



Proline, antioxidant enzymes activity and productivity of snap bean as affected by bio-regulators application under two sowing dates

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Abstract : Two consecutive field experiments were conducted in the experimental farm, Faculty of Agriculture, Ain Shams University, Qalubia governorate during the two winter seasons of 2012/2013 and 2013/2014 to study the response of snap bean cv Bronco to two sowing dates (1th and 16th of October) and two bio-regulators i.e., salicylic acid (SA) at 0, 0.5 and 1.0 mM and putrescine(PUT) at 0 , 1.0 and 2.0 mM as well as the combination between both of them . The experiment was laid out in a split plot design with three replicates .Proline, antioxidant enzyme activities (POX ,CAT and SOD) and pod weight as well as total yield were determined. The results revealed that the higher significant value of proline content in snap bean leaves was recorded through the first sowing date. The combined application of SA at 0.5 mM and PUT at 2 mM mitigated and significantly enhanced the proline content . The first sowing date significantly increased the activity of POX and SOD compared with the second one .The maximum and significant response of POX ,CAT and SOD generated in plants when sprayed with SA in combination with PUT at higher rates. Sowing snap bean seeds on the 1st October induced significant maximum total yield. Application of SA or PUT at any concentration and their combination significantly increased total yield compared to the check untreated plants.

Key words : Snap bean, salicylic acid, putrescine, sowing dates, proline , *antioxidant enzymes activity* , yield.