Effect of drought stress on qulity and quantity of periwinkle (Catharanthus rosea L.) under PGPR inoculum

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The effect of drought stress on the quantitative and qualitative traits of periwinkles inoculated with plant growth stimulating microorganisms was investigated in a factorial experiment based on a randomized complete design with three replications in a greenhouse. The studied factors included drought stress at three levels that were adjusted by irrigation interval (irrigation at 30, 45 and 55% moisture depletion) and plant growth stimulating microorganisms (Mycorrhiza, Pseudomonas, Thiobacillus, and no-inoculation). It was found that the drought stress imposed by increasing irrigation intervals resulted in the loss of morphological traits and this loss was more evident at severer stress. However, the increase in stress enhanced some physiological and biochemical traits, such as chlorophyll b, total chlorophyll, proline, root catharanthine, leaf vinblastine, and leaf vindoline. Microorganisms improved plant tolerance of water deficit stress. Plants inoculated with Pseudomonas and mycorrhiza outperformed the Thiobacillus-inoculated or non-inoculated ones in terms of most studied traits. The highest amounts of ajmalicine and catharanthine were obtained plants exposed to 45% moisture depletion mycorrhiza and the highest amounts of leaf vindoline and vinblastine were exhibited by plants exposed to 55% moisture depletion Pseudomonas. The results on the correlation of the traits showed a significant and positive correlation of N and P with plant dry weight, ajmalicine, catharanthine, vindoline, and vinblastine. Therefore, the results lead us to the conclusion that the inoculation with Mycorrhiza or Pseudomonas accompanied with irrigation at 45% moisture depletion can be recommended for moderate growth of periwinkles as well as the extraction of medicinal alkaloid drugs these plants.

Keywords : Ajmalicine, Anthocyanin, Irrigation interval, Vindoline.