Implications of Glyphosate Resistant Transgenic Soybeans on the Bradyrhizobium Japonicum Symbiosis. (S03-zablotowicz143216-Oral)

Authors:

- R.M.Zablotowicz* - *USDA-ARS, Stoneville, MS*
- K.N.Reddy - *USDA-ARS, Stoneville, MS*

Abstract:

Glyphosate-resistant soybean expressing an insensitive 5-enolpyruvylshikimate-3-phosphate synthetase gene has revolutionized weed control and soybean production. Soybeans nitrogen fixing symbiont, B. japonicum, possess a glyphosate-sensitive enzyme and accumulate hydroxybenzoic acid intermediates of the shikimic acid pathway, causing injury or growth inhibition. In a series of greenhouse and field experiments glyphosate inhibited nodulation and leghemoglobin content of glyphosate-resistant soybean. Glyphosate accumulated in nodules, but inconsistent effects on nitrogenase activity were found in field studies. King et al (2001) demonstrated transient inhibition of nitrogenase activity following glyphosate application with the greatest effects under moisture stress. Hernandez et al. (1999), found the level of glyphosate inhibition of bacteroid nitrogenase activity was related to in vitro glyphosate sensitivity of the B. japonicum strains. These studies indicate the potential for reduced nitrogen fixation in the glyphosate-resistant soybean system, however consistent yield reductions due to reduced nitrogen fixation have not been demonstrated.

Corresponding Author Information:

Robert Zablotowicz
USDA-ARS
P.O. Box 350
Stoneville, MS 38776

phone: 662-686-5260
fax: 662-686-5422
e-mail: rzablotowicz@ars.usda.gov

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