

# Enhancing long-term resistance of soybean cyst nematode

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## Overview of project objectives

The soybean cyst nematode (SCN) is the most damaging pathogen to soybean production in North America. Although SCN-resistant soybean varieties are available to minimize yield loss, producers are faced with limited options for rotation once SCN develops in their fields. The lack of genetic diversity in SCN resistance has significantly increased the prevalence of SCN and reduced the effectiveness of current resistance sources.

The research team looked at diversifying resistance resources against the SCN to generate a broader spectrum of soybean cultivars with robust SCN resistance. They also studied SCN genetic codes help to identify the proteins that SCN delivers to overcome soybean resistance.

## Key results

The researchers followed a two-pronged strategy. First, they worked on diversifying resistance resources against the SCN. The long-term aim is to generate a broader spectrum of soybean cultivars with robust SCN resistance. They coordinated multi-site testing of SCN-resistant soybean lines, which gauged how these soybean lines resist different nematode populations, how they performed in different soil conditions and under different environments. The development and commercialization of a soybean variety with the Rhg1 resistance locus combined with two additional resistance genes from *G. soja* was one highlight of this particular approach.

In the second part of their strategy, the researchers studied the molecular basis of nematode virulence. Nematodes overcome plant resistance by delivering protein molecules into the plant that interfere with its ability to mount a defense reaction. Since some nematode populations are better at overcoming soybean resistance than others, it is likely that these populations deliver different, more powerful proteins. These differences are encoded within the genetic code of the nematodes. Analyzing the genetic code of SCN populations differing in virulence will help identify the proteins that SCN delivers to overcome soybean resistance. The team generated and compared proteins from virulent and non-virulent nematode populations, generating a large amount of data to analyze. They also developed an online portal, [SCNBase.org](http://SCNBase.org), to store this data, ensuring free and global access of this information.

## Benefit to farmers

This work in sequencing multiple SCN populations can lead to development of a field test that farmers can use to make informed decisions about the most suitable soybean cultivars for their operation. This research work will tremendously improve breeding efforts and will critically inform farmers' cultivar decisions. In the future, farmers may have more alternatives in soybean cultivars that are SCN-resistant to combat this plant-devastating pest.

## Links

[An integrated approach to enhance durability of Soybean Cyst Nematode resistance for long-term strategic management](#)

*USB National Soybean Checkoff Research Database*