

Ornamental Cabbage Landscape Evaluation

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ABSTRACT: Twelve cultivars of *Brassica oleracea* were planted at the HREU to evaluate vigor, foliage color, landscape performance, uniformity, uniqueness, insect and disease tolerance and bolting. 'Savoy Ace' was the tallest and 'Rona Red' was the widest of the cultivars evaluated except for 'Ruby Perfection'. 'Osaka White' showed the highest vigor rating for the November and December ratings. 'Osaka White', 'Rose Bouquet', 'Osaka Red', and 'Tokyo Mix' showed the most vigor for the final rating.

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MATERIALS AND METHODS: Twelve cultivars were obtained from various sources (Table 1). The flats were seeded on July 7, 2004. The plants were grown in a temperature controlled 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. Plants were 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 + diphenate methyl) at a rate of 2 oz/gal prior to transplanting to plant beds to control root rot. The plants were transplanted into raised beds on August 12. Plants were spaced 18 inches apart within the row. 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, foliage rating, landscape rating, uniformity, uniqueness, pest resistance, disease resistance, and heading. Heading is defined as a compact mass of leaves that protects the apical meristem. Heading is a characteristic in ornamental cabbage that is undesirable. Data was collected on 3 dates: 10/7/04, 11/7/04, and 12/9/04. Growth measurements were collected on 12/5/2004. The study was a randomized complete block with four replications. The experimental unit was four plants. All measurements were made and reported in centimeters. 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. Plants were rated on a scale of 1-5. The rating system is as follows: 1 = poor - This would represent a plant that was performing poorly with no growth or flowering; 2 = fair - This would represent a plant that was poorly uniform in growth; 3 = good - This would represent a plant that is fairly uniform in growth; 4 = very good - This would represent a plant that is uniform in growth; 5 = excellent - This would represent a plant that is very uniform in growth. The growth index used to measure the plant growth was calculated by the following formula: $\pi \cdot r^2 \cdot h$, where $r^2 = (((\text{width1} + \text{width2})/2)/2)^2$. Width 1 and Width 2 were measured at right angles to each other to determine an average plant diameter and h = plant height. All measurements were made in centimeters.

RESULTS AND DISCUSSION: ‘Savoy Ace’ was the tallest and ‘Rona Red’ was the widest of the cultivars evaluated except for ‘Ruby Perfection’ (Table 2). ‘Osaka White’ showed the highest vigor rating for the November and December ratings. ‘Osaka White’, ‘Rose Bouquet’, ‘Osaka Red’, and ‘Tokyo Mix’ showed the most vigor for the final rating (Table 3). The red and pink foliage plants showed more color in the earlier ratings and generally scored higher than the green and white cultivars (Table 4). ‘Ruby Perfection’ and ‘Tokyo Mix’ had the highest early landscape rating. ‘Rose Bouquet’, ‘Osaka Red’, and ‘Osaka Pink’ rated highest for the December rating (Table 5). ‘Rose Bouquet’ and ‘Osaka Red’ had the highest uniqueness rating for the December rating (Table 7). ‘Savoy Ace’ had the most insect damage in the October rating. ‘Savoy Ace’ and ‘Point One’ had the most damage in the November rating (Table 8). It is a desirable characteristic for cabbage to develop a head. The leaves in the head surrounding the apical meristem show the most coloration as the temperatures grow increasing cooler. ‘Sombrero’, ‘Savoy Ace’, and ‘Point One’ are eating varieties. The eating type cabbage developed heads early in the trial. This was not always a good ornamental characteristic especially in the green colored varieties. It was very attractive in the purple-red foliated varieties (Table 10).

Table 1. Cabbage cultivars and sources.

Cultivar	Source
Pink Beauty	Park Seed
Point One	Pinetree Seeds
Osaka Pink	Park Seed
Osaka Red	Stokes Seed
Osaka White	Stokes Seed
Red Ruby Perfection	Pinetree Seeds
Rona Red	Park Seed
Rose Bouquet	Park Seed
Savoy Ace	Pinetree Seeds
Sombrero	Pinetree Seeds
Tokyo Mix	Takii America
Tokyo Red	Takii America

Table 2. Ornamental cabbage height, width, and size 12/9/2004.

Cultivar	Height (cm)	Width (cm)	Size ^z (cm ³)
Savoy Ace	41.4 a ^y	67.7 a	152761 a
Ruby Perfection	39.2 ab	59.7 b	125172 ab
Osaka Pink	38.4 a-c	45.9 ef	66699 de
Osaka White	37.8 a-c	56.2 b-d	94013 dc
Sombrero	35.6 b-d	58.2 bc	98649 bc
Rona Red	34.9 b-d	69.1 a	143103 a
Rose Bouquet	34.4 b-d	51.8 de	72768 dc
Osaka Red	34.3 c-e	54.3 b-d	74961 dc
Point One	31.9 d-f	52.3 cd	71031 c-e
Pink Beauty	29.4 ef	43.3 f	44555 e
Tokyo Mix	28.0 f	56.0 b-d	71562 c-e
Tokyo Red	27.6 f	56.4 b-d	69011de

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

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

Table 3. Ornamental cabbage vigor ratings. ^z

Cultivar	Oct. 7	Nov. 11	Dec. 9
Osaka Pink	3.1 a ^y	3.4 bc	3.8 a-c
Savoy Ace	3.0 a	3.6 ab	Harvested
Ruby Perfection	2.9 ab	3.3 bc	3.4 cd
Tokyo Red	2.9 a-c	3.4 bc	3.5 b-d
Sombrero	2.9 a-c	3.3 bc	3.2 d
Rona Red	2.8 a-c	3.1 c	3.4 cd
Pink Beauty	2.8 a-c	3.1 c	3.1 d
Point One	2.8 a-c	3.1 c	3.4 cd
Tokyo Mix	2.6 a-c	3.4 bc	3.7 a-c
Osaka Red	2.6 a-c	3.3 bc	3.9 ab
Rose Bouquet	2.5 bc	3.2 c	3.7 a-c
Osaka White	2.4 c	3.9 a	4.1 a

^y 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.)

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

Table 4. Ornamental cabbage foliage ratings. ^z

Cultivar	Oct. 7	Nov. 11	Dec. 9
Tokyo Red	3.0 a ^y	3.2 b	3.5 bc
Tokyo Mix	2.9 ab	3.3 ab	3.4 c
Sombrero	2.9 ab	3.5 a	3.5 bc
Ruby Perfection	2.9 ab	3.0 cb	3.4 c
Osaka Red	2.7 bc	3.5 a	4.0 ab
Osaka Pink	2.6 c	2.4 d	3.7 bc
Rona Red	2.6 c	3.5 a	3.2 c
Pink Beauty	2.4 c	2.3 de	2.3 d
Rose Bouquet	2.4 cd	3.0 cb	4.5 a
Savoy Ace	2.1 de	2.0 ef	harvested
Osaka White	2.1 e	2.8 c	3.3 c
Point One	2.0 e	1.8 f	2.2 d

^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 cabbage landscape ratings.^z

Cultivar	Oct. 7	Nov. 11	Dec. 9
Ruby Perfection	3.5 a ^y	3.0 bc	3.3 b-d
Tokyo Mix	3.0 ab	3.3 ab	2.8 de
Rona Red	2.9 bc	3.3 ab	3.1 cd
Osaka Red	2.8 b-d	3.3 ab	4.1 a
Sombrero	2.8 b-d	3.3 ab	3.5 bc
Rose Bouquet	2.8 b-d	3.1 a-c	4.2 a
Tokyo Red	2.7 cd	3.3 a	3.3 b-d
Pink Beauty	2.6 de	3.0 bc	2.3 e
Osaka White	2.4 ef	2.8 c	3.0 cd
Osaka Pink	2.2 f	2.3 d	3.8 ab
Savoy Ace	2.2 f	1.5 e	Harveste d
Point One	2.1 f	2.1 d	2.2 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.

Table 6. Ornamental cabbage uniformity ratings.^z

Cultivar	Oct. 6	Nov. 11	Dec. 9
Savoy Ace	3.0 a ^y	2.8 bc	harvested
Tokyo Mix	2.9 ab	3.3 a	3.3 a-c
Ruby Perfection	2.8 a-c	2.8 bc	3.0 b-d
Osaka Red	2.6 a-d	2.3 d	3.5 ab
Sombrero	2.6 a-d	2.8 bc	2.9 cd
Osaka White	2.6 b-e	3.3 a	3.5 a
Tokyo Red	2.5 c-e	2.8 bc	3.1 a-d
Rose Bouquet	2.3 de	2.5 cd	2.7 d
Rona Red	2.3 de	2.5 cd	3.5 a
Pink Beauty	2.3 de	3.0 ab	3.0 b-d
Point One	2.2 e	2.6 cd	2.2 e
Osaka Pink	2.2 e	2.3 d	3.0 b-d

^y 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.)

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

Table 7. Ornamental cabbage uniqueness ratings.^z

Cultivar	Oct. 6	Nov. 11	Dec. 9
Tokyo Mix	3.0 a ^y	3.3 a	2.8 c
Ruby Perfection	3.0 a	3.0 ab	3.0 bc
Tokyo Red	3.0 a	3.0 ab	3.4 b
Sombrero	2.9 a	3.3 a	3.3 b
Rose Bouquet	2.9 ab	3.2 a	4.3 a
Pink Beauty	2.8 ab	3.0 ab	2.0 d
Osaka Red	2.6 bc	3.3 a	4.5 a
Rona Red	2.5 c	2.8 bc	3.0 bc
Savoy Ace	2.3 d	1.5 e	harvested
Osaka White	2.3 d	2.5 c	3.5 b
Osaka Pink	2.1 de	2.0 d	3.3 bc
Point One	2.0 e	1.4 e	1.6 d

^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 8. Ornamental cabbage pest ratings. ^z

Cultivar	Oct. 6	Nov. 11	Dec. 9
Tokyo Mix	2.7 a ^y	2.5 c	2.5 e
Rose Bouquet	2.7 a	3.3 a	2.8 cd
Sombrero	2.6 ab	2.8 bc	2.8 cd
Ruby Perfection	2.5 a-c	3.3 a	3.3 a
Pink Beauty	2.5 a-c	2.5 c	3.0 bc
Osaka Pink	2.4 a-c	2.8 bc	3.0 bc
Rona Red	2.4 a-c	2.5 c	2.8 d
Tokyo Red	2.4 a-c	3.0 ab	3.1 ab
Osaka White	2.4 a-c	3.0 ab	3.0 bc
Osaka Red	2.3 bc	2.8 bc	3.0 bc
Point One	2.2 c	1.5 d	2.6 de
Savoy Ace	1.6 d	1.8 d	harvested

^z Rating scale: 1 = Poor (Extensive insect damage) 3 = Good (Minimal insect damage) 5 = Excellent (No insects present).

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

Table 9. Ornamental cabbage disease ratings. ^z

Cultivar	Oct. 6	Nov. 11	Dec. 9
Savoy Ace	3.0 a ^y	1.8 d	harvested
Tokyo Mix	3.0 a	2.5 c	3.0 b
Rona Red	3.0 a	2.5 c	3.0 b
Osaka Red	2.9 ab	2.8 bc	3.0 b
Osaka White	2.9 ab	3.0 ab	3.0 b
Osaka Pink	2.8 a-c	2.8 bc	3.0 b
Sombrero	2.8 a-d	3.0 ab	3.2 a
Rose Bouquet	2.7 b-d	3.0 ab	3.0 b
Ruby Perfection	2.7 b-d	3.1 a	3.0 b
Tokyo Red	2.6 cd	3.0 ab	3.1 ab
Pink Beauty	2.5 de	2.5 c	3.0 b
Point One	2.3 e	1.5 d	3.0 b

^z Rating scale: 1 = Poor (Extensive disease damage) 3 = Good (Minimal disease damage) 5 = Excellent (No disease present or evidence of damage).

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

Table10. Ornamental cabbage heading ratings. ^z

Cultivar	Oct. 6	Nov. 11	Dec. 9
Savoy Ace	2.3 a ^y	3.4 b	harvested
Point One	2.2 a	3.1 bc	4.4 a
Sombrero	1.9 a	3.9 a	3.3 bc
Rona Red	1.0 b	2.3 ef	2.9 c
Tokyo Red	0.9 bc	3.2 bc	3.4 bc
Osaka White	0.8 b-d	2.6 de	3.8 ab
Tokyo Mix	0.6 b-e	2.9 cd	3.9 ab
Ruby Perfection	0.4 c-e	2.9 cd	3.1 c
Rose Bouquet	0.4 c-e	2.1 f	3.6 bc
Osaka Red	0.4 de	3.2 bc	3.5 bc
Pink Beauty	0.4 de	3.1 bc	3.2 bc
Osaka Pink	0.3 e	2.3 ef	3.9 ab

^z Rating scale: 1 = Poor, 3 = Good , 5 = Excellent

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