Abstract
An outdoor pot experiment was carried out to determine the combined effect of water stress and phosphorous (P) deficiency in soil on physiological and biochemical indices of soybean (*Glycine max* (L.) Merr.). The soil used was collected at a depth of 10 -30 cm of a long-term field experiment with a suboptimal P supply (Pdl 30 mg/kg soil). It was classified as loamy sand. Water treatments included two levels of water supply - 70% (control) and 30 % (drought) of soil water holding capacity and were applied during eight weeks. The results revealed that water deficit induced inhibition of growth processes, accompanied by a significant reduction of the plant height and shoot biomass, as well as P, K, Ca, Mg, and N uptake by plants. We also found a decrease in the activities of nitrate reductase, glutamine synthetase, and glycolate oxidase in leaves of the stressed plants. On the other hand, proline was accumulated in the leaves under water and P deficiency. Similarly, the activities of acid phosphate (AcP), alkaline phosphatise (AlP), and phosphodiesterase (PDE) in leaves were higher under P and water stress conditions. The average values of AcP for both water treatments were about 4 times higher than those of AlP and PDE. These data highlighted the important role of enzymes for plants under stress conditions.

Key words: soybean, water stress, phosphorous, nitrate reductase, glutamine synthetase, glycolate oxidase, phosphatases