'Bettergreen' Southernpea

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'Bettergreen' is a new southernpea [*Vigna unguiculata* (L.) Walp.] that was approved for release in Apr. 1991 by the U.S. Dept. of Agriculture (USDA), Agricultural Research Service. 'Bettergreen' is a cream-type cultivar that is homozygous for a newly discovered gene that conditions a unique green cotyledon trait. The new cultivar can be harvested near-dry seed maturity without loss of the seed's fresh green color.

Origin

'Bettergreen' was derived from a single mutant plant harvested from a 1986 field planting of 'Carolina Cream', which is a well-adapted, cream-type cultivar that was released by the USDA in 1982 (Fery and Dukes, 1984) and was derived from the cross Ala. 963.8 × 'Floriceam'. Main attributes of 'Carolina Cream' are its excellent culinary quality and resistance to its main insect pest, cowpea curculio (*Chalcodermus aeneus* Boehman), and major foliage disease, cercospora leaf spot (*Cercospora cruenta* Sacc.).

Description

Except for the green cotyledon trait and slightly greener foliage of mature plants, the 'Bettergreen' phenotype is similar to that of 'Carolina Cream'. 'Bettergreen' is a small-seeded (11.5 g/100 dry peas, 22 g/100 fresh peas), cream-type southernpea. The plants have a medium, bushy growth habit. There is no red or purple on stems, branches, petioles, or peduncles. Flowers are white. Pod set is concentrated, and the pods are borne scattered at foliage level. Dry pods are attached pendantly to the peduncles, and each peduncle typically produces two pods: A typical pod is slightly curved, 15 cm long, and contains 12 to 14 peas. Pods are green when immature, green with a distinct purple shading at optimum green-shell maturity, and pale tan or straw when dry. Fresh peas are ovate to reniform, and dried peas have a smooth seedcoat.

Seedcoats and cotyledons of field-grown 'Bettergreen' peas harvested at dry-stage maturity are light olive [Munsell (1990) rating: 7.5 Y 7/6]. In comparison, seedcoats and coty-

ledons of 'Carolina Cream' peas harvested at similar maturity have no green [Munsell (1990) rating: 2.5 Y 8/4]. The green cotyledon trait is distinct from the green testa trait described by Chambliss (1974, 1979) (Fig. 1).

Frozen 'Bettergreen' peas harvested at green-shell maturity and blanched for 1 min in boiling water retained much of their natural color [Munsell (1990) ratings: 10 Y 8/8 (20%), 2.5 GY 7/8 (40%), 5 GY 7/10 (40%)]. Similarly treated 'Carolina Cream' peas harvested at the same maturity retained much less of their natural color [Munsell (1990) ratings: 7.5 Y 8.5/8 (80%), 2.5 GY 7/8 (20%)]. Microwave-cooked fresh and frozen green-shell 'Bettergreen' peas suffered some color degradation, but were more uniformly and distinctly greener than microwave-cooked 'Carolina Cream' peas [Munsell (1990) ratings: 'Bettergreen', 2.5 GY 7/8 (100%); 'Carolina Cream', 7.5 Y 8.5/6 (80%), 7.5 Y 7/8 (20%)]. When cooked traditionally, 'Bettergreen' and 'Carolina Cream' fresh and frozen green-shell peas suffered severe color degradation [Munsell (1990) ratings: 'Bettergreen', 7.5 Y 8/6 (100%); 'Carolina Cream', 5 Y 8/4 (40%), 7.5 Y 8/4 (60%)].

Fig. 1. Dried seeds (left) and their cotyledons (right) of 'Freezegreen' (top), 'Bettergreen' (center), and 'Carolina Cream' (bottom). Note the lack of green in 'Carolina Cream' testa or cotyledons, the presence of green in 'Bettergreen' tests and cotyledons, and the presence of green in testa and the lack of green in cotyledons of 'Freezegreen' (homozygous for the *gt* gene, which conditions the green testa trait).

Frozen 'Bettergreen' peas processed at dry-stage maturity retained only a portion of the natural green-shell color [Munsell (1990) ratings: 5 Y 8.5/4 (90%), 10 Y 8/6 (10%)]. Canned 'Bettergreen' peas processed at dry-stage maturity suffered severe color degradation [Munsell (1990) rating: 2.5 Y 8.25/4 (100%)]. Canned 'Bettergreen' peas also exhibited severe seedcoat loss, but similarly treated 'Carolina Cream' peas maintained seedcoat integrity.

The green color of dry 'Bettergreen' peas gradually fades when the peas are exposed to light. However, the results of a replicated greenhouse experiment that studied the relationship between seed color and harvest time indicate that this phenomenon should not cause a problem in a well-managed production system. The peas harvested from 'Bettergreen' pods 21, 28, 35, 42, 49, and 56 days after anthesis were 100%, 100%, 99%, 54%, 14%, and 11% green, respectively (most pods were dry at 21 days). Seeds from the original mutant plant have been stored in darkness since 1986, and the green color has not faded noticeably.

Results of replicated fieldtests conducted in Charleston, S. C., indicate that 'Bettergreen' has the same high yield potential as 'Carolina Cream'. There has been no noticeable genetic stability problem with the green cotyledon trait in the several generations observed since its discovery. 'Bettergreen' is similar in maturity to 'Mississippi Silver', and should exhibit the same resistance to cowpea curculio, cercospora leaf spot, southern blight (*Sclerotium rolfsii* Sacc.), rust [*Uromyces phaseoli* (Pers.) Wint. var. *vignae* (Barcl.) Arth.], and powdery mildew (*Erysiphe polygoni* DC. ex St. Amans) and the same tolerance to seedling diseases as 'Carolina Cream'. 'Bettergreen' is susceptible to root-knot nematodes (*Meloidogyne* spp.), as is 'Carolina Cream'.

'Bettergreen' is recommended for use as a home-garden and fresh-market cultivar for spring, midseason, and fall plantings throughout the southern United States. It is recommended particularly for trial as a commercial processing cultivar for the frozen-food industry. We anticipate that 'Bettergreen' will be used extensively as parental material in breeding programs to convert standard cream-, pink-eye-, and blackeye-type southernpeas to green-cotyledon phenotypes.

Availability

'Bettergreen' breeder's seed has been released to seed producers. Small, trial samples of breeder's seed are available for distribution to all interested research personnel. Address all seed requests to R.L.F.

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