

# MOLECULAR CHARACTERIZATION OF SOYBEAN RESISTANCE TO SOYBEAN CYST NEMATODE

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## ABSTRACT

The soybean cyst nematode, *Heterodera glycines*, is a devastating pathogen to soybean worldwide. This obligate parasite establishes specialized feeding cells within host roots that are required for completion of the nematode life cycle. In resistant soybean plants, juveniles penetrate into roots, but subsequent degeneration of feeding cells prevents the nematode from further growth and development. The soybean resistance genes and signaling pathways controlling this process have not yet been identified. The *Rhg4* locus, a major QTL controlling soybean resistance against *H. glycines* was previously sequenced and patented by two independent research groups and a gene encoding a leucine-rich repeat receptor-like kinase protein (LRR-RLK) was proposed as the gene for resistance. These claims, which have been generally accepted by the soybean community, were never validated by functional studies to confirm that this was the correct gene for resistance. In this study, a combination of approaches including TILLING, haplotyping, and complementation were not able to confirm a role for this gene in resistance to *H. glycines*. Consequently, further fine mapping and testing of additional candidate genes is underway. In addition, the role of salicylic acid (SA), a key signaling molecule in plant resistance to biotrophic pathogens was investigated for a role in *Rhg4*-mediated resistance to *H. glycines*. Studies measuring endogenous SA levels in response to nematode infection and parasitic success on transgenic plants compromised for SA production or on soybean roots following exogenous application with SA, suggest that SA plays a role in basal resistance, but may not play a major role in *R* gene-mediated resistance to *H. glycines*.