

'Texas Pinkeye Purple Hull' Cowpea

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'Texas Pinkeye Purple Hull' (TPPH) cowpea [*Vigna unguiculata* (L.) Walp.] (Fig. 1) was released by the Texas Agricultural Expt. Station in 1990 as a replacement cultivar for 'Pinkeye Purple Hull', 'Pinkeye Purple Hull-BVR' (Kuhn et al., 1984), and 'Coronet' (Brantley, 1976). It was developed for the canning and freezing industry but also is suited for fresh market and home gardens. Generally, TPPH matures 10 days earlier and is higher yielding, especially at narrow row spacing, than 'Pinkeye Purple Hull' and 'Pinkeye Purple Hull-BVR', and it does not show virus symptoms typically exhibited by 'Coronet' under field conditions. Unlike 'Pinkeye Purple Hull', TPPH does not exhibit extreme chlorosis when grown on highly calcareous soils and will produce pods under these conditions. It resists lodging and pod shattering.

Origin

TPPH was derived from a cross made in the greenhouse at College Station, Texas, in Fall 1984. The parents (Fig. 2) were TX63-7, an advanced breeding line from the Texas program, and US 432, released as germplasm by the U.S. Dept. of Agriculture (USDA), Agricultural Research Service (ARS) in 1988 (Fery and Dukes, 1990). The F₁ was selfed in the greenhouse in Spring 1985 to produce F₂ seed. In Summer 1985, a single plant selection was made from the segregating F₂ population and was assigned the breeding line number 220-4. Another single plant selection was made from F₃ rows in Summer 1986. Selection was based on the plant's superior architecture, pod location, and high yield of attractive peas. The selection's seed was planted in the greenhouse, and single seed descent was practiced for four subsequent cycles (F₄-F₇). A small seed increase block was planted in the field at College Station in Fall 1987. Then in Summer 1988, the line was evaluated as plant rows at

College Station and Lubbock, Texas. Seeds from these two plantings were used for a Fall 1988 increase in Weslaco, Texas, followed by a Spring 1989 increase at Weslaco. Careful and intense roguing was practiced with each seed increase to eliminate a rare but persistent cream pea variant resembling US-432, the male parent. The variant is easily recognized because it has no anthocyanin in the plant or seed and matures later than TPPH. This variant can be controlled with the regular supply of new breeder seed. Seeds derived from the Spring 1989 Weslaco planting were provided to the Texas Foundation Seed Service for seed increase; supplied to canners and freezers for field and processing evaluations; entered in the Texas statewide cowpea testing program with locations at Weslaco, College Station, Temple, Overton, Munday, and Lubbock; and used for entry in the Regional Southernpea Cooperative Trials.

Description

TPPH has an improved plant architecture compared to the standard pinkeye purple hull cultivars, such as 'Pinkeye Purple Hull', 'Pinkeye Purple Hull-BVR', and 'Coronet'. The plant's erect growth habit lends itself to narrow row spacing or a twin row planting pattern and to mechanical harvest. The recommended

seeding rate is four seed per 30.5 cm on single rows and five to six seed per 30.5 cm on twin-row planting configurations. The plants are 15 to 20 cm taller than the standard pinkeye cultivars and have a high bush growth habit with a determinate growth pattern. Flowers differ from most other pinkeye cultivars by exhibiting more yellow at the throat of the standard petals; also, there is more purple above the yellow coloration on the standard petal and tinged wing and keel petals. The calyx is distinctly darker in anthocyanin pigmentation. Pod color is green and purple when immature, dark purple when ready for mature-green harvest, and purple when dry. The slightly curved pods are concentrated at or above the foliage level. Fresh peas are slightly kidney shaped and green with a bright-pink eye. The dry seed has a smooth to slightly wrinkled cream testa with a dark maroon eye, which is slightly larger than that of 'Pinkeye Purple Hull'. The dry testa of TPPH is less bleached than that of 'Pinkeye Purple Hull'. TPPH seeds are smaller than those of 'Pinkeye Purple Hull', with 100 seeds weighing ≈18 g. Seedling primary leaves are dull green, which is markedly different from the glossy green of 'Pinkeye Purple Hull'. As the plant matures, there is a noticeable amount of purple anthocyanin streaking in the petiole, and leaves are a darker green than the standard pinkeye cultivars, as indicated by the labscan spectrophotometer (model LS-5100 colorimeter; Hunter Associates Laboratory, Reston, Va.) (data not shown). The mature-green stage is reached in 54 to 60 days.

TPPH was immune to a Georgia isolate of blackeye cowpea mosaic virus (BICMV) i.e., no enzyme-linked immunosorbent assay-detectable BICMV was present in plants 4 weeks after inoculation (unpublished data, R.O. Hampton, USDA, ARS, Virology Laboratory, Dept. of Botany and Plant Pathology, Oregon State Univ., Corvallis). The cultivar was toler-

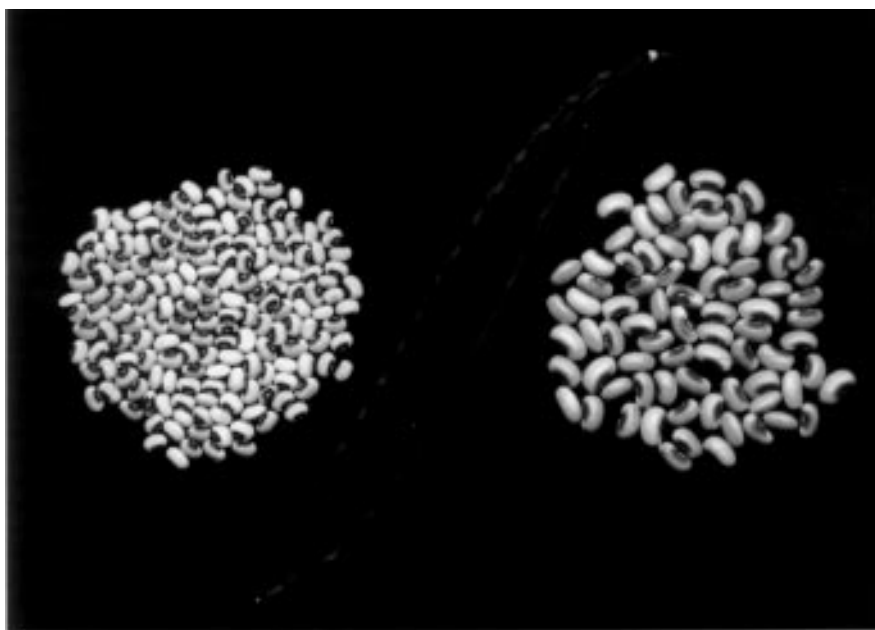


Fig. 1. (left) Dry and (right) fresh pods and seeds of 'Texas Pinkeye Purple Hull' cowpea.

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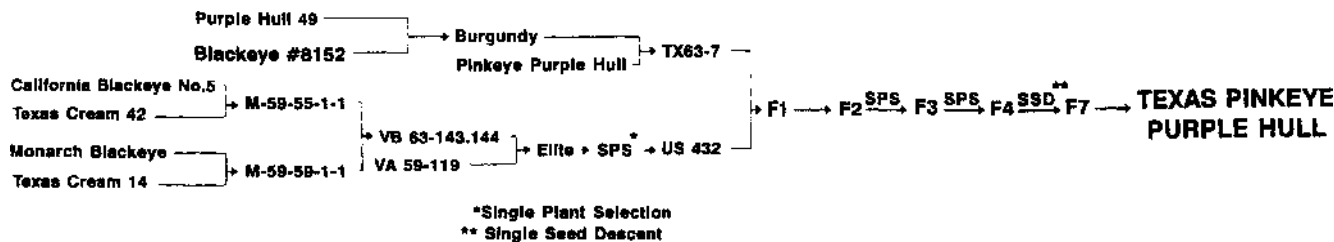


Fig. 2. 'Texas Pinkeye Purple Hull' cowpea pedigree.

ant to two other BICMV isolates from California and India (i.e., inoculated plants showed no symptoms, but BICMV was readily detectable in the plants). TPPH also was immune to two isolates of cowpea aphid-borne mosaic virus (CAMV) (exotic to the United States) but was susceptible (delayed, pronounced mosaic symptoms) to a Moroccan isolate of CAMV. Almost all cowpea genotypes are susceptible to this virulent CAMV isolate. TPPH has exhibited a high level of resistance to root knot in greenhouse and field tests (unpublished data, P.D. Dukes and R.L. Fery, U.S. Vegetable Laboratory, USDA, ARS, Charleston, S.C.). Root knot is a major cowpea root disease incited by several species of the root knot nematode of the genus *Meloidogyne*, in this case *Meloidogyne incognita* (Kofoid and White) Chitwood Race 1. It is susceptible to rust [*Uromyces appendiculatus* (Persoon) Unger], powdery mildew (*Erysiphe polygoni* DC), and cercospora leaf spot (*Cercospora* spp.).

TPPH yield has been rated outstanding in numerous trials throughout Texas and in the Regional Southernpea Cooperative Trials. The yield generally has been equal to or higher than that of 'Pinkeye Purple Hull' and 'Pinkeye Purple Hull-BVR' and significantly higher when planted either on narrow (50 cm apart) or twin (25 cm apart on 10-cm centers) rows. In the 1990 Regional Southernpea Cooperative Trials, TPPH produced a higher yield at all 10 locations across six states than the control 'Pinkeye Purple Hull-BVR' (Table 1). The 1989 and 1990 Cooperative Trial results from the two narrow row spacing sites at Kibler, Ark. (46 cm), and Jackson, Tenn. (76 cm), showed the higher yield of TPPH over 'Pinkeye Purple Hull-BVR', when planted in narrow rows (Table 2). Thus, TPPH offers producers greater flexibility in row spacing and planting configurations than the cultivars currently used. Unlike the standard pinkeye cultivars, TPPH can be harvested mechanically in the fresh green stages using a Pixall harvester. Also, it resists lodging and pod shattering.

Freezing and canning processing evaluations were conducted by Rio Grande Foods,

Table 1. Yield comparison of imbibed 'Texas Pinkeye Purple Hull' and 'Pinkeye Purple Hull-BVR' seed grown at 10 Regional Southernpea Cooperative Trial locations in 1990.

Location	Interrow spacing (cm)	Yield (kg·ha ⁻¹)	
		Texas Pinkeye Purple Hull	Pinkeye Purple Hull-BVR
Milstead, Ala.	107	3367	3156
Fayetteville, Ark.	1072	1509	1402
Hope, Ark.	91	2772	2200
Kibler, Ark.	46	2402	1430
Calhoun, La.	102	2576	1959
Charleston, S.C.	102	2135	1959
Jackson, Tenn.	76	696	437
College Station, Texas	102	661	75
Lubbock, Texas	102	3309	1641
Overton, Texas	102	1216	465
Mean		2064 ^z	1017

^zThe genotypic effect was tested against the genotype (G) × location (L) interaction and was found to be highly significant. There was no crossover interaction because 'Texas Pinkeye Purple Hull' outyielded 'Pinkeye Purple Hull-BVR' at all 10 locations. The G × L interaction is considered nonsignificant because it contributed only 5.4% of the total variability.

Table 2. Yield comparison of imbibed 'Texas Pinkeye Purple Hull' and 'Pinkeye Purple Hull-BVR' seed grown on narrow rows in two locations, Regional Southernpea Cooperative High-density Trials in 1989 and 1990.

Interrow spacing (cm)	Location	Year	Yield (kg·ha ⁻¹)	
			Texas Pinkeye Purple Hull	Pinkeye Purple Hull-BVR
46	Kibler, Ark.	1989	3810	1753
	Kibler, Ark.	1990	2402	1438
76	Jackson, Tenn.	1989	1913	1425
	Jackson, Tenn.	1990	696	437
Mean			2205 ^z	1263

^zThe genotypic effect was significant at $P \leq 0.10$ when tested against the genotype × location interaction.

McAllen, Texas; Bush Brothers, Blytheville, Ark.; and by the Dept. of Food Science, Univ. of Arkansas, Fayetteville (D.R. Davis, unpublished data). According to those results, TPPH is outstanding in pea and liquor color, wholeness, texture, flavor, and general appearance in canned and frozen products.

Availability

An application for Plant Variety Protection with Title V option has been filed for TPPH, and the registered seed class has been eliminated. Commercial producers and home gardeners can obtain information on seed avail-

ability from the Texas Foundation Seed Service, Texas Agricultural Experiment Station, College Station, Texas 77843-2581; phone 409/845-4051.

Literature Cited

- Brantley, B.B. 1976. Coronet: A new southernpea variety. Georgia Agr. Expt. Sta. Res. Rpt. 220.
 Fery, R.L. and P.D. Dukes. 1990. Registration of US-432 cowpea (southernpea) germplasm. Crop Sci. 30:428.
 Kuhn, C.W., B.B. Brantley, J.W. Demski, and G. Pio-Ribeiro. 1984. 'Pinkeye Purple Hull-BVR', 'White Acre-BVR', and 'Corona' cowpeas. HortScience 19:592.