The effects of phosphorus application on soybean plants under suboptimal moisture conditions

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A greenhouse experiment was conducted on soil to evaluate response of phsophorus (P) application in a factorial combination on growth and ureides contents of soybean (Glycine mx L.) cultivar Licurici. Soybean plants were grown in a soil very low in available P. The water treatments were 70% water holding capacity (WHC) as normal level and 35% WHC as stress drought. The all plants were grown till 4 weeks at normal water regime (70% WHC). Drought was imposed 4 weeks after sowing by withholding water from pots until 35% of soil water holding capacity was achieved. Suboptimal moisture of soil was imposed for 2 weeks. P application significantly increased dry weights of plants and leaf area irrespective of soil moisture level. Nodulation was the most susceptible to both abiotic factors P deficiency and water shortage. Plants at P deficiency and low levels of P supply had lower growth rates, higher ureides and amino acids concentrations in nodules and roots than plants grown with high (100 mg P kg-1 soil) P. The same trend of P influence was denoted in plants subjected to drought stress (35% WHC). P application much more raised DM and decreased level of ureides in roots under well-watered regime. Hence, adequate P nutrition maintained greater DM and activity of symbiotic system and attenuated the adverse effect of drought.