

Ornamental Kale Landscape Evaluation

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ABSTRACT: Nineteen cultivars of ornamental kale, *Brassica oleracea*, were planted in field beds to evaluate vigor, foliage color, landscape performance, uniformity, uniqueness, insect, disease tolerance and bolting. 'Red Bor' was the tallest of all cultivars in this trial while 'Nagoya' was the shortest. 'Red Russian' and 'Red Peacock' produced the greatest plant width and 'White Crane' had the least width. Overall 'Red Russian' and 'Red Peacock' were the largest plants and 'Sunrise' was the smallest.

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MATERIALS AND METHODS: Nineteen cultivars were obtained from various sources (Table 1). Seed were sown in flats on July 7, 2004. The plants were grown in a heated greenhouse in 606 inserts containing Metro Mix 366. The plant material was fertilized with 200 ppm (mg_l^{-1}) N using Peter's Peat Lite Special 20-10-20 water soluble fertilizer until ready to transplant in the landscape. The plants were then transferred to a shade structure covered with 40% shade cloth. This was done to prepare them for planting in the landscape. The plants were drenched with Banrot (etridiazole + thiophanate methyl) at a rate of 2 oz/gal prior to transplanting to plant beds. The plants were transplanted into raised beds on August 12. The beds were fertilized monthly with 4 lbs. of 13-13-13 and 1.5 lb of 0-0-60 /1000 ft^2 .

The data recorded in this experiment were growth, plant vigor, landscape rating, flower yield, uniformity, uniqueness, pest resistance, and disease resistance. The growth index used to measure the plant growth was calculated by the following formula: $\pi \cdot r^2 \cdot h$, where $r^2 = (((\text{width}_1 + \text{width}_2)/2)/2)^2$. Width 1 and Width 2 were measured at right angles to each other to determine an average plant diameter and plant height (h). Data was collected on 3 dates: 10/7/04, 11/7/04, and 12/9/04. Data were analyzed by SAS PROC GLM (SAS Institute Inc., Cary, NC). Mean separation was conducted with Fisher's Protected LSD at the 0.05 significance level. The experimental design was a randomized complete block with four replications. The experimental unit was four plants of a cultivar. Plants were spaced 18 inches apart within the row. All measurements were made and reported in centimeters. Plants were rated on a scale of 1-5; where 1 = poor (performing poorly with no growth or flowering); 2 = fair (poorly uniform in growth or flowering); 3 = good (fairly uniform in growth and flowering); 4 = very good (uniform in growth and flowering); 5 = excellent (very uniform in growth and flowering).

RESULTS AND DISCUSSION: ‘Red Bor’ was the tallest of all cultivars while ‘Nagoya’ was the shortest. ‘Red Russian’ and ‘Red Peacock’ showed the greatest width and ‘White Crane’ had the smallest width. Overall ‘Red Russian’ and ‘Red Peacock’ were the largest and Sunrise was the smallest (Table 2).

‘Red Russian’ and ‘Red Peacock’ were the most vigorous cultivars in this trial on the November and December ratings (Table 3). ‘Red Russian’, ‘Nagoya Red’, and ‘Red Peacock’ had the highest foliage rating on each of the three observation dates (Table 4). ‘Red Peacock’ had the highest landscape rating for the October and December ratings while ‘Red Peacock’ and ‘Nagoya Red’ had the highest rating for the November rating (Table 5). ‘White Peacock’, ‘Nagoya Red’, and ‘Red Peacock’ were the most uniform cultivars for all three dates with the exception of ‘Victoria Pigeon’ on the November rating (Table 6). ‘Red Peacock’ was the most unique on all three dates except for ‘Red Russian’ on the October rating (Table 7).

Table 1. Cultivars and seed sources for ornamental kale evaluation 2004.

Cultivar	Seed Source
Dwarf Blue Curled Scotch	Pinetree Seeds
Nagoya Red	S&G Seed
Nagoya Rose	Sakata Seed
Nagoya White	Stoke's Seed
Nero di Toscano	Pinetree Seeds
Purple Pigeon	Johnny's Seed
Red Bor	Pinetree Seeds
Red Crane	Gloeckner Seed
Red Peacock	Stoke's Seed
Red Russian	Pinetree Seeds
Snow Prince	Sakata Seed
Sunrise	Gloeckner Seed
Sunset	Park's Seed
Tsugami	Gloeckner Seed
Victoria Pigeon	Johnny's Seed
White Crane	Gloeckner Seed
White Peacock	Gloeckner Seed
White Pigeon	Johnny's Seed
Winter Bor	Pinetree Seeds

Table 2. Ornamental kale height, width and size for ornamental kale evaluation 2004.

Cultivar	Height (cm)	Width (cm)	Size ^z (cm ³)
Red Bor	61.2 a ^y	64.5 c	213855 b
Nero di Toscano	47.8 b	75.3 b	2181125 b
Red Russian	46.8 b	85.1 a	268766 a
Red Peacock	46.6 b	84.9 a	264014 a
Winter Bor	46.5 b	67.7 c	190110 b
White Crane	40.9 c	28.3 j	26682 fg
Snow Prince	39.6 cd	52.3 d	92998 d
White Peacock	39.5 cd	76.0 b	189241 b
Tsugami	38.9 cd	35.2 h-j	38459 e-g
Dwarf Blue Curled Scotch	34.9 de	71.2 bc	141256 c
Victoria Pigeon	33.3 ef	41.9 e-h	57618 ef
White Pigeon	32.8 ef	48.9 de	64213 de
Red Crane	32.7 e-g	38.9 f-h	46559 e-g
Purple Pigeon	31.0 e-g	48.1 de	57186 e-g
Sunrise	30.7 e-g	30.1 ij	22342 g
Sunset	30.0 e-g	36.6 g-i	32193 e-g
Nagoya Red	28.4 fg	44.5 ef	46406 e-g
Nagoya Rose	27.5 g	38.4 f-h	32566 e-g
Nagoya White	21.5 h	42.5 e-g	30916 e-g

^z Size = $\pi \cdot r^2 \cdot h$, where $r^2 = (((\text{width1} + \text{width2})/2)/2)^2$

^y Means with the same letter do not differ at the 5% significance level by Fisher's Protected LSD.

Table 3. Ornamental kale vigor ratings for ornamental kale evaluation 2004. ^z

Cultivar	Oct. 7	Nov. 11	Dec. 9
Red Russian	3.4 a ^y	4.1 a	4.4 a
Red Peacock	3.0 a-d	4.1 a	4.1 ab
Red Bor	2.6 ef	3.3 b-d	4.1 ab
Snow Prince	3.0 a-d	3.3 b-d	4.0 a-c
White Peacock	3.1 a-c	3.8 ab	3.8 b-d
White Pigeon	2.8 c-f	3.6 a-c	3.7 b-d
Dwarf Blue Curled Scotch	2.8 c-f	3.2 c-e	3.7 b-d
Purple Pigeon	2.9 b-e	3.4 b-d	3.6 c-e
White Crane	2.6 ef	3.5 bc	3.5 d-f
Tsugami	2.9 b-e	3.5 bc	3.5 d-f
Sunrise	2.9 b-f	2.9 de	3.4 d-g
Victoria Pigeon	3.3 a	3.3 b-d	3.3 d-g
Sunset	2.8 c-f	3.3 b-d	3.3 d-g
Nagoya Red	3.1 a-d	3.2 cd	3.2 e-h
Nero di Toscano	2.5 f	2.7 e	3.1 e-h
Red Crane	2.8 c-f	3.1 c-e	3.1 f-h
Winter Bor	2.8 c-f	3.1 c-e	3.0 gh
Nagoya Rose	2.7 d-f	2.9 de	2.8 h
Nagoya White	3.1 a-d	3.1 c-e	2.8 h

^z Rating scale: 1 = Poor (Plants not uniform in growth habit. Slow or no growth. Overall, a plant that you would not want in your garden) 3 = Good (Plants fairly uniform in growth habit. Growing average. Not spectacular, just an average plant.) 5 = Excellent (Plants uniform in growth habit. Growing rapidly. The ideal plant.)

^y Means with the same letter do not differ at the 5% significance level by Fisher's Protected LSD.

Table 4. Ornamental kale foliage ratings for ornamental kale evaluation 2004. ^z

Cultivar	Oct. 7	Nov. 11	Dec. 9
Red Russian	3.5 a ^y	4.0 a	4.3 a
Nagoya Red	3.4 a	4.3 a	4.3 a
Red Peacock	3.3 ab	4.0 a	4.0 ab
White Peacock	3.0 bc	3.5 b	3.8 b
Red Bor	2.9 c	3.5 b	3.8 b
Purple Pigeon	2.8 cd	3.5 b	3.8 b
Nagoya Rose	2.8 cd	3.1 bc	3.1 c
Nero di Toscano	2.8 cd	2.5 d-f	2.0 ef
Winter Bor	2.5 de	2.5 d-f	2.5 c
Sunrise	2.4 ef	2.2 fg	1.8 f
Red Crane	2.4 ef	2.1 f-h	2.3 de
Sunset	2.4 ef	2.4 e-g	2.5 d
Victoria Pigeon	2.3 e-g	2.2 fg	2.1 ef
Nagoya White	2.3 e-g	2.3 fg	2.3 de
White Pigeon	2.2 e-g	2.9 cd	2.9 c
White Crane	2.1 fg	2.3 fg	2.5 d
Dwarf Blue Curled Scotch	2.0 g	1.8 h	1.8 f
Tsugami	2.0 g	2.0 gh	2.3 de
Snow Prince	2.0 g	2.8 c-e	3.3 c

^z Rating scale: 1 = Poor (Little to no foliage coloration.) 3 = Good (Satisfactory foliage coloration. 5 = Excellent (Showing excellent color in leaves. The ideal plant.)

^y Means with the same letter do not differ at the 5% significance level by Fisher's Protected LSD.

Table 5. Ornamental kale landscape ratings for ornamental kale evaluation 2004.^z

Cultivar	Oct. 7	Nov. 11	Dec. 9
Red Peacock	3.5 a ^y	4.5 a	5.0 a
Red Russian	3.1 b	3.8 bc	4.0 bc
Nagoya Rose	3.0 bc	3.0 d	2.8 gh
Nero di Toscano	3.0 bc	2.5 e-g	2.0 k
White Peacock	2.9 b-d	3.5 c	3.8 cd
Nagoya Red	2.9 b-d	4.1 ab	4.3 b
Purple Pigeon	2.7 c-e	3.4 c	4.0 bc
Victoria Pigeon	2.6 de	2.5 e-g	2.4 ij
Nagoya White	2.6 de	2.5 e-g	2.3 i-k
White Pigeon	2.5 ef	2.7 d-f	3.2 ef
Winter Bor	2.5 ef	2.5 e-g	2.8 gh
Red Crane	2.4 ef	2.4 f-h	2.3 i-k
Snow Prince	2.4 ef	2.9 de	3.5 de
White Crane	2.3 fg	2.5 e-g	2.5 hi
Red Bor	2.3 fg	2.5 e-g	3.0 fg
Tsugami	2.3 fg	2.3 gh	2.3 i-k
Dwarf Blue Curled Scotch	2.0 gh	2.0 hi	2.5 hi
Sunrise	1.9 h	1.7 i	2.1 jk
Sunset	1.8 h	2.0 hi	2.3 i-k

^z Rating scale: 1 = Poor (Plants very poor. No distinguishing characteristics.) 3 = Good (Plants good. A few noticeable qualities. Not spectacular, just an average plant.) 5 = Excellent (Plants showing outstanding qualities. The ideal plant.)

^y Means with the same letter do not differ at the 5% significance level by Fisher's Protected LSD.

Table 6. Ornamental kale uniformity ratings for ornamental kale evaluation 2004. ^z

Cultivar	Oct. 7	Nov. 11	Dec. 9
White Peacock	3.4 a ^y	3.9 a	4.0 a
Nagoya Red	3.2 ab	3.7 a-c	3.7 ab
Victoria Pigeon	3.2 ab	3.2 cd	3.3 b-d
Red Peacock	3.2 ab	3.8 ab	3.8 ab
Red Russian	3.0 bc	3.0 de	3.0 c-e
White Crane	2.9 b-d	3.3 b-d	3.3 b-d
Purple Pigeon	2.9 b-d	2.9 de	3.0 c-e
Sunset	2.8 c-e	2.5 ef	2.5 e-g
White Pigeon	2.7 c-e	2.9 de	2.9 c-f
Nagoya Rose	2.6 c-e	2.8 d-f	2.5 e-g
Winter Bor	2.6 c-e	2.3 f	2.3 g
Nagoya White	2.6 c-e	2.6 ef	2.3 fg
Red Crane	2.6 c-e	2.9 de	2.3 g
Tsugami	2.6 c-e	2.7 ef	2.3 fg
Red Bor	2.6 de	2.3 f	3.0 c-e
Nero di Toscano	2.5 de	3.0 de	3.3 b-d
Dwarf Blue Curled Scotch	2.5 de	2.5 ef	2.8 d-g
Sunrise	2.5 de	2.3 f	2.5 e-g
Snow Prince	2.4 e	2.9 de	3.3 bc

^z Rating scale: 1 = Poor (Plants not uniform in growth habit) 3 = Good (Plants fairly uniform in growth habit) 5 = Excellent (Plants uniform in growth habit)

^y Means with the same letter do not differ at the 5% significance level by Fisher's Protected LSD.

Table 7. Ornamental kale uniqueness ratings for ornamental kale evaluation 2004.^z

Cultivar	Oct. 7	Nov. 11	Dec. 9
Red Peacock	3.8 a ^y	4.5 a	4.8 a
Red Russian	3.5 ab	3.8 b	3.8 bc
Red Bor	3.3 bc	3.5 bc	3.5 c
Nero di Toscano	3.3 bc	3.0 de	2.8 d
Nagoya White	3.0 cd	3.3 cd	2.7 d
Purple Pigeon	3.0 cd	3.5 bc	3.8 bc
White Peacock	3.0 cd	3.3 cd	3.5 c
Red Crane	3.0 cd	3.0 de	2.8 d
Nagoya Red	3.0 cd	3.0 de	3.0 d
Nagoya Rose	2.8 de	2.9 de	2.8 d
Winter Bor	2.8 de	3.0 de	3.0 d
White Pigeon	2.8 de	2.2 gh	2.7 d
Sunset	2.8 de	2.8 ef	3.0 d
White Crane	2.5 e	2.8 ef	2.8 d
Victoria Pigeon	2.5 e	2.5 fg	2.0 e
Snow Prince	2.5 e	2.8 ef	4.0 b
Tsugami	2.4 e	2.8 ef	2.7 d
Sunrise	2.0 f	1.2 i	1.7 e
Dwarf Blue Curled Scotch	2.0 f	2.0 h	2.0 e

^z Rating scale: 1 = Poor (Plants very poor. No distinguishing characteristics) 3 = Good (Plants good. A few noticeable qualities. Not spectacular, just an average plant) 5 = Excellent (Plants showing outstanding qualities. The ideal plant.)

^y Means with the same letter do not differ at the 5% significance level by Fisher's Protected LSD.