

Effects of water table depth control on physiological traits and seed yield of nodulating and non-nodulating soybeans in different soil types.

Shinji Shimada^{*1}, Kazuya Matsuura^{*2} and Shinsaku Fujimori^{*3}

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Summary

This study aimed to analyze the effects of four water table depths (Cont: not controlling water table; WT20, WT40, and WT80: water table was maintained at -20, -40, and -80 cm depth from the soil surface, respectively) and different four soils (GY: Gley soil, GLL: Gray lowland soil, LCA: Light-colored Andosol, SDR: Sand-dune Regosol), on the leaf color (SPAD value), photosynthesis, nodule nitrogen fixation, and seed yield of soybean variety Enrei and its near isogenic non-nodulating line En1282. The SPAD value was largely influenced by both soils and water table management in En1282, whereas it was only slightly influenced in Enrei. The apparent photosynthetic rate (AP) of Enrei was remarkably influenced by water table treatment and tended to be lower for Cont in GY and GLL, whereas it was slightly influenced in LCA and SDR. It seems that stomatal conductance was

involved in the difference. The AP of En1282 was higher in lower water table treatments. The amount of fixed nitrogen tended to be higher for WT40. With GY and GLL, the seed yield was the lowest in Cont and was the highest for WT40, whereas it was lower for WT20 with LCA and was lower for WT80 with SDR. A close relationship was found between the SPAD value at R5 stage and seed yield at maturity in En1282, but not in Enrei. Nitrogen availability from the soil remarkably affects SPAD value, AP and productivity in En1282. The effect of water table control on seed yield varied according to soils and was large for GY and GLL which have relatively lower porosity and water holding capacity; therefore, controlling water table seems to be more important in these kinds of soil property for obtaining higher yield.