'Nordic' Red Raspberry

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'Nordic' red raspberry (*Rubus idaeus* L.) (Fig. 1) was developed by the Univ. of Minnesota fruit breeding program. It is similar for many traits to its parent, 'Boyne', a widely grown cultivar in the northern United States and eastern Canada, but the canes are less thorny and the fruit is less acidic in flavor. Although 'Nordic' is being introduced primarily as a summer-fruiting cultivar, it will produce a late fall crop on the primocanes in years or locations with long growing seasons.

Origin

'Nordic' originated from a cross of 'Boyne' × 'Fallred' made in 1969. Brooks and Olmo (1972) provide descriptions and pedigrees of 'Boyne' and 'Fallred', a primocane-fruiting cultivar. 'Nordic' was selected in 1972 and has been tested as MN 603 since 1974 in replicated plots at Excelsior in east-central Minnesota and in single plots at Morris and Grand Rapids in western and northern Minnesota, respectively.

Description and performance

'Nordic' has been compared with several red and purple raspberry cultivars in replicated trials (randomized complete-block design with four replications) established in 1979 and 1984 at the Univ. of Minnesota Horticultural Research Center, Excelsior (Tables 1 and 2). Yield, fruit weight, and harvest period of 'Nordic' have been similar to 'Boyne'. Harvest of the floricanes crop usually begins in the first week of July at Excelsior. The floricanes crop has been heavy, and the primocane crop has usually been 1 t·ha⁻¹ or less in Minnesota and has not been harvested until mid-September, 2 to 3 weeks later than 'Heritage'. Winter injury to 'Nordic' has been minimal and similar to that observed on 'Boyne' during the testing period from 1981 to 1987. Minima in winter at Ex-

celsior during this period ranged from -25 to -36°C. In laboratory freezing tests during Winter 1987-88, the temperatures at which 50% of the buds were killed (T₅₀ values) from plants growing at Excelsior were -22.9°C on 10 Nov., -28.9°C on 3 Jan., and -23.6°C on 14 Mar. (Warmund and George, 1990).

The relative performance of 'Nordic' and other cultivars that are commonly grown in Minnesota were compared for several fruit quality traits (Table 3). 'Nordic' was consistently ranked superior to 'Boyne' for fruit firmness, skin strength, and flavor. The fruit do not appear as dark as those of 'Boyne' as they ripen.

The primocanes of 'Nordic' are green, with sparse purple spines situated mostly at the base. Root suckering is moderate and cane height reaches ≈ 1.8 m. Primocanes typically have 35 to 40 nodes bearing large, dark-green leaves with three leaflets. Fruit is born in the autumn on the top six to 10 nodes. Primocanes will frequently branch between the basal 10 to 15 nodes even without pruning (topping or tipping) cuts.

'Nordic' is susceptible to anthracnose [*El-sinoe veneta* (Burkh.) Jenkins]. Lesion coverage on leaves and stems has been moderate but less severe than on 'Boyne'. Spur blight [*Didymella applanata* (Niessl) Sacc.] symptom severity has been light to moderate, similar to 'Boyne'. Although 'Nordic' has performed well on the heavy clay loam soils

Table 1. Mean yield and fruit weight (1981-85) for raspberry cultivars in a planting established in 1979 at Excelsior, Minn.

Cultivar	Yield (t·ha ⁻¹)	Fruit wt (g)
Nordic	4.2	1.8
Boyne	4.0	2.0
Reveille	4.3	2.6
Sentinel	3.6	2.5
Brandywine	5.7	2.8
LSD (0.05)	0.7	0.1

Table 2. Mean yield and fruit weight (1986-88) for raspberry cultivars in a planting established in 1984 at Excelsior, Minn.

Cultivar	Yield (t·ha ⁻¹)	Fruit wt (g)
Nordic	4.5	1.6
Boyne	4.1	1.7
Haida	3.7	1.8
Sentry	2.0	1.5
Skeena	2.9	2.1
Brandywine	3.3	2.9
Royalty	2.6	2.9
LSD (0.05)	0.8	0.1

during testing at Excelsior and Morris, its susceptibility to root rot caused by *Phytophthora* spp. has not been determined. Virus-indexing of 'Nordic' plants that were propagated from the original seedling and grown for 10 years in evaluation plots at Excelsior revealed the presence of tomato ring-spot virus (TRV) and raspberry bushy dwarf virus (RBDV). The plants exhibited symptoms of TRV (State-Smith and Converse, 1987) but not those of RBDV (Murant, 1987). No infection by the red raspberry mosaic virus complex was detected.

The parents of 'Nordic' are known to be susceptible to *Amphorophora agathonica* Hottes., the aphid vector of the red raspberry mosaic virus complex (Daubeny, 1972, personal communication). However, preliminary data suggest that 'Nordic' may have some resistance. In field counts conducted

Fig. 1. Fruit of 'Nordic' red raspberry.

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Table 3. Comparison of raspberry cultivars for fruit quality traits at Excelsior, Minn. (1983-85).¹

Cultivar	Attractiveness	Color	Firmness	Skin strength	Flavor
Nordic	7.7	7.0	6.3	6.7	7.0
Boyne	7.0	6.3	5.3	6.0	6.3
Reveille	7.6	7.0	6.0	6.0	6.0
Newburgh	6.3	6.3	4.6	5.3	8.0
Haida	8.3	7.6	8.0	7.0	7.0
Canby	7.6	7.3	6.6	7.3	7.3

¹Rating scale for each trait is 1 = very poor to 9 = excellent. Fruit were rated in the field by J.J.L. between 15-25 July each year at Excelsior, Minn.

at Excelsior on five dates in 1975 (10 shoots per cultivar in single plots), no aphids were observed on 'Nordic', while known susceptible genotypes, such as 'Fallred', 'September', and 'Boyne', had 8 to 50 aphids per shoot. In another experiment, reproduction of the aphid was monitored on several cultivars. The number of aphids in a saran enclosure placed over each cane tip were counted 6 days after one aphid was placed in each enclosure on each of three dates (three replications per date). 'Nordic' had 0.4 aphids/cane tip, which was similar to 'Reveille' (0.2 aphids/cane tip)-a known resistant cultivar (Daubeney, 1972), and significantly lower ($P \leq 0.05$) than the known susceptible cultivars (Kennedy et al., 1973) Latham (7.2 aphids/cane tip) and Fallred (4.8 aphids/cane tip). The dominant *Ag*₁ gene derived from 'Lloyd George' is the only gene in existing cultivars that is known to confer immunity to *A. agathonica* (Jennings, 1988), although other sources of resistance have been described (Daubeney, 1972; Daubeney and Stary, 1982). If 'Nordic' is indeed resistant or immune, some other gene(s) or types of gene action apparently confer the resistance.

Adaptabilities and uses

'Nordic' appears to be well-adapted to all of Minnesota and probably the surrounding region. In addition, 'Nordic' may be useful as a primocane-fruiting cultivar in areas south of Minnesota, where a cultivar that is later than 'Heritage' may be desired. 'Nordic' should be suitable for pick-your-own or local fresh-market production. For processing uses, 'Nordic' likely will be similar to 'Boyne', which has been an excellent cultivar for local processing (Brooks and Olmo, 1972). Frozen packs of 'Nordic' fruit [four fruit : one sugar (w/w)] were rated similar to those of 'Boyne' for appearance, texture, and flavor by trained sensory evaluation panels (data not presented).

Availability

'Nordic' is propagated by cooperating nurseries under a royalty agreement with the Minnesota Nurserymen's Research Corporation. A list of nurseries propagating 'Nordic' can be obtained from J.J.L.

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