HORTSCIENCE 35(4):776–777. 2000.

'Butterbowl' Squash, A Novel, Flat-shouldered Globe Butternut

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Additional index words. butternut squash, *Cucurbita moschata*, black fruit rot, bacterial spot and vine borer resistance, early maturity

Butternut squash (*Cucurbita moschata* Duch. Ex Poir) is one of the most popular winter squashes grown in the United States. However, current consumers not only bake but also microwave squash. The flesh is much thinner at the bulb end of the fruit around the seed cavity than in the neck of the typical butternut squash so that the whole fruit does not cook uniformly during the microwave process. A smaller butternut type squash with a more uniform flesh thickness around most of the seed cavity would be expected to cook more uniformly in the microwave and would be useful to home gardeners and for the fresh market, but not for processors.

A novel, small-sized, flavorful, flat-shouldered, globe-shaped fruit line NE-RBN-4 of butternut quality was developed and released in 1997 as 'Butterbowl' (Fig. 1). No winter squash with these characteristics is presently available for consumers. A local panel expressed a strong interest in this squash because of its small size, excellent cooked quality, and attractive shape.

Origin

Segregation of plants with crookneck, long straight necks, short necks, pear, and near-round to flat-shouldered, globe fruit shapes were observed in the F_2 generation of the cross of true breeding crookneck lines NE-BNCR-67-1-7 x Yellow Cushaw (Agway Co., Syracuse, N.Y.) (Ibrahim et al., 1973). The mutant BNCR-67-1-7 was selected in 'Butternut 23' by the senior author. A number of S_4 inbred lines were derived subsequently from selfing the F_2 plants with the novel neckless fruit. Seed was saved from an open-pollinated (OP) flat-shouldered, globe-shaped fruit of one of the S_4 lines. An S_6 inbred line NE-RBN-4 was subsequently derived from selfing the above OP progeny and after testing was released with the name 'Butterbowl'.

Description

'Butterbowl' and two standard butternut cultivars, 'Waltham' and 'Ponca', were evaluated in field trials over 3 years (1992, 1994, 1995) at Lincoln, Nebr. Single-row plots of each cultivar were spaced 2.4 m apart, with five plants spaced 1.2 m apart within rows in a randomized complete-block design with five replications. Mean marketable fruit weight, fruit yield, and days to maturity were recorded.

The reactions of the cultivars to the following disease and insect pests were recorded: black rot on fruit caused by the fungus *Didymella bryoniae* (Auersw.) Rehm [anamorph: *Phoma cucurbitacearum* (Fr) Sacc] (at harvest); bacterial spot on foliage caused by *Xanthomonas campestris* pv. *cucurbitae* (Bryon) Dowson (early August); powdery mildew on leaves caused by *Erysiphe cichoracearum* DC (end of August); and vine borer injury (*Melitia cucurbitae* Harris) (at harvest).

Feedback on cooked fruit quality of 'Butterbowl' was obtained from 12 evaluators, selected at large from staff (not project associated) in the College of Agriculture, Univ. of Nebraska, Lincoln. No attempts were made to quantify measurements of texture, color, and flavor of the cooked squash or to compare with other cultivars of butternut. The cooked squash were rated for the above traits as very good, good, fair, or poor. Information on cooking procedures was not requested.

The marketable fruit yield of 'Butterbowl' was similar to that of 'Ponca' in all tests except in 1995, when yield of 'Butterbowl' exceeded that of 'Ponca' (Table 1). The marketable fruit yield of 'Waltham' was significantly greater than that of 'Butterbowl' in two out of the four trials (Table 1). The fruit weight of 'Butterbowl' (0.8 to 1.4 kg) was similar to that of 'Ponca' in all trials except in 1994 (Expt. II), when it was slightly greater, but was less than that of 'Waltham' in all trials (Table 1). The circum-

Fig. 1. Fruit of near-oblate butternut type cultivar 'Butterbowl' (NE-RBN-4).

Table 1. Marketable fruit yield and fruit weight of two standard butternut squash and cultivars of 'Butterbowl'.

Cultivar /line	1992		1994 (Expt. I)		1994 (Expt. II)		1995	
	Yield ($Mg \cdot ha^{-1}$)	Fruit wt (kg)	Yield ($Mg \cdot ha^{-1}$)	Fruit wt (kg)	Yield ($Mg \cdot ha^{-1}$)	Fruit wt (kg)	Yield ($Mg \cdot ha^{-1}$)	Fruit wt (kg)
Ponca	5.6	0.8	14.8	0.9	17.3	1.1	11.7	0.8
Waltham	8.3	1.3	15.0	1.5	26.0	1.8	18.6	1.3
Butterbowl	5.2	1.0	16.4	1.1	16.4	1.4	17.0	0.8
LSD ($P \leq 0.05$)	2.5	0.2	6.5	0.3	4.9	0.2	2.5	0.12

Received for publication 14 June 1999. Accepted for publication 13 Sept. 1999. Published as Paper No. 12638, Journal Series, Nebraska Agricultural Research Division. Research was conducted under former Project 20-14. The photograph of 'Butterbowl' squash (Fig. 1) was provided by the W. Atlee Burpee and Co., 300 Park Avenue, Warminster, PA 18974. 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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ference and height of the 'Butterbowl' fruit ranged from 39–42 cm to 10–13 cm, respectively (Fig. 1). The spread of the vines of 'Butterbowl' was less (1.7–1.9 m) than that of 'Ponca' (2.1–2.4 m) and 'Waltham' (2.4–3.0 m). 'Butterbowl' would be suitable for small gardens with limited space because of its more limited vine growth; the genetic basis for this property is not known. Since the fruit yields and vine spread of 'Butterbowl' were less than 'Waltham' at the spacing used in the trials reported here, we recommend that the three cultivars be compared at closer row spacings, as yields of 'Butterbowl' should improve at the same within-row spacings.

'Butterbowl' matured earlier (90–95 d) than 'Ponca' (95–100 d) and 'Waltham' (100–103 d) in these trials, and thus could provide growers with earlier maturing fruit for marketing. No crookneck fruit were observed in 'Butterbowl' and 'Waltham', while a few crookneck mutant fruits were observed in 'Ponca'. Slight shriveling of the skin of 6% to 7% of 'Butterbowl' fruit occurred after 42–46 d in storage (10.6 °C, 75% relative humidity) in 1994 and 1995, so the fruits should be used within 2 months of harvest.

Ten out of 12 testers rated the flavor and color of 'Butterbowl' as very good, and two out of 12 as good. All of the testers regarded the texture as very good to good. Eleven out of 12 regarded the shape as appealing. Two reported that this squash was excellent for microwave cooking. Others did not indicate the cooking procedure used.

No feeding by larvae of the vine borer moth was observed in the stems of the three cultivars. Under natural infection in the field, 'Butterbowl' and 'Waltham' were resistant to black fruit rot while 'Ponca' fruit were susceptible. The foliage of 'Butterbowl' was resistant to bacterial spot while that of 'Waltham' and 'Ponca' was susceptible, based on natural infection in the field and in inoculation tests in the greenhouse (unpublished). 'Butterbowl' and 'Waltham' were moderately susceptible to powdery mildew while 'Ponca' was highly susceptible in the field.

The overall merit of the novel flat-shouldered, globe-shaped 'Butterbowl' is due to its suitability for microwaving, cooking quality, limited vine spread, early maturity, and resistance to diseases and vine borer. 'Butterbowl' is suitable for home gardens and commercial production for the fresh market.

Seed availability

An exclusive release of 'Butterbowl' was made to Hollar Seeds, P.O. Box 106, Rocky Ford, CO 81067, with a marketing arrangement with W. Atlee Burpee Seed Co. Seed for breeding purposes may be obtained from the senior author.

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