'Bettergro Blackeye' Southernpea

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'Bettergro Blackeye' is a new southernpea [*Vigna unguiculata* (L.) Walp.] cultivar that was approved for release in July 1991 by the Agricultural Research Service, U.S. Dept. of Agriculture. 'Bettergro Blackeye' is well adapted for production throughout the southern United States, where it produces excellent yields of high-quality, blackeye-type peas. The new cultivar is resistant to the cowpea curculio (*Chalcodermus aeneus* Boehman), the major insect pest of the southernpea in many southern production areas, and root knot, a severe root disease incited by several species of the root-knot nematode (*Meloidogyne* spp.).

Origin

'Bettergro Blackeye' was developed over 12 years using a backcross-pedigree breeding procedure that included two hybridizations and repeated single-plant selections (Fig. 1). The initial cross involved Ala. 963.8, a line resistant to the cowpea curculio, and 'Magnolia Blackeye'. The second cross was a backcross of the F_1 of the initial cross to the 'Magnolia Blackeye' parent. Following the last hybridization, intense selection pressure was applied in the F_2 through F_3 generations for cowpea curculio resistance and superior horticultural characteristics. Selections for overall cowpea curculio resistance were made using procedures described by Cuthbert et al. (1974). 'Bettergro Blackeye' originated as a bulk of an F_3 population grown in 1984. 'Bettergro Blackeye' was tested as US-481 throughout the southern United States as an observational

entry in the 1986 Regional Southernpea Cooperative Trials and as a replicated entry in the 1987, 1988, and 1989 trials.

Description

'Bettergro Blackeye' has a tall, upright plant habit (Fig. 2). Maturity is usually concurrent with that of 'Pinkeye Purple Hull'. Flowers are white; the margins of the wing and standard are violet. There is moderate pigmentation (purple) on stems, branches, and bases and tips of petioles and peduncles. The pods are borne in a scattered fashion at foliage level. Pod set is concentrated. Base pod color is light green (Munsell rating: 5 GY 6/8) when immature, a cream yellow (Munsell rating: 5 Y 8/6) at green-shell maturity, and a light straw (Munsell rating: 2.5 Y 8/5) when dry. The green-shell maturity pods have a touch of reddish shading and reddish tips. A typical pod

is slightly curved, 17 to 20 cm long, and contains 12 or 13 peas (Fig. 3). Dry pods are borne on peduncles in a pendant fashion, and each peduncle usually produces two or three pods. 'Bettergro Blackeye' plants have a greater tendency to produce a second crop than plants of most southernpea cultivars, which tend to defoliate and die immediately after harvest.

The size, shape, and eye pattern of 'Bettergro Blackeye' peas are similar to those characteristic of the leading pinkeye-type cultivars Pinkeye Purple Hull and Coronet (Fig. 3). The oblong shape of the dry peas is intermediate between the ovoid/ovate shape characteristic of 'Magnolia Blackeye' and the kidney shape characteristic of 'California Blackeye No. 5'. Seed size is medium (15 g/100 dry peas; 36 g/100 fresh peas). The fresh peas are light yellow (Munsell rating: 5 Y 8/6). The dry seed testa is rough and light tan (Munsell rating: 2.5 Y 8.5/2).

Canned samples of fresh 'Bettergro Blackeye' peas scored well in quality tests conducted in 1987, 1988, and 1989 at the Univ. of Arkansas (T.E. Morelock and D.R. Davis, 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 7.7 for 'Bettergro Blackeye' and 7.8 for 'Pinkeye Purple Hull-BVR'. The canned 'Bettergro Blackeye' product was similar in appearance to the canned 'Pinkeye Purple Hull-BVR' product.

'Bettergro Blackeye' has a level of resistance to the cowpea curculio similar to that of 'Carolina Cream', 'Carolina Crowder', and the breeding line 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 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 cowpea curculio larvae than pods harvested from susceptible cultivars (Cuthbert et al., 1974).

'Bettergro Blackeye' has excellent yield

Fig. 1. Pedigree of 'Bettergro Blackeye' southernpea.

Fig. 2. Four-row field plots of 'Bettergro Blackeye' southernpeas at the postharvest stage. (Note: The outside rows have been harvested.)

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Fig. 3. Pods and peas of 'Bettergro Blackeye' southernpea.

potential. It outyielded the 'Pinkeye Purple Hull-BVR' control in the 1986, 1987, 1988, and 1989 Regional Southernpea Cooperative Trials by 34.8%, 14.3%, 12.6%, and 20.9%, respectively (total number of trials reporting shelled yield: 42). Results of many field tests have shown 'Bettergro Blackeye' to have no unusual susceptibility to any major southernpea disease. 'Bettergro Blackeye' is homozygous for the *Rk* gene that conditions a high level of

resistance to root-knot nematodes (Fery and Dukes, 1980). Observations of natural epiphytotics indicate that the cultivar is also resistant to rust [*Uromyces phaseoli* (Pers.) Wint. var. *vignae* (Barcl.) Arth.] and powdery mildew (*Erysiphe polygoni* DC. ex St. Amans). Tests conducted at Auburn Univ. using enzyme-linked immunosorbent assay (ELISA) methodology indicate that 'Bettergro Blackeye' is susceptible to blackeye cowpea mosaic

virus (O.L. Chambliss and P.B. Strniste, unpublished data). Caution should be exercised in areas (or seasons) where this virus might be a problem.

'Bettergro Blackeye' is recommended for use as a home garden and commercial processing cultivar for spring and mid-season plantings throughout the southern United States. The cultivar will probably benefit more from closer row spacing than cultivars with a more vining plant habit. The enhanced "second crop" potential may be of considerable importance to home gardeners.

Availability

Breeder's seed of 'Bettergro Blackeye' has been released to seed producers. Small, trial samples of breeder's seed are available from R.L.F. for distribution to all interested research personnel.

Literature Cited

- Cuthbert, F.P., Jr., R.L. Fery, and O.L. Chambliss. 1974. Breeding for resistance to the cowpea curculio in southern peas. *HortScience* 9:69-70.
- Fery, R.L. and P.D. Dukes. 1980. Inheritance of root-knot resistance in the cowpea [*Vigna unguiculata* (L.) Walp.]. *J. Amer. Soc. Hort. Sci.* 105:671-674.
- Munsell Color. 1990. Munsell book of color: Glossy finish collection. Munsell Color, Baltimore.