

# Reaction of Soybean Cultivars to Waterlogged Soils

Matthew Douglas Rhine

Dr. W. Eugene Stevens, Thesis Supervisor

## ABSTRACT

Irrigating soybean prior to an extensive rain can result in waterlogged soil that may cause root damage and plant death. Some soybean cultivars tolerate waterlogged soils. The objective of this study was to evaluate tolerance of soybean cultivars to waterlogged soils at different soybean growth stages and flood durations. A selection of maturity group IV soybean cultivars was screened for flood tolerance in the field. Five cultivars were selected for variations in tolerance to waterlogged soil conditions. An experiment was conducted to determine the response of these cultivars to waterlogged soil for 192 h at three growth stages (V5, R1, and R5). A second experiment was conducted to determine the response of these cultivars to flood for 0, 48, 96, 144, and 192 h at the R1 stage of growth. A significant interaction was found between cultivars and growth stage flooding when exposed to waterlogged soil. The greatest yield suppression from waterlogged soil occurred at the R5 growth stage compared to V5 and R1. Soybean yield suppression due to waterlogged soil was least when flood was applied at V5 compared with the R1 and R5 stages of growth. Flood duration had a significant negative effect on soybean yield ( $P = 0.0012$ ). When averaged across years and cultivars, soybean yields declined  $310 \text{ kg ha}^{-1}$  after being flooded for 192 hours at bloom compared to non-flooded checks. Significant interactions between cultivar and duration were not found.