‘Wendy’ Strawberry

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‘Wendy’ strawberry (Fragaria ×ananassa Duchesne) was commercially introduced in Canada in July 2006 by the Atlantic Food and Horticulture Research Centre (AFHRC) of Agriculture and Agri-Food Canada. ‘Wendy’, a short-day cultivar, ripens in the early season, offering growers an alternative to ‘Annapolis’ with good fruit quality and yield. Plants of ‘Wendy’ are vigorous, resembling ‘Evangeline’ in habit, and they produce ample runners to establish matted rows. In greenhouse screening with multiple races of Phytophthora fragariae Hickman var. fragariae, ‘Wendy’ has demonstrated partial resistance.

Origin

‘Wendy’ is a seedling of a K96-5 × ‘Evangeline’ cross made under the direction of A.R. Jamieson in 1997 at Kentville, Nova Scotia (Fig. 1). ‘Evangeline’, introduced from the AFHRC in 1999, is an early-season cultivar that has uniform, attractive fruit but is only moderately productive (Jamieson et al., 2004). K96-5 is an early-midseason genotype selected in the AFHRC breeding program in 1996, which was used in breeding as a source of resistance to P. fragariae var. fragariae, which causes red stelle root rot. The cross was made in the winter of 1997 in a greenhouse and seeds were extracted from mature fruit and sowed in Spring 1997 and subsequently transplanted into the field at Sheffield Mills, Nova Scotia. ‘Wendy’, tested as K98-6, was selected for its high yield of large, firm, flavorful fruit in 1998 by A.R. Jamieson. The genetic background of ‘Wendy’ places it in the northeastern group of cultivars with influence from the northern group (Sjulin and Dale, 1987).

Performance

Fruit has been harvested from ‘Wendy’ at Kentville each year since 2000 in at least one 5-m-matted row developed from 10 plants. In addition ‘Wendy’ was tested in Atlantic Canada in regional trials planted in Spring 2003, 2004, and 2007. Fruit of ‘Wendy’ was harvested from these replicated trials at three AAFC sites, Kentville, Nova Scotia, Bouctouche, New Brunswick, and Harrington, Prince Edward Island, and one grower site in Waterville, New Brunswick, from 2004 to 2008 (Table 1). Plants were arranged in latinized randomized block designs across sites. Each site had three blocks. Site was analyzed as a factor, not as a treatment, because the purpose was to test the average performance of cultivars in the Maritime Provinces, not to measure genotype × environment interaction. Matted rows were developed from seven plants per plot spaced 0.5 m between plants within rows and 1.4 m between rows. To reduce the plot-end effects, the central 3 m of each plot was harvested. Fruit was harvested two times per week and sorted into marketable and unmarketable categories. Berries were considered unmarketable if they showed symptoms of disease, damage by pests, or were too small—less than the diameter of a Canadian dime (18 mm). The average fruit weight for the season was a weighted mean based on the mass of a randomly selected 25 marketable fruit sub-sample from each plot from each harvest and the yield for each plot for each harvest (Moore, 1970). Similarly, the average harvest date for the season was a weighted mean based on the dates of harvest and the yield for each date. Data from the field trials were subjected to analysis of variance (GenStat 11.1; VSN Intl. Ltd., Oxford, U.K.) and when F probabilities were significant, means (Table 1) were separated by least significant difference (LSD, P ≤ 0.05).

Fruit firmness was determined in 2003 and 2004 by penetration using an Imada Digital Force Guage (Model DPS-4R; Imada, Northbrook, IL) with a 7.5-mm o.d. V-notched tip. The maximum force (Newtons) that occurred during insertion of the probe 6 mm into both sides of each of 10 secondary fruit was recorded and averaged (Table 2). Secondary fruit picked at Kentville on 4 July 2003 and 6 July 2004, during the second week of harvest, were selected based on color as fully red but not overripe. The two measurements per fruit were averaged and the 10 means were used to calculate a cultivar mean and s.e. by Quattro Pro (Corel Corporation, Ottawa, Canada).

In 2008, red ripe fruit samples were frozen and subsequently thawed and analyzed for soluble solids concentration (SSC), pH, and total acid. SSC was measured with a Reichert Mark II digital refractometer (Reichert Scientific Instruments, Buffalo, NY) and pH and titratable acidity with a Man-Tech automatic titrator (Model QC-Titrator™; Man-Tech Associates Inc., Guelph, Ontario, Canada). Three replications of 200-g fruit samples were harvested at each of three dates (30 June, 3 July, and 7 July) during the central part of the 2008 harvest season. Analysis of variance was performed and LSD (P ≤ 0.05) values were calculated (Table 3).

Fig. 1. Pedigree of ‘Wendy’ strawberry.
Table 1. Yield, fruit weight, and harvest season for 'Wendy' and standard early-season cultivars for 4 years averaged over various sites in Atlantic Canada.

| Cultivar | Yield (t·ha⁻¹) | Fruit weight (g) | Harvest season (day of year) |
|----------|----------------|------------------|----------------------------|
|          | Marketable     | Unmarketable     |                            |
| 2004 (Sites 1 and 2) |                |                  |                            |
| Annapolis | 12.9 ab         | 1.7 a            | 14.3 a                     | 193.8 a                     |
| Evangeline | 8.3 c           | 1.0 b            | 10.5 b                     | 192.3 b                     |
| Veestar | 10.8 bc         | 1.9 a            | 9.8 b                      | 191.3 c                     |
| Wendy | 14.7 a          | 1.9 a            | 15.2 a                     | 193.0 b                     |
|          | SEM (n = 6)     |                  | 0.98                       | 0.16                        |
|          | Mean separation |                  |                            |                             |
| 2005 (Sites 1, 2, and 3) |                |                  |                            |
| Annapolis | 11.9 a          | 1.3 ab           | 14.7 a                     | 189.9 a                     |
| Evangeline | 8.4 b           | 0.8 b            | 10.9 b                     | 190.1 a                     |
| Veestar | 10.0 ab         | 1.7 a            | 9.6 c                      | 189.4 a                     |
| Wendy | 11.6 a          | 1.1 b            | 15.1 a                     | 189.8 a                     |
|          | SEM (n = 9)     |                  | 1.07                       | 0.17                        |
| 2006 (Sites 1 and 2) |                |                  |                            |
| Annapolis | 14.2 a          | 2.2 a            | 14.1 a                     | 181.1 a                     |
| Evangeline | 12.3 a          | 2.3 a            | 10.1 b                     | 180.9 ab                    |
| Veestar | 12.8 a          | 3.0 a            | 8.9 c                      | 180.3 b                     |
| Wendy | 15.6 a          | 3.0 a            | 14.0 a                     | 180.8 ab                    |
|          | SEM (n = 6)     |                  | 1.20                       | 0.32                        |
| 2008 (Sites 1, 3, and 4) |                |                  |                            |
| Annapolis | 6.4 b           | 1.5 a            | 11.4 b                     | 187.9 a                     |
| Wendy | 9.6 a           | 1.7 a            | 13.7 a                     | 187.6 a                     |
|          | SEM (n = 9)     |                  | 0.87                       | 0.28                        |

*Data for 2004 from plots established in 2003; data for 2005 and 2006 from plots established in 2004; data for 2008 for plots established in 2007. Data from entire trials, containing nine to 12 cultivars or selections, were used in the analysis of variance.

*Mean separation within columns by least significant difference test at P ≤ 0.05.

Table 2. Mean fruit firmness of 'Wendy', 'Evangeline', and 'Sable' harvested red-ripe.

| Cultivar | Firmness (N) | SE |
|----------|--------------|----|
| 2003     |              |    |
| Evangeline | 4.6          | 0.17|
| Sable    | 4.4          | 0.10|
| Wendy    | 4.8          | 0.15|
| 2004     |              |    |
| Evangeline | 4.4          | 0.22|
| Sable    | 3.8          | 0.15|
| Wendy    | 5.0          | 0.16|

*Fruit firmness in Newtons as determined by penetration with a 7.5-mm o.d. V-notch tip.

The harvest season of 'Wendy' was not different from 'Annapolis' in most trials (Table 1). The seasonal mean fruit weight of 'Wendy' equals or exceeds 'Annapolis' (Table 1), which is noted for its large fruit for an early-season variety (Jamieson, 2003). The seasonal mean fruit weight of 'Wendy' is frequently rated as very good, 8 on a scale of 1 to 9 compared with 7 to 8 for 'Evangeline' and 6 to 7 for 'Annapolis'. The mean SSC of 'Annapolis' was 8.7%, similar to 'Sable' and slightly firmer than 'Evangeline' as measured by the force of penetration (Table 2). The flavor of 'Wendy' is frequently rated as very good, 8 on a scale of 1 to 9 compared with 7 to 8 for 'Evangeline' and 6 to 7 for 'Annapolis'. The mean SSC of 'Annapolis' was 8.7%, similar to 'Sable' and slightly firmer than 'Evangeline' as measured by the force of penetration (Table 2). The titratable acidity (TA) was substantially lower for 'Wendy' than the other cultivars contributing to a much higher SSC:TA (Table 3), which is perceived as greater sweetness (Kader, 1991). 'Wendy' has a high soluble solids content (SSC) and a lower titratable acidity (TA) than 'Sable' and 'Evangeline', indicating that fruit weight for 'Annapolis', indicating that fruit weight for 'Wendy' has a greater drop during the harvest season.

**Plant Description**

Plants of 'Wendy' are vigorous and they runner freely. Plant size is medium to large compared with 'Evangeline', which is small to medium. The leaf petiole of 'Wendy' is longer than for 'Evangeline'. Leaves of 'Wendy' are cupped, weakly blistered, and the leaf color of the upper side is medium green (137A) and the underside is light green (137C) (Royal Horticultural Society, 1986). The average terminal leaflet's length-to-width ratio (L/W) is 1.19 with an obtuse and slightly oblique shape of the leaf base. For comparison, leaves of 'Evangeline' are the same color only slightly cupped with an

Fig. 2. 'Wendy' strawberries in a 1.14-L (quart) box.
acute base and a mean L/W of 1.25. Leaf margin teeth are obtuse for ‘Wendy’ but more pointed (acute) for ‘Evangeline’. The pose of the petiole hairs is outward for ‘Wendy’ and outward to upward (near the point of leaflet attachment) for ‘Evangeline’. The flower stalks of ‘Wendy’ are longer than those of ‘Evangeline’ but less stiff, giving a semierect attitude at first picking. The outer calyx of ‘Wendy’ has a larger diameter than the inner calyx. Flowers of ‘Wendy’ are smaller and the calyx larger than for ‘Evangeline’.

Disease Response

Reaction to specific races of Phytophthora fragariae Hickman var. fragariae, the cause of red stele root rot, has not been determined. However, in a severe screening test similar to Scott et al. (1976) with multiple races, including race A-5 to which specific resistance is rare, ‘Wendy’ demonstrated partial resistance. On a scale of 0 (dead plant) to 5 (no disease), ‘Wendy’ scored 1.7, significantly ($P \leq 0.05$) better than ‘Annapolis’ (1.3), ‘Cavendish’ (1.2), and ‘Sable’ (1.0), three cultivars with resistance to several races. In field plots at Kentville, ‘Wendy’ plants have demonstrated moderate resistance to leaf scorch [caused by Diplodia earlana (Ellis & Everh.) F.A. Wolf] and powdery mildew [caused by Sphaerotheca macularis (Wallr.:Fr.) Jacz. f. sp. fragariae] but susceptibility to leaf spot [caused by Mycosphaerella fragariae (Tul.) Lindau]. Green petal disease (caused by clover phyllody phytoplasma) is common in Atlantic Canada; however, plots of ‘Wendy’ have contained few plants with symptoms indicating a moderate level of resistance.

‘Wendy’ appears to be well adapted throughout eastern Canada and the northeastern United States. ‘Wendy’ will be of value as a firm-fruited alternative to other early-season cultivars providing attractive, richly flavored berries for local and regional markets.

Availability

Certified ‘Wendy’ plants are being propagated under royalty agreements with licensed nurseries, the names of whom will be supplied on request. The Atlantic Food and Horticulture Research Center has been granted Plant Breeder’s Rights for ‘Wendy’ in Canada (Certificate No. 2467) and a U.S. Plant Patent has been awarded (USPP 18,340). Nurseries interested in securing a propagating license may contact A.R. Jamieson, Agriculture and Agri-Food Canada, Atlantic Food and Horticulture Research Center, 32 Main Street, Kentville, Nova Scotia, B4N 1J5, Canada, or andrew.jamieson@agr.gc.ca.

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