

A Transdisciplinary Approach to Developing An Eastern Broccoli Industry

Thomas Björkman¹, Jeanine M. Davis², Mark W. Farnham³, Miguel Gómez⁴, Phillip Griffiths¹, Mark Hutton⁵, Dean A. Kopsell⁶, James R. Myers⁷, Carl E. Sams⁸ and Justin Smith⁹

¹Horticulture, Cornell University NYSAES, Geneva, NY, ²Horticultural Science, NC State University, Mills River, NC, ³U.S. Vegetable Lab, USDA ARS, Charleston, SC, ⁴Applied Economics and Management, Cornell University, Ithaca, NY, ⁵Highmoor Farm, University of Maine, Monmouth, ME, ⁶Department of Plant Sciences, University of Tennessee, Knoxville, TN, ⁷Horticulture, Oregon State University, Corvallis, OR, ⁸Department of Plant Sciences, The University of Tennessee, Knoxville, TN, ⁹Bejo Seeds USA, Yuma, AZ

A confluence of economic, social, and scientific conditions has created an opportunity to make broccoli a significant crop in the eastern U.S.

Our SCRI-funded team of public- and private-sector participants is overcoming barriers that hindered previous efforts. The well-coordinated, transdisciplinary team addresses all the obstacles simultaneously, which is the key to achieving success.

Breeding broccoli for eastern U.S. production

The scientific breakthrough that made the effort possible was the development of broccoli breeding lines that continue to make uniform buds despite temperatures that normally arrest the process.



Current problem: Hot, humid conditions can lead to deformities in commonly grown commercial varieties.



Our Solution: New breeding lines produce uniform buds despite high temperatures.

Public sector and commercial broccoli breeders are developing new hybrids that produce quality heads under hot and humid conditions typical of eastern summers.

Evaluating broccoli for eastern production: the regional trial system



Broccoli hybrids are evaluated in five eastern trial locations. Results provide feedback to broccoli breeding programs, identify top material for commercial release, and inform production recommendations for growers. Nutrient analysis on trial material provides insights to genetic and environmental bases for improved nutritional quality.

Evaluators at each trial site use standardized protocols to rate broccoli heads with respect to several traits that contribute to product quality.



Commercial release of new broccoli varieties

Commercial partners Bejo Seeds USA, Seminis Vegetable Seeds, Syngenta Seeds, and Johnny's Selected Seeds will identify new varieties for commercial release based on trial performance. The companies will assume responsibility for scaling up seed production and marketing new releases to eastern growers. Several lines that were advanced in the pipeline were released as varieties and became available for the 2012 season.

Grower networks for year-round production

Extension partners are working to develop grower networks along the Eastern Seaboard that together will be able to supply eastern broccoli year-round. GAP-certified growers manage small production trials and eventually scale up to fill a supply slot for distributor partners. Economic analysis, including crop budgets and a variable transshipment model, allows cost-of-production benchmarking and guides growers to the most competitive production and post-harvest practices.



Lexington County, SC, Extension Associate J. Powell Smith, USDA Vegetable Lab broccoli breeder Mark Farnham, and W.P. Rawl director of Field Operations Charles Wingard discuss broccoli quality.

Consumer Acceptance

We are working with distribution and retail partners to build acceptance for eastern-grown broccoli among produce buyers and consumers. Consumer surveys will provide feedback to broccoli breeders on the acceptability of various product attributes that may differ from western norms.



Virginia-grown broccoli is shipped to retailers in reusable plastic containers (RPCs).



Acknowledgement

This work was funded by the USDA's National Institute of Food and Agriculture through the Specialty Crops Research Initiative.