Fruit Varieties Journal 49(2):99-100 1995

'Toro' Highbush Blueberry

ARLEN DRAPER,[1] NICHOLI VORSA,[2] GENE GALLETA,[3]
GOJKO JELENKOVIC[4] AND MARK EHLENFELDT[5]

Abstract

'Toro' is a midseason tetraploid highbush blueberry, *Vaccinium corymbosum* L., resulting from the cooperative breeding program of the Agricultural Research Service of the United States Department of Agriculture and the New Jersey Agricultural Experiment Station. 'Toro' ripens with 'Bluecrop' in southern New Jersey (early July to late July). 'Toro' has good fresh fruit flavor, is very productive, and retains good fruit color through the fruiting season. 'Toro' plants are strong and upright. 'Toro' may complement 'Bluecrop' or be an alternative for fresh and frozen markets in northern U.S. blueberry production areas.

Additional index words: Vaccinium corymbosum, fruit breeding.

'Toro,' tested as G-360, resulted from a cross of 'Earliblue' x 'Ivanhoe' made by A. D. Draper at Beltsville, MD in 1969. The original plant was selected from a seedling field grown at the Atlantic Blueberry Company near Weymouth, New Jersey by A. D. Draper, D. Scott, and G. Jelenkovic in 1972. They, along with N. Vorsa and G. Galletta, continued evaluation of 'Toro' during the period 1975-1987. 'Toro' was released to nurseries for propagation in early 1987.

Table 1. Fruit yield per plant of 'Toro' highbush blueberry by harvest dates for 1988, 1989, and 1990.

Year	Harvest date/yield (kg)[z]					Total yield (kg)
1988	7/7	7/13	7/20	7/27	8/3	
	3.30	2.04	1.25	0.57	0.23	7.29 (16.0 lb.)
1989	7/7	7/18	7/27	8/7		
	2.04	4.20	5.07	0.05		11.36 (25.0 lb.)
1990	6/25	6/29	7/5	7/12		
	0.74	1.26	2.30	0.76		5.05 (11.1 lb.)

[z]Yields are an average of three plants. The same plants were harvested each year.

Table 2. Ratings of berry size, color, scar, firmness, flavor, and crop for test rows of 'Toro' and 'Bluecrop' over 6 years (1983-1986, 1988-1989).

		Berry characteristics[z]					
Cultivar		Size	Color	Scar	Firmness	Flavor	Crop
Toro	mean	8	8	8	8	7	8
	range	(8)	(8)	(8)	(8)	(7)	(8)
Bluecrop	mean	8	8	8	8	7	8
	range	(7-8)	(8)	(8)	(8)	(6-7)	(8-9)

[z]For size, scar, firmness, flavor, and crop 1 = poorest, 9 = best; for color, 1 = dark, 9 = light.

Evaluations, beginning in 1983, of a test row of 'Toro' indicated that its outstanding characteristics are consistently high productivity, sound fruit with good size, scar, flavor, and firmness, and retention of good blue fruit color through the harvest season. Harvest data from the test row of 'Toro' showed total yields per plant of 7.29 kg (16.0 lb.) in 1988, 11.36 kg (25.0 lb.) in 1989, and 5.05 kg (11.1 lb.) in 1990 (Table 1), with three pickings securing 89.4%, 99.6% and 85.0% of the total yield in those years. Visual ratings suggested that the total yield of 'Toro' was comparable to that of 'Bluecrop.' Fruit clusters of 'Toro' typically are tighter than those of 'Bluecrop.' This tightness, however, is not extreme, and preliminary evaluations suggest that 'Toro'

[1,3]U.S. Department of Agriculture-Agricultural Research Service, Beltsville, MD 20705.
[2,4]Dept. of Horticulture, Cook College, Rutgers University, New Brunswick, NJ 08903.
[5]U.S. Department of Agriculture-Agricultural Research Service, Blueberry and Cranberry Research Center, Lake Oswego Road, Chatsworth, NJ 08019 (corresponding author).

Table 3. Mean berry weight (g) of 'Toro' and 'Bluecrop' highbush blueberry cultivars from 4 harvests in 1989.

Cultivar	Harvest date 7/7	7/18	7/27	8/7	Mean
Toro	1.9 ± .07[z]	1.7 ± .06	1.6 ± .05	1.3 ± .06	1.6
Bluecrop	1.9 ± .04	1.6 ± .04	1.5 ± .04	1.4 ± .04	1.6

[z]Weights represent an average of 30 individual berries randomly sampled from bulked fruit at each harvest.

may be machine harvested without difficulty. The fruit of 'Toro' ripens in mid-season, at the same time as 'Bluecrop,' but tends to finish slightly earlier than 'Bluecrop.' 'Toro' holds its quality well on the bush, and thus it may be feasible to wait to pick 'Toro' until after the first picking of 'Bluecrop.' Delayed picking may actually benefit flavor by allowing more complete fruit ripening and reduction of acidity.

'Toro' compares favorably to 'Bluecrop' in all aspects of general fruit quality (Table 2). 'Toro' was similar in fruit size to 'Bluecrop' when measured in 1989, with both cultivars averaging 1.6 g per berry over 4 pickings (Table 3). Soluble solids, pH, and titratable acidity for 'Toro' and 'Bluecrop' fruit were also comparable across harvests (Table 4).

The plant of 'Toro' is upright and vigorous with strong, stocky canes, as reflected in the name 'Toro.' Observations, however, suggest that young plants grow more slowly than other cultivars, and may take more time to establish a full-sized mature plant. 'Toro' has consistently produced a good crop over the years that it has been tested in New Jersey. This suggests that 'Toro' has excellent fruit-bud and wood tolerance to the fluctuating winter temperatures common at this location, as well as inherent productivity. Stem canker, *Botryosphaeria corticis*, has occasionally been observed on 'Toro' in New Jersey; however, 'Toro' does not appear to be particularly susceptible, and the infection does not appear to spread readily among the plants.

Plants of 'Toro' were distributed to commercial propagators in 1987 and should now be available to growers. Neither the USDA nor the New Jersey AES has plants for distribution. Contact N. Vorsa, NJAES, Blueberry and Cranberry Research Center, Lake Oswego Road, Chatsworth, NJ 08019 for plant sources.

Table 4. Means for percent soluble solids, pH, and titratable acidity for fruit of 'Toro' and 'Bluecrop' from three 1989 harvests.

Character	Cultivar	Harvest date 7/7	7/18	7/27
Soluble solids[z]	Toro	9.9 ± 0.2	9.1 ± .05	9.4 ± 0.2
	Bluecrop	9.4 ± 0.5	9.2 ± 0.2	9.6 ± 0.2
pH[y]	Toro	3.1 ± 0.08	2.9 ± 0.06	3.1 ± 0.06
	Bluecrop	3.2 ± 0.03	3.1 ± 0.04	3.2 ± 0.03
Titratable acidity[x]	Toro	4.6 ± 0.2	4.6 ± 1.0	3.5 ± 0.3
	Bluecrop	4.4 ± 0.1	3.9 ± 0.4	3.2 ± 0.1

[z]Thirty berries averaged.
[y]Average of extracted juice from five one-cup berry samples.
[x]Five samples averaged. Titratable acidity expressed as milliliters (ml) of 0.1N NaOH required to titrate a 5 ml juice sample to pH 8.1.