'Tender Cream' Southernpea

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Additional index words. cowpea, *Vigna unguiculata*, insect resistance, cowpea curculio, *Chalcodermus aeneus*, *Cercospora cruenta*, rust, *Uromyces phaseoli* var. *vignae*, powdery mildew, *Erysiphe polygoni*, southern blight, *Sclerotium rolfsii*, nematode resistance, root knot, *Meloidogyne* spp., blackeye cowpea mosaic virus, southern bean mosaic virus

'Tender Cream' is a new southernpea [*Vigna unguiculata* (L.) Walp.] that was approved for release in Apr. 1995 by the U.S. Dept. of Agriculture (USDA), Agricultural Research Service. 'Tender Cream' is well adapted for production throughout the southeastern United States, where it can be expected to produce excellent yields of cream-type peas. The major attributes of the new cultivar are its excellent culinary and processing characteristics and multiple resistances to major diseases and pests.

Origin

'Tender Cream' is the product of a complex breeding program involving pedigree, line selection, and recurrent backcross breeding procedures (Fig. 1). The initial cross involved Ala. 963.8, a line resistant to the cowpea curculio, and 'Floriceam' (Lorz and Halsey, 1964). Single-plant selection was practiced through the F₃ generation, when CR 17-1-34, a line homozygous for a dominant gene (*Cl_s*) conditioning *Cercospora* leaf spot resistance, was selected (Fery et al., 1975). A line selection procedure was then used to derive curculio-resistant breeding lines from individual CR 17-1-34 plants, and this resulted in the release of the curculio-resistant cultivar 'Carolina Cream' (Fery and Dukes, 1984). Finally, a backcross breeding procedure was initiated to transfer the *Rk* gene for root-knot

nematode (*Meloidogyne* spp.) resistance from 'Floriceam' to 'Carolina Cream.' 'Tender Cream' originated from a bulked F₃ population derived from the sixth backcross. 'Tender Cream' was tested as US-630 throughout the southern United States as an observational entry in the 1992 Regional Southernpea Cooperative Trials and as a replicated entry in the 1993 and 1994 trials.

Description

The 'Tender Cream' phenotype is similar to those of 'Carolina Cream' and 'Bettergreen' (Fery and Dukes, 1984; Fery et al., 1993). The plants have a medium, bush growth habit. There is no red or purple pigmentation on stems, branches, petioles, or peduncles. Flowers are white. Pod set is concentrated, and the pods are borne at foliage level in a scattered fashion. Dry pods are attached to the peduncles in a pendent manner, and each peduncle typically produces two pods. A typical pod is slightly curved, 14 to 16 cm long, and contains 12 to 14 peas (Fig. 2). Pods are green when immature, green with a distinct purple shading at optimum green-shell maturity, and pale tan or straw color when dry. The fresh

peas are small (20 g/100 peas), cream colored [Munsell (1990) rating: 2.5 Y 8/4], and have an ovate to reniform shape. Dry peas have a smooth seedcoat.

'Tender Cream' has a level of resistance to the cowpea curculio (*Chalcodermus aeneus* Boehman) that is similar to that of Ala. 963.8. The new cultivar has a pod factor that inhibits pod wall penetration by feeding and ovipositing adult curculios. Failure to penetrate the pod wall prevents both pea damage and oviposition. The results of tests conducted over several years suggest that, in most seasons, pods harvested from cultivars with this type of resistance will be infested by 75% to 98% fewer curculio larvae than pods harvested from susceptible cultivars (Cuthbert et al., 1974).

Fig. 1. Pedigree of 'Tender Cream' southernpea.

Fig. 2. Pods and peas of 'Tender Cream' southernpea.

Received for publication 26 Feb. 1996. Accepted for publication 13 July 1996. We acknowledge the assistance of R.O. Hampton, Agricultural Research Service, U.S. Dept. of Agriculture, Dept. of Plant Pathology, Oregon State Univ., Corvallis, for characterizing the reaction of 'Tender Cream' to blackeye cowpea mosaic and southern bean mosaic viruses; T.E. Morelock, D.R. Davis, and A.R. Gonzalez, Depts. of Horticulture and Food Science, Univ. of Arkansas, Fayetteville, for conducting processing and product evaluation tests; and all participants in the Regional Southernpea Cooperative Trials for their critical evaluation of 'Tender Cream'. The assistance of Agricultural Research Technicians F.P. Maguire, R.B. Cuthbert, II, and E.L. Corley, Jr., is also gratefully acknowledged. The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked *advertisement* solely to indicate this fact.

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Table 1. Number of *Meloidogyne incognita* larvae in postharvest soil samples, average gall index, average egg mass index, and average imbibed seed yield of 'Tender Cream' and 'Carolina Cream' plots grown in a field infested with a natural population of the southern root-knot nematode.

Cultivar	No. larvae/ 100 cc soil	Gall index ²	Egg mass index ³	Imbibed seed yield (kg·ha ⁻¹) ^x
Tender Cream	47	1.7	1.4	1,798
Carolina Cream	1,208	4.5	4.4	1,469
LSD (0.05%)	99	0.4	0.4	155

²Plants rated on a scale of 1 to 5; 1 = no galling and 5 = severe galling.

³Plants rated on a scale of 1 to 5; 1 = no egg masses and 5 = large number of egg masses.

^xSpace-planted plots (randomized complete-block design with 10 replications, 18 hills per plot, three seeds planted per hill, 30 cm between hills, and 102 cm between rows).

'Tender Cream' has exhibited a high level of resistance to root-knot nematodes in all greenhouse and field tests; the numbers of galls and egg masses on the roots have always been minimal. The results of a 1994 test conducted in a field infested with a natural population of the southern root-knot nematode [*M. incognita* (Kofoid and White) Chitwood] demonstrated the value of this resistance in 'Tender Cream' (Table 1). The resistant 'Tender Cream' outyielded the susceptible 'Carolina Cream' isoline by 22.4%. Although the roots of the 'Carolina Cream' plants exhibited extensive galling and egg mass production, 'Tender Cream' roots were relatively free of galls and egg masses. Postharvest soil samples from plots with 'Tender Cream' plants yielded only 4% as many *M. incognita* larvae as did samples from plots with 'Carolina Cream' plants.

Results of many field tests indicate that 'Tender Cream' does not have unusual susceptibility to any major southernpea disease. Tests conducted at Oregon State Univ. using enzyme-linked immunosorbent assay (ELISA) methodology indicate that 'Tender Cream' is resistant to southern bean mosaic virus (R.O. Hampton, unpublished data). The cultivar is homozygous for the *Cl_s* gene that conditions a high level of resistance to *Cercospora* leaf spot (*Cercospora cruenta* Sacc.). Additionally, we expect 'Tender Cream' to exhibit the same resistances to 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.' Observations of

several field tests, however, indicate that 'Tender Cream' does not have a high level of resistance to bacterial blight (*Xanthomonas vignicola* Burk.), and yield reductions might occur if the new cultivar is grown in areas where this disease is a problem.

The results of other tests conducted at Oregon State Univ. indicate that 'Tender Cream' is susceptible to the Georgia isolate of blackeye cowpea mosaic virus (BICMV) when seedlings are mechanically inoculated under standard greenhouse conditions (R.O. Hampton, unpublished data). Under these conditions, 'Tender Cream' plants produce striking mosaic symptoms typical of BICMV and ELISA tests are positive for BICMV. However, greenhouse susceptibility to the Georgia isolate of BICMV differs from repeated field observations of 'Tender Cream' during evaluation trials. In some of these trials, adjacent plants of the BICMV-susceptible 'Coronet' developed distinct symptoms, whereas 'Tender Cream' remained free of such symptoms or developed mild symptoms no worse than those exhibited by the BICMV-resistant 'Pink-eye Purple Hull-BVR.' Such results suggest that 'Tender Cream' possesses field resistance to BICMV, a phenomenon previously recognized in other cultivars of southernpea and other legume species. Nevertheless, caution should be exercised in areas (or seasons) where this virus might be a problem.

Results of replicated field studies conducted at Charleston, S.C., over several years indicate that 'Tender Cream' has the same maturity and high yield potential as 'Carolina Cream.' 'Tender Cream' outyielded the cream control

('Early Acre' or 'White Acre') in the 1992, 1993, and 1994 Regional Southernpea Cooperative Trials by 5.4%, 11.0%, or 18.8%, respectively (a total of 32 trials reported shelled yield).

Canned samples of fresh 'Tender Cream' peas scored well in quality tests conducted in 1992, 1993, and 1994 at the Univ. of Arkansas (T.E. Morelock, D.R. Davis, and A.R. Gonzalez, unpublished data). The average processed grade of canned samples (average scores over 3 years for color of peas and liquor, wholeness, texture, flavor, and general appearance: 1 = poorest, 10 = best) was 8.5 for 'Tender Cream' and 8.4 for the 'White Acre'/'Early Acre' control. The canning quality of 'Tender Cream' is distinctly superior to that of 'Bettergreen', a cultivar gaining acceptance in the freezing industry.

'Tender Cream' is recommended for use as a processing, home garden, and fresh-market cultivar for spring, midseason, and fall plantings throughout the southeastern United States. 'Tender Cream' is particularly recommended for trial as a commercial processing cultivar for canned southernpea products.

Availability

'Tender Cream' 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 requests to R.L.F.

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