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Beta III Carrot

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The open pollinated carrot (*Daucus carota* L.) 'Beta III' was released and widely distributed in 1986, primarily for its value as a garden cultivar and for an improved source of carotenes for providing vitamin A. It is a promising population for breeders to extract inbred lines for improved hybrids.

In one year of observation trials in Florida and California, 'Beta III' was not among those with highest scores for appearance. In Florida, it received marks equal to 'Olympiad', 'Golden State', 'Savory', 'Apopka', 'Ingot', and 'Cello King'; In California, 'Beta III' was comparable to 'Golden State', 'Olympiad', 'Savory', 'Sixpence', 'Imperator 58', and 'Sweet N Crisp'. These results suggest a limited future for U.S. commercial production. The clear promise for improved supply of beta and alpha carotenes and good eating quality may create increasing home-garden demand. The naming of 'Beta III'

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and its worldwide distribution will make possible some acceptance in areas of vitamin A deficiency.

Origin

'Beta III' was derived from breeding population, USDA B951-1, released in 1983 at recurrent cycle 3 to supply diverse germplasm to breeders for developing inbred lines. The population, B 951-1, originated from 14 inbred × inbred crosses made in outdoor breeding plots at Madison, Wis. in 1976. Parents chosen as sources of *Alternaria* resistance were F₄ lines derived from crosses made in 1971 between high quality market-type inbreds and three open pollinated accessions from Japan, PI 261648 ('Kokubu'), PI 226043 ('San Nai'), and 'Imperial Long Scarlet'. The market-type parents were derived from earlier inbred × inbred crosses of diverse origin and advanced to at least F₄.

Selected F₁ roots, grown in muck soil at Palmrya, Wis. in 1977, were vernalized for 6 weeks. Then, one healthy plant from each cross was selected for mass pollination under a screen cage in the greenhouse. The seeds produced were planted in Oct. 1978 at Zellwood, Fla. where the plants were regularly subjected to high levels of exposure to *Al-*

ternaria dauci from nearby crops and from alternate rows of susceptible cultivars grown to ensure a continuous supply of inoculum. Additional field and greenhouse testing has confirmed that a high level of tolerance to *A. dauci* exists in this population.

From the plants selected for *Alternaria* resistance in Feb. 1979, ≈200 with good interior color and acceptable market type were sampled for flavor. Ten roots considered to have the best eating quality were planted at Madison, Wis. for increase under an outdoor screen isolator numbered 951. Two additional cycles of selection resulted in the population 951-1 released in 1983.

Roots with good flavor and high carotene content by laboratory determinations for each of the last three cycles, 1983 through 1985, resulted in total carotene ranging from 180 to 320 ppm. They averaged 270 ppm, more than a 90% increase over the 140 ppm in roots from cage 951-1 in 1979. The breeders seed from another cycle is expected to have nearly 300 ppm total carotene.

Description

Mature roots of 'Beta III' are 2 to 3 cm in diameter at the shoulder, 17 to 23 cm long, exterior color uniform dark orange, with slightly dimpled exterior. Interior color is dark orange with little color difference between xylem and phloem. Cambium color is frequently dark reddish-orange. There is very little yellow or green color in exterior or interior shoulder area. Tops are vigorous, strong at the shoulder for mechanical harvest and tolerant to *alternaria* leaf blight. Segregants for orange color (carotene) in lower petioles near the crown may be selected to minimize root color defects.

Availability

Inquiries regarding seed availability for 'Beta III' carrot should be directed to P.W. Simon, ARS/USDA, Dept. of Horticulture, Univ. of Wisconsin, Madison, WI 53706.