

## Progress in the Deployment of Nutrient-Rich Nematode Resistant Carrots to Benefit Growers, Consumers, and the Environment

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Carrots are an important source of nutrients for the U.S. diet and have \$550 million farm gate value to U.S. growers, but root-knot nematodes (*Meloidogyne* spp.) threaten approximately 3/4 of the U.S. carrot crop. Nematode infection causes forking and galling disfiguration to carrot taproots resulting in 'cosmetic injury' and economic loss. New sources of genetic resistance to the two most important root-knot species affecting carrot production, *M. javanica* and *M. incognita*, have been identified in several unrelated germplasm sources from local carrot populations of diverse geographic origins including Brazil, Europe, Syria, China, and Australia. Inbred lines, single cross hybrids, and diverse populations from several sources of resistance have been developed and evaluated on a small scale in field test sites heavily infested with nematodes. These sources of nematode resistance vary widely in nutritional value attributable to both carotenoid and anthocyanin pigments, and also vary in flavor. The inheritance and genetic map location of resistance genes is being determined, and molecular markers are being developed to facilitate incorporation of resistance genes by indirect selection. Plants with superior levels of resistance have been selected and seed supplies of selected individual plants with elite high resistance are being increased for testing in trials in the upcoming year. A web site is being developed to target large and small-scale carrot growers (<http://www.ars.usda.gov/pandp/docs.htm?docid=19858>) as a part of this project.

Specialty Crop Research Initiative award 2008-51180-04896 to P.W. Simon and P.A. Roberts.

