Resistance to Soybean Cyst Nematode Critical to Manage Yield Losses

Soybean cyst nematode (SCN) causes extensive soybean yield loss, and host resistance has been an effective strategy to minimize this loss. However, the widespread use of the PI 88788 source of SCN resistance in the northern U.S. has resulted in shifts in the virulence of nematode populations. In many fields, SCN can now reproduce on PI 88788.

A recent study published in *Crop Science* utilizes a unique dataset derived from the Northern Regional SCN Tests. Eleven years of soybean yield test data were pooled across the northern U.S. along with the host resistance of yield test entries and the characterization of sites for initial nematode egg counts and nematode virulence on resistance sources.

A yield advantage of nematode-resistant entries was documented at environments with low initial egg counts, and the yield advantage increased as the initial egg counts increased. At all levels of virulence on PI 88788, breeding lines with resistance from this source yielded more than susceptible entries, and there was little yield advantage detected for resistance sources other than PI 88788.

Given the yield advantage of entries developed with the PI 88788 source, recommendations to rotate resistance sources remain critical to prevent further development of virulence on PI 88788.


Developing Climate-Resilient Wheat

Increases in climate variability have placed new emphasis on the need for resilient wheat varieties. Alongside demands for increased resiliency, consumer interest in healthier, more functional foods is growing. Therefore, the identification of potential breeding targets to create climate-resilient, nutritionally improved wheat varieties is of particular interest.

Fructans are carbohydrates found in many plants, including wheat, which serve physiological roles in both plants and humans. Within plants, fructans are essential in conferring tolerance to stresses associated with climate variability (i.e., drought, cold temperatures, and salinity), and fructan consumption by humans confers benefits to humans by promoting gut health. The fructan content of wheat grain varies by genotype; however, the utility of fructans as a breeding target to develop climate-resilient and nutritious wheat varieties has not been examined.

A new article in *Crop Science* examines connections between fructans in wheat plants, wheat-based food products, and impacts of fructan consumption on human health. Drawing upon the current state of knowledge about wheat grain fructans and human health, potential breeding methodologies and goals were suggested. Implementation of breeding for increased wheat fructans will likely result in the development of climate-resilient varieties with increased nutritional value.


Fructan storage, metabolism, and transport through the life stages of wheat plants. 1-SST, sucrose:sucrose 1-fructosyltransferase; 6-SFT, sucrose:fructan 6-fructosyltransferase; 1-FFT, fructan:fructan 1-fructosyltransferase; 1-FEH, exo-inulinase; 6-FEH, levanase; DAA, days after anthesis; SPS, sucrose phosphate synthase; SPP, sucrose 6-phosphate phosphatase.


Segment of soybean root infected with soybean cyst nematode. Signs of infection are brown-white females or cysts with egg masses that are attached to root surfaces. *Source: Wikimedia/PDH.*
