.33 ^{abcd}
Range	8.74-15.37	11.25-17.22	2.60-7.22	2.15-6.83	2.40-7.02	2.05-6.63
Total	10.94±2.22	13.45±2.13	4.19±1.38	3.69±1.39	4.24±1.67	3.91±1.65

Values represented as mean ± SD; for each column, different lowercase letters indicate significantly different at p<0.05, as measured by 2-sided Tukey's HSD among genotypes. Value (Mean± SD) bearing common superscript (abcd) within column does not vary significant.

Supplementary Table 6.

Lines	Bulb Shape Index		Average Bulb Weight (g)		Bulb Yield (Kg/Plot)	
	2013	2014	2013	2014	2013	2014
IC-0279582	1.13±0.01 ^{ghijk}	1.05±0.08 ^{cdefg}	36.78±3.28 ^a	34.55±4.29 ^a	7.39±0.60 ^a	6.90±0.86 ^a
IC-0035182	1.31±0.09 ^k	1.21±0.08 ^{fg}	39.74±4.58 ^{ab}	37.24±4.98 ^{ab}	7.84±0.81 ^a	7.48±0.99 ^{abc}
IC-0035851	1.20±0.15 ^{hijk}	1.14±0.17 ^{efg}	33.82±2.54 ^a	31.20±2.69 ^a	6.89±0.38 ^a	6.29±0.79 ^a
IC-0035856	0.92±0.08 ^{abcdefg}	0.94±1.00 ^{abcdef}	86.54±6.90 ^{ef}	87.10±7.35 ^{def}	17.30±1.38 ^{de}	17.39±1.41 ^{efg}
IC-0035891	1.04±0.10 ^{defghi}	1.05±0.10 ^{cdefg}	53.82±5.46 ^{cd}	49.35±6.73 ^{bc}	10.76±1.09 ^c	9.99±1.38 ^{cd}
IC-0035940	1.22±0.17 ^{ijk}	1.30±0.20 ^g	37.40±4.14 ^a	34.00±3.63 ^a	7.70±0.87 ^a	6.81±0.72 ^a
IC-0035992	0.99±0.09 ^{bcdefg}	0.98±0.09 ^{bcdefg}	37.39±4.84 ^a	33.15±4.27 ^a	7.67±1.16 ^a	6.74±0.79 ^a
IC-0038823	0.81±0.06 ^{abc}	0.78±0.08 ^{abc}	89.65±5.89 ^{efg}	86.12±5.88 ^{def}	17.93±1.18 ^{def}	17.27±1.23 ^{efg}
IC-0047928	1.09±0.06 ^{efghij}	1.05±0.12 ^{cdefg}	35.82±3.02 ^a	32.52±5.78 ^a	7.13±0.74 ^a	6.48±1.17 ^a
IC-0047940	1.01±0.08 ^{fg hijk}	1.02±0.11 ^{bcdefg}	37.69±3.85 ^a	32.38±2.39 ^a	7.43±0.76 ^a	6.24±0.55 ^a
IC-0279180	1.01±0.11 ^{bcdefghi}	0.93±0.14 ^{abcdef}	42.15±3.97 ^{abc}	37.57±3.78 ^{ab}	8.39±0.72 ^{abc}	7.50±0.80 ^{abc}
IC-310990	1.01±0.11 ^{efghijk}	0.98±0.08 ^{abcdef}	44.23±4.29 ^{abcd}	37.75±6.22 ^{ab}	8.90±0.91 ^{abc}	7.54±1.24 ^{abcd}
IC-0338582	1.06±0.07 ^{defghi}	1.08±0.09 ^{defg}	88.76±11.34 ^{efg}	83.47±11.17 ^{def}	17.75±2.27 ^{def}	16.71±2.25 ^{efg}
IC-0356095	0.90±0.08 ^{abcdef}	0.87±0.07 ^{abcde}	97.90±6.80 ^{fg}	92.02±5.44 ^{ef}	19.78±1.36 ^{ef}	18.41±1.08 ^{fg}
IC-0369521	0.93±0.02 ^{abcdefg}	0.88±0.07 ^{abcde}	98.23±2.65 ^g	93.16±3.14 ^f	19.84±0.53 ^{ef}	18.63±0.64 ^g
IC-0374706	1.03±0.05 ^{defghi}	1.02±0.15 ^{bcdefg}	40.69±1.62 ^{ab}	37.21±1.97 ^{ab}	8.17±0.29 ^{ab}	7.32±0.32 ^{abc}
IC-0374724	0.93±0.03 ^{cdefghi}	0.90±0.04 ^{abcde}	38.93±4.77 ^a	36.03±5.46 ^{ab}	7.64±1.10 ^a	7.21±1.10 ^{ab}
IC-0391544	0.77±0.77 ^a	0.70±0.69 ^a	52.00±5.01 ^{bcd}	48.26±4.60 ^{bc}	10.50±0.85 ^{bc}	9.64±0.92 ^{bcd}
IC-0392640	0.86±0.05 ^{abcd}	0.83±0.08 ^{abcd}	93.91±5.33 ^{efg}	86.28±4.90 ^{def}	18.78±1.06 ^{def}	17.27±0.99 ^{efg}
IC-0392647	1.01±0.10 ^{efghijk}	1.03±0.12 ^{bcdefg}	93.92±4.02 ^{efg}	89.40±2.09 ^{def}	18.78±0.80 ^{def}	17.85±0.42 ^{efg}
IC-0440229	1.28±0.08 ^{jk}	1.22±0.11 ^{fg}	84.28±3.94 ^e	78.44±4.13 ^d	16.89±0.80 ^d	15.69±0.80 ^e
IC-0512324	0.80±0.06 ^{ab}	0.75±0.10 ^{ab}	98.57±8.12 ^{fg}	93.56±8.34 ^f	19.97±1.76 ^f	18.72±1.72 ^g
IC-0524211	0.81±0.03 ^{ab}	0.72±0.08 ^a	83.00±3.34 ^e	78.06±1.23 ^d	16.63±0.62 ^d	15.59±0.26 ^e
IC-0588677	0.89±0.06 ^{abcde}	0.91±0.18 ^{abcde}	83.46±8.44 ^e	79.17±9.40 ^{de}	16.58±1.50 ^d	15.84±1.88 ^{ef}
IC-0039039	0.85±0.05 ^{abcd}	0.75±0.08 ^{ab}	55.12±5.86 ^d	51.23±6.81 ^c	10.90±1.29 ^c	10.24±1.37 ^d
Local check	1.20±0.15 ^{hijk}	1.13±0.26 ^{efg}	34.02±1.78 ^a	30.54±5.52 ^a	6.69±0.38 ^a	6.11±1.10 ^a
Range	0.77-1.31	0.70-1.30	33.82-98.57	31.20-93.56	6.69-19.97	6.11-18.72
Total	1.02±0.17	0.97±0.19	62.30±25.88	58.07±25.33	12.47±5.18	11.61±5.07

Values represented as mean ± SD; for each column, different lowercase letters indicate significantly different at p<0.05, as measured by 2-sided Tukey's HSD among genotypes. Value (Mean± SD) bearing common superscript (abcd) within column does not vary significant.