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## 'Boost' in gibberellin response by water-stress in seedling growth[1]

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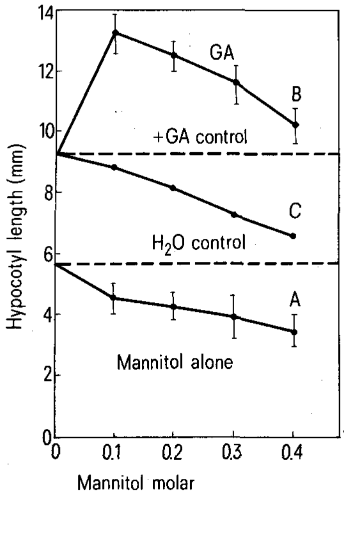
*Summary.* The seedling growth of *Brassica campestris* var. *varuna*, has been studied, as affected by water-stress and gibberellin treatments. A 'boost' in the net GA response due to water-stress, has been observed. Thus presence of GA can overcome the water-stress effects.

Longitudinal growth caused either by auxin or gibberellin is always associated with increase in water uptake[2]; the same is true for leaf expansion caused by Kinetin[3]. Role of this water uptake has been examined in some detail in auxin-induced growth, by use of respiratory inhibitors[4], and also by providing osmoticum by mannitol, and studying the permeability of the membrane to water[5], and other solutes[6]. The present experiment was designed to study the interaction of osmoticum provided by mannitol and gibberellic acid (GA)-induced growth in *Brassica campestris* seedlings. It has been noticed that, in presence of mannitol and GA together, both the hormone-induced growth and also the stress-induced inhibition are only partially expressed. So to elaborate their role in such an interaction, the following experiment was performed. Basic methods have been described earlier[7].

Germinated seeds of *B. campestris* were given 24 h of the stress treatment using the different concentrations of mannitol (0.1-0.4 M) and from each treatment half the seedlings were transferred to water and the other half transferred to GA (10 mg/l) solution, to study the recovery of the stress effects in water or in GA. Growth measurements were taken 48 h after transfer from mannitol solution, and hypocotyl length is the mean of 20 seedlings. A separate control was run for comparison, which comprised of the first 24 h in water and then half the seedlings to water (water control) and the other half to GA (GA control). Respective mannitol control refers to half the seedlings given stress (0.1-0.4 M) and then transferred to water, as compared to other half transferred to GA.

Hypocotyl length measured after 48 h of recovery is plotted in the figure, where curve A represents the hypocotyl length of seedlings transferred from different mannitol concentrations to water against the water control, thus showing the inhibition caused by the pre-stress treatment. The curve B shows the hypocotyl length of seedlings transferred from different mannitol concentrations to GA, showing a net promotion in GA response, and against GA control, whereas the curve C is plotted as growth of the seedlings transferred from different mannitol concentrations to GA solutions, minus the mannitol alone seedlings, showing that the pre-stress still interfers in GA alone response.

It is clear from the figure that the stress-treatment of the seedlings is reflected in an inhibition even at later periods of the growth (curve A), and also that a stress pre-treatment interferes in the net GA response of a normal seedling (curve C). However, when we plot the growth of the stress-pretreated seedling in GA, a very significant picture arises, since all these points keep values higher than the GA control itself. This shows that the pre-treatment with stress in some way makes the seedlings more responsive to GA, thus a sort of 'boost' is observed in GA response. This boost may also reflect that GA in some way helps in the recovery of the injury caused by mannitol stress. A similar pattern has also been observed in *B. nigra* seedlings.




Showing the hypocotyl growth in length of seedlings of *B. campestris* pretreated with different concentrations of mannitol for 24 h and then transferred to water or GA solution. For explanation of curves see text. Vertical bars show SD. The calculated and table values of significance at 5% levels are 397.589 and 2.10 for treatments, and 1.751 and 2.10 for replications.

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