

Soybean genetic treasure trove found in Swedish village

July 29 2011



Soybean breeder and geneticist Tommy Carter inspects research plots during extreme drought stress at the North Carolina State Sandhills Research Station. Carter evaluates approximately 25 acres (5,000 plots) of soybean for drought/stress resistance annually. Credit: United States Department of Agriculture

The first screening by U.S. Department of Agriculture (USDA) scientists of the American ancestors of soybeans for tolerance to ozone and other stresses had an eye-opening result: The world superstars of stress resistance hailed from a little village in far northern Sweden, called Fiskeby.

The screeners, geneticist Tommy Carter and [plant physiologist](#) Kent Burkey, are with the Agricultural Research Service (ARS) in Raleigh,

NC. Carter works in the ARS [Soybean](#) and Nitrogen Fixation Research Unit, and Burkey is in the agency's Plant Science Research Unit. ARS is USDA's principal intramural scientific research agency.

After analyzing thousands of soybean types to generate the family tree of North American soybeans, Carter found 30 ancestors, which together account for 92 percent of the genetic material in North American soybeans. He screened these ancestors first for [salt tolerance](#). Two lines of vegetable soybeans, Fiskeby 840-7-3 and Fiskeby III, were the most salt tolerant.

Carter screened for aluminum tolerance, and again the Fiskeby plants stood out-and the same thing happened when he screened for tolerance to drought and high [ozone levels](#). The Fiskeby plants also were found to be resistant to iron deficiency and toxic soil aluminum.

The scientists searched breeder pedigree records and found that only a few U.S. cultivars trace their ancestry to the Fiskeby stress-tolerant types. This indicates that there is great potential to increase tolerance to ozone and other stresses in North American soybeans by adding genes from Fiskeby.

Burkey, Carter and Jim Orf, a geneticist at the University of Minnesota at St. Paul, have crossed Fiskeby III with ozone-susceptible Mandarin Ottawa soybeans and developed 240 breeding lines from the offspring.

With the help of funding from the United Soybean Board of Chesterfield, Mo., the team is mapping the genes in these lines to see which are connected to resistance to ozone and the other stresses.

The Swedish soybeans appear to have an even more pronounced resistance to ozone than to the other stresses. Understanding the ozone effect may be key to unraveling the secrets of the broad [stress resistance](#)

of the Swedish soybeans.

Provided by United States Department of Agriculture

Citation: Soybean genetic treasure trove found in Swedish village (2011, July 29) retrieved 25 April 2024 from <https://phys.org/news/2011-07-soybean-genetic-treasure-trove-swedish.html>

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