'Charleston Greenpack', a Pinkeye-type Southernpea with a Green Cotyledon Phenotype

Richard L. Fery¹

U.S. Vegetable Laboratory, Agricultural Research Service, U.S. Department of Agriculture, 2875 Savannah Highway, Charleston, SC 29414-5334

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'Charleston Greenpack' is a new southernpea [*Vigna unguiculata* (L.) Walp.] that was approved for release on 2 May 1997 by the U.S. Dept. of Agriculture, Agricultural Research Service. 'Charleston Greenpack' is the first pinkeye-type southernpea cultivar that exhibits the green cotyledon trait. The new cultivar can be harvested at the near-dry stage of maturity without loss of the pea's fresh green color. Frozen food processors have been interested in the green cotyledon trait because it greatly enhances the appearance of the frozen product.

Origin

'Charleston Greenpack' was developed at the U.S. Vegetable Laboratory, Charleston, S.C., over a 7-year period using a backcross-pedigree breeding procedure that included two hybridizations and repeated single-plant selections (Fig. 1). The initial cross involved 'Bettergreen', a cream-type cultivar with green cotyledons, and 'Kiawah', a pinkeye-type cultivar with cream-colored cotyledons (Fery and Dukes, 1988; Fery et al., 1993). The second cross was a backcross of the F₁ of the initial cross to the 'Kiawah' parent. Following the last hybridization, intense selection pressure was applied in the F₂ through F₈ generations for the green cotyledon phenotype and superior horticultural characteristics. 'Charleston Greenpack' originated as a bulk of an F₈ population grown in 1994.

Description

'Charleston Greenpack' is similar in appearance to 'Coronet' and 'Pinkeye Purple Hull-BVR', but usually matures 2 to 3 d earlier. The plant habit is low bushy and somewhat more compact than that of either 'Coronet' or 'Pinkeye Purple Hull-BVR', and the peduncles are 2 to 3 cm shorter (Table 1). There is extensive pigmentation (purple) on the stems, branches, and peduncles; the peti-

oles contain moderate pigmentation at the base and tip. Flower color is predominately white; the upper, inside margin of the standard is lightly pigmented (violet), the base of the standard is yellow, and the wing is pigmented (violet) on the back surface. Pod set is concentrated, and the pods are borne above the foliage in a scattered fashion. Dry pods are attached to the peduncles in a pendant manner, and each peduncle typically produces two pods.

A typical 'Charleston Greenpack' pod is moderately curved, 17 cm long, and contains

14 peas (Fig. 2). 'Charleston Greenpack' has more peas per pod than either 'Coronet' or 'Pinkeye Purple Hull-BVR', and the dry pods produce a higher shellout percentage of dry peas (Table 1). Pod color is green [Munsell (1990) rating: 5 GY 4/6] when immature, dark purple [Munsell (1990) rating: 10 P 2/1] when ready for mature-green harvest, and dark purple [Munsell (1990) rating: 10 P 2/1] when dry. The upper sutures and tips of immature pods are pigmented. Fresh peas are kidney-shaped and have a pink eye [Munsell (1990) rating: 2.5 R 5/6], quite similar to fresh 'Coronet' and 'Pinkeye Purple Hull-BVR' peas. The dry peas have a smooth seedcoat, and are slightly smaller than those of 'Coronet' and 'Pinkeye Purple Hull-BVR' (Table 2). Results of spring, late spring, and early summer field tests (10 replicates) conducted at Charleston, S.C., indicate that 'Charleston Greenpack' yields are comparable to those of 'Coronet', and comparable to or better than those of 'Pinkeye Purple Hull-BVR' (Table 3).

'Charleston Greenpack' is homozygous for the *gc* gene that conditions the green cotyledon trait (Fery and Dukes, 1994). Seedcoats and cotyledons of field-grown 'Charleston Greenpack' peas harvested at dry-stage matu-

Fig. 1. Pedigree of 'Charleston Greenpack' southernpea.

Table 1. Plant height, plant width, peduncle length, pod length, percent machine shellout, and number of peas per pod for 'Charleston Greenpack', 'Coronet', 'Kiawah', and 'Pinkeye Purple Hull-BVR' southernpeas grown in a late spring planting, Charleston, S.C., 1996.

Cultivar	Plant height (cm)	Plant width (cm)	Peduncle length (cm)	Pod length (cm)	Machine shellout ² (%)	Peas/pod (no.)
Charleston Greenpack	43.6 b ³	68.8 b	31.3 b	17.3 b	78.9 a	14.3 a
Coronet	47.1 a	73.8 a	33.1 a	16.4 c	77.8 b	13.2 b
Kiawah	45.8 a	71.5 ab	34.4 a	17.5 b	77.6 b	13.6 b
Pinkeye Purple Hull-BVR	46.0 a	70.6 b	34.6 a	18.2 a	76.5 c	13.6 b

²Percentage of dry seed obtained from machine-shelled sample of dry pods [(mass of dry seed/mass of dry pods) × 100].

³Mean separation within columns by Duncan's multiple range test at $P \leq 0.05$.

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¹Research Geneticist.

Fig. 2. Pods and peas of 'Charleston Greenpack' southernpea.

Table 2. Fresh and dry seed characteristics of 'Charleston Greenpack', 'Coronet', 'Kiawah', and 'Pinkeye Purple Hull-BVR' southernpeas, Charleston, S.C., 1996.

Cultivar	Fresh			Dry		
	Length ^a (mm)	Width ^a (mm)	Mass/ 100 peas ^b (g)	Length ^b (mm)	Width ^b (mm)	Mass/ 100 peas ^b (g)
Charleston Greenpack	10.6 c ^x	6.0 b	29.8 a	7.0 b	4.2 b	12.8 b
Coronet	10.8 bc	6.4 a	31.3 a	7.2 a	4.4 a	13.2 a
Kiawah	10.9 b	6.1 b	30.3 a	7.0 b	4.4 a	13.4 a
Pinkeye Purple Hull-BVR	11.2 a	6.0 b	31.0 a	7.1 ab	4.3 ab	13.5 a

^aPea samples harvested from replicated field test planted 12 June.

^bPea samples harvested from replicated field test planted 23 May.

^xMean separation within columns by Duncan's multiple range test at $P \leq 0.05$.

Table 3. Dry seed yields of 'Charleston Greenpack', 'Coronet', 'Kiawah', and 'Pinkeye Purple Hull-BVR' southernpeas grown in spring, late spring, and summer plantings, Charleston, S.C., 1996.^a

Cultivar	Dry seed yield (kg·ha ⁻¹)		
	Spring	Late spring	Early summer
Charleston Greenpack	1307 a ^b	1096 a	488 a
Coronet	1516 a	1068 ab	615 a
Kiawah	1429 a	953 c	504 a
Pinkeye Purple Hull-BVR	1329 a	986 bc	545 a

^aSpring, late spring, and early summer tests planted on 23 May, 12 June, and 2 July, respectively. The experimental design of each test was a randomized complete block with 10 replications. Each plot was space-planted, 18 hills per plot, three seeds per hill, 30 cm between hills, and 102 cm between rows. Single harvest of dry pods.

^bMean separation within columns by Duncan's multiple range test at $P \leq 0.05$.

ity are light olive in color [Munsell (1990) rating: 7.5 Y 7/4]. In comparison, seedcoats and cotyledons of 'Coronet' and 'Pinkeye Purple Hull-BVR' peas harvested at similar maturity are cream-colored [Munsell (1990) rating: 2.5 Y 8/4]. When dry 'Charleston Greenpack' peas are imbibed to restore fresh-harvest seed size and blanched in boiling water for 3 min, they exhibit a "fresher" color [Munsell (1990) rating: 10 Y 7/4] than do dry seeds. Similarly treated 'Coronet' and 'Pinkeye Purple Hull-BVR' peas have a cream color [Munsell (1990) rating: 5 Y 8/2]. The foliage of field-grown 'Charleston Greenpack' plants tends to have a greener color than the foliage of 'Coronet' and 'Pinkeye Purple Hull-BVR' plants. Additionally, the inside surface of "mature-green" pods are greener in 'Charleston Greenpack' than in other pinkeye cultivars.

'Charleston Greenpack' is recommended for use as a home-garden and fresh-market cultivar for spring, midseason, and fall plantings. It should perform well in all areas where 'Coronet' or 'Pinkeye Purple Hull-BVR' have been grown successfully. 'Charleston Greenpack' is recommended particularly as a processing cultivar for the frozen-food industry.

Availability

Protection for 'Charleston Greenpack' is being sought under the Plant Variety Protection Act. 'Charleston Greenpack' was developed under a Cooperative Research and Development Agreement with Western Seed Multiplication, Inc. (WSM), Box 173AA, Oglethorpe, GA 31068, and WSM has been granted an exclusive license to market the new cultivar. Genetic material of this release will be deposited in the National Plant Germplasm System where it will be available for research purposes, including development and commercialization of new cultivars.

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