

[P1] Field Crop Production

Thu. Sep 9, 2021 12:15 PM - 2:00 PM Room 1 (Poster) (Field Crop Production)

12:15 PM - 1:00 PM

[P1-19]NB-LRR-Encoding Genes Conferring Susceptibility to Organophosphate Pesticides and Leaf Greenness in Sorghum

*Nominated for Presentation Awards

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In crops, leaf greenness or injury can be monitored for optimal growth and photosynthesis capacity, but developmental and environmental factors can influence leaf greenness negatively. Leaves may experience cell death following the application of organophosphate pesticides leading to growth defects, similar to pathogen infection. To understand organophosphate pesticide sensitivity (OPS) and leaf greenness in sorghum, we conducted QTL analysis in a recombinant inbred line derived from the Japanese cultivar NOG, which exhibits OPS. Assessment of leaf greenness in natural conditions allowed us to detect several QTLs, although the appearance of these QTLs was not fully reproducible over multiple years. However, mapping OPS in this population identified a prominent QTL on chromosome 5, which corresponded to *Organophosphate-Sensitive Reaction (OSR)* reported previously in other mapping populations. The *OSR* locus included a cluster of three genes potentially encoding nucleotide-binding leucine-rich repeat (NB-LRR, NLR) proteins, among which *NLR-C* was considered to be responsible for OPS in a dominant fashion. *NLR-C* was functional in NOG, whereas the other resistant parent, BTx623, had a null mutation caused by the deletion of promoter sequences. Our finding of *OSR* as a dominant trait is important not only in understanding the diversified role of NB-LRR proteins in cereals but also in securing sorghum breeding free from OPS.