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Evaluation of Broccoli Cultivars for Summer Crown-Cut Production in West Virginia

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Broccoli (*Brassica oleracea*) for crown-cut production was evaluated in West Virginia during late spring and summer in 2014. Crown-cut broccoli is the standard unit for retail broccoli in West Virginia. Heads are harvested at approximately 4-6 inch diameter and cut approximately 5 inches from the first branches of florets. This produces a 4-6 in. x 5 in. head that is sold as a single unit. There is a strong demand for locally grown broccoli in West Virginia. The objective of this evaluation was to determine suitable cultivars for summer crown-cut production.



Figure 1. Twenty-four broccoli cultivars were evaluated for summer crown-cut production in Eastern West Virginia.

Materials and Methods

Broccoli were seeded in 50-cell trays in mid-April and grown for approximately six weeks in a greenhouse before transplanting in field plots on May 24, 2014. The plots were established at Spring Valley Farm in eastern West Virginia (Figure 1). Twin rows on 36-inch wide raised beds with plastic mulch and drip irrigation were established. Approximately 150 lbs/acre of N was broadcast and disked in prior to bedding with an additional 50 lbs/acre applied over a 6-8 week period through the drip irrigation system. Transplants were spaced 12 inches between plants in the row and between rows on the bed resulting in 21,780 plants per acre. Each variety was planted in 12-foot plots with 24 plants per plot and replicated three times in a randomized complete block design. Standard pest management practices were followed throughout the season. Harvest commenced on July 10 and continued over a three-week period. When the heads (crowns) reached a minimum diameter of 4 inches, the heads were cut and trimmed to a 5-inch length from the first branches, weighed, and quality attributes measured.

Results and Discussion

The mid- to late July period is typically the period of highest temperatures in West Virginia. The average maximum temperature is 87°F. Maximum temperatures during head development and harvest (July 1-July 31) ranged from 82°F-88°F in 2014.

‘Castle Dome,’ ‘Captain,’ and ‘Blue Wind’ were the earliest maturing varieties evaluated. ‘Castle Dome’ had superior quality and yield relative to the other two early-maturing cultivars (Table 1, 2).

‘Green Gold’ produced the highest total yield per acre. This variety had a light green color with small bead size, but the head was occasionally lumpy. ‘Emerald Crown’ produced excellent quality crowns with good color and domed shape. ‘Lieutenant’ had excellent heat tolerance. ‘Gypsy’ and ‘Green Magic’ have consistently been high-yielding varieties in this evaluation as well as previous trials. ‘BC 1691’ had excellent yields but was not significantly dome-shaped. A dome-shaped head is important for summer or high-temperature broccoli production since the rain droplets do not hold onto the head triggering soft rot. ‘Izabel’ had excellent yields, but some incidence of hollow stem was observed. Bjorkman (2011) noted that increasing the plant population to 31,000 plants per acre can reduce hollow stem incidence for crown-cut broccoli.

‘Durapak-16’ and ‘Durapak-19’ are late maturing varieties, but ‘Durapak-19’ produced excellent quality crowns.

Acknowledgements

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Literature Cited

Bjorkman, T. 2011. Maximum crown-cut broccoli yield for New York. Eastern Broccoli Project SCRI Annual Report.

Table 1. Broccoli cultivars evaluated.

Cultivar	Seed Source	Head Height (in.)	Comments
Amadeus	JS	19	Leafy heads (heat stress) with low marketable percentage
Avenger	SK	14	Poor color and bead development; leafy heads (heat stress)
Bay Meadows	SY	14	Small bead size and domed heads with good color
BC1691	SM	12	Good color but not significantly dome-shape
BC 1764	SM	13	Dome-shaped heads; light green color
Blue Wind	JS	13	Poor color (blue-green) and bead size
Burney	SM	13	Light green color with small bead size but hollow stem
Captain	SM	13	Slight dome shape with light green color
Castle Dome	SM	12	Early maturity with good color
Diplomat	SK	12	Heads were not domed shaped
Durapak-16	SY	20	Dome-shaped with small beads and good color; late
Durapak-19	SY	24	Dome-shaped with small beads and good color; late
Emerald Crown	SK	13	Medium head size with good color and slightly domed
Emerald Jewel	SK	13	Green-yellow color with small bead size
Expo	SW	12	Poor color; leafy heads (heat stress)
Green Gold	SK	13	Light green color; small bead size; somewhat lumpy head shape
Green Magic	SK	12	Excellent color and bead size
Gypsy	SK	15	Good color with small to medium size beads
Imperial	SK	13	Excellent color with small bead size and dome-shaped
Izabel	SK	15	Excellent color; domed head but hollow stem
Legacy	SM	13	Poor color and bead shape
Lieutenant	SM	13	Excellent color and shape
Luna	SK	13	Light green with domed head and good bead size
Tahoe	SK	14	Discolored beads (yellow eye) from heat

Table 2. Marketable yield of crown-cut broccoli harvested-2014 (yields \geq 500 boxes/acre in bold).

Cultivar	Wt./head (ounces)	Diameter (in.)	Marketable (%)	Total Marketable Yield (boxes/acre) ^z
Amadeus	11.4	5.5	50	317
Avenger	13.8	5.0	8	67
Bay Meadows	12.4	5.8	61	425
Bejo 1691	12.0	6.1	78	533
Bejo 1764	11.6	6.0	54	350
Blue Wind	11.6	6.1	53	325
Burney	12.2	5.7	61	417
Captain	11.0	5.9	42	242
Castle Dome	14.6	6.8	45	375
Diplomat	10.7	5.2	72	425
Durapak-16	13.4	6.1	80	600
Durapak-19	13.9	5.9	86	667
Emerald Crown	13.1	5.9	69	525
Emerald Jewel	11.3	6.1	75	492
Expo	15.8	6.2	33	22
Green Gold	17.1	6.3	80	775
Green Magic	13.2	5.9	75	558
Gypsy	13.5	5.9	80	600
Imperial	12.4	5.7	72	500
Izabel	13.4	5.7	83	625
Legacy	14.0	6.1	33	267
Lieutenant	14.2	6.3	78	625
Luna	13.1	5.8	80	592
Tahoe	10.6	5.2	62	383
<i>Mean</i>	<i>11.7</i>	<i>5.1</i>	<i>60.4</i>	<i>433</i>
<i>Standard error</i>	<i>0.5</i>	<i>0.2</i>	<i>3.2</i>	<i>25</i>

^z24 lbs/box.