

A List of Germplasm Releases from the University of Wisconsin Carrot Breeding Program, 1964-1994

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The carrot (*Daucus carota* L.) breeding program at the Univ. of Wisconsin-Madison was initiated by W.H. Gabelman in 1949. A variety of inbred lines, hybrids, and synthetic populations were released by Gabelman through the Wisconsin State Agricultural Experiment Station over 30 years. Many of these lines and synthetics have served as germplasm sources for processing carrot hybrids developed and grown throughout the world. In some

cases, these inbred lines have been used directly to produce commercial hybrids used widely in the processing industry. In other cases, this germplasm has served as parental material for breeding efforts.

The breeding program was geared toward assessing the feasibility of F₁ hybrid carrots, which required an understanding of pollen sterility, inbreeding potential, and seed production characteristics. The primary focus of the breeding program was the development of disease resistant, high-carotene, high-quality processing carrot inbred lines and populations for use in the commercial seed industry. All sterile lines were developed through the use of petaloid sterility, with the exception of W93A, which was developed with brown anther sterility. Between 1953 and 1981, Gabelman and students investigated the inheritance of caro-

tene and color, pollen sterility, and resistance to cercospora leaf spot. This work assisted in the development of strategies crucial to the continued improvement of carrots through hybrid cultivars.

The primary types of carrot used in Gabelman's breeding program were 'Danvers', 'Red-Cored Chantenay', 'Royal Chantenay', and 'Nantes'. Many of the later inbred lines are of a type intermediate between 'Danvers' and 'Nantes'. These later lines possess the ability to be used in both fresh-market and processing pedigrees.

Little description, other than that found in brief release notices, has been available for distribution to workers in the field of carrot breeding and genetics. This report is an attempt to present a compilation of Gabelman's releases, including the year of release, line designation, salient features, and pedigree (Table 1). This report is one of a series that lists W.H. Gabelman's vegetable releases (Goldman, 1996a, 1996b).

Literature Cited

- Goldman, I.L. 1996a. A list of germplasm releases from the University of Wisconsin onion breeding program, 1957-1993. HortScience 31:878-879.
- Goldman, I.L. 1996b. A list of germplasm releases from the University of Wisconsin table beet breeding program, 1964-1992. HortScience 31:880-881.

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Table 1. Year of release, name or number, description and pedigree of carrot germplasm released by W.H. Gabelman, 1964-94.

Year of release	Name or no.	Description ^z	Pedigree
1964	W93A ^y , W93B ^x	Inbred, brown-anther-sterile	Derived from 'Royal Chantenay'. Sterility derived from 'Tendersweet' obtained from J.E. Welch, Univ. of California, Davis
1964	Hybrid Gold	F ₁ hybrid; large, deep, orange-colored roots	W93A x Wissyn 33
1964	Wissyn 5	Synthetic, long, large wedge-shaped root; increased carotene content	Derived from 'Kieler's Rote'
1964	Wissyn 6	Synthetic, medium-length, wedge-shaped root; good eating quality	Derived from a cross of inbred lines extracted from 'Kieler's Rote' and 'Royal Chantenay'
1964	Wissyn 33	Synthetic, medium-length, wedge-shaped root	Derived from inbred lines extracted from a breeding line and the cultivars Kieler's Rote and Tendersweet
1964	Wissyn 171	Synthetic, long, tapered shape with tapered tip	Derived from inbred lines extracted from 'Yellow Belgian' and 'Imperator'
1964	Wissyn 173	Synthetic, similar to Wissyn 171	Derived from inbreds extracted from 'Imperator'
1971	W77C ^w	Inbred, Nantes shape, uniform color, combines well with W133	Derived from 'Scarlet Nantes' (Northrup King)
1971	W133A, W133B	Inbred, uniform color, irregular cambium, low incidence of cracking, smooth exterior, uniform interior color	Derived from a single plant of Wissyn 33
1971	W204C	Inbred, large diameter, deep-orange color	Derived from a pollination cage containing 10 high-color lines. The female parent was obtained from No. 4 Sib-bulk Mass. This synthetic was derived partially from 'Danvers 126' developed by the Campbell Soup Co.
1971	Lucky Gold	F ₁ hybrid, Nantes shape	W133 x W77C
1971	Danvers Gold	F ₁ hybrid, Danvers shape	W133 x W204C
1988	W255A, W255B	Inbred, excellent color and flavor	Derived from the synthetic population RZT75 ^v selected for resistance to rhizoctonia

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Table 1. Continued.

Year of release	Name or no.	Description ²	Pedigree
1988	W259A, W259B	Inbred, excellent color and flavor	Derived from the synthetic population ARL76 ¹
1988	W266C ^w	Inbred, excellent color and flavor, S cytoplasm	Derived from the inbreds W239 ³ and W255 and the hybrid 'Sytan'
1988	Lucky B	F ₁ hybrid, low in terpenoids, carotene level twice that of Scarlet Nantes, excellent flavor	W259 x W266
1988	Dan D	F ₁ hybrid, lower in terpenoids, carotene level twice that of Scarlet Nantes, excellent flavor	W255 x W266
1994	WAY271B	Inbred, aster yellows resistant, deep-orange color, moderate resistance to foliar blights	Derived from an aster yellows-tolerant selection from the OP cultivar Gold King crossed with the synthetic AYSYN83 ⁴ , followed by recombination with selections from AYSYN83
1994	WAY272C	Inbred, aster yellows resistant, good resistance to foliar blights	Derived from an aster yellows-tolerant selection of an inbred line derived from the hybrid W33 x W266, crossed with AYSYN83
1994	WAY273C	Inbred, aster yellows resistant, combines well for color, smooth exterior, good eating quality	Derived from an aster yellows-tolerant selection of Scarlet Nantes crossed with AYSYN83, followed by a cross with the inbred line W262 ⁵

²Descriptions were compiled from field notebooks, release notices sent to agricultural experiment stations, and opinions of W.H. Gabelman. When color is mentioned, it refers to interior color. Aster yellows is caused by a mycoplasma-like organism vectored by the aster leafhopper, *Macrostelus fascifrons* stal. Foliar blights (alternaria and cercospora) are caused by the pathogens *Alternaria radicina* Meier et al. or *Alternaria dauci* (Kuhn, Groves, and Skolko) and *Cercospora carotae* (Pess.), respectively. Rhizoctonia is caused by the fungi *Rhizoctonia carotene* Rader and *Rhizoctonia solani* Kuhn.

³All lines with the designation "A" are petaloid-sterile, with the exception of W93A, which is brown-anther-sterile.

⁴All inbred lines with the designation "B" are maintainer genotypes.

⁵All lines with the designation "C" are restorer genotypes.

^wThis inbred line, synthetic, or hybrid not released.