

# SIWRKY45 Interacts with Jasmonate-ZIM Domain Proteins to Negatively Regulate Defense Against Root Knot Nematode *Meloidogyne incognita* in Tomato

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## Abstract

Root knot nematode (RKN), a kind of plant parasitic nematodes, leads to large reduction of crop yield, and seriously damages the agricultural production. The phytohormone jasmonates (JAs) act as important signals to regulate resistance against multiple abiotic and biotic stresses. However, little is known about the mechanism of JA-mediated defense responses against RKN in tomato. In this study, we found that the WRKY transcription factor SIWRKY45 interacts with most of the Jasmonate-ZIM domain proteins (JAZs) in yeast and plant. Overexpression of *SIWRKY45* decreased plant resistance to RKN *Meloidogyne incognita* with increased gall index. We further generated *slwrky45* mutants using the CRISPR/Cas9 technology, and discovered that the gall index and the number of nematodes and females in *slwrky45* mutants are significantly reduced compared with wild type, as inoculated with RKN *Meloidogyne incognita*. Moreover, the contents of jasmonic acid and JA-isoleucine (JA-Ile) were highly increased in *slwrky45* mutants with RKN *Meloidogyne incognita* infection compared with wild type. Furthermore, EMSA, and Dual-LUC assays demonstrated that SIWRKY45 directly binds and represses jasmonate biosynthesis gene *ALLENE OXIDE CYCLASE* ( *AOC*). Overall, our findings revealed that JAZ-interaction protein SIWRKY45 negatively controls plant defense against RKN *Meloidogyne incognita* by the regulation of JA biosynthesis in tomato.

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