Effect of growth-regulators on growth parameters of sunflower grown under different NPK fertilizers in calcarieous soils

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S u m m a r y

Four field experiments were carried out to study the combined effects of growth-regulating substances and NPK fertilizers on sunflower growth and development on a calcarieous sandy soil /A/ at Őrbottyán and a calcarieous loamy chernozem soil /B/ at Nagyhörcsök, during the two successive seasons of 1983 and 1984.

The experiments were laid-out in a strip-plot design with four replications. The main plot treatments contained four growth-regulating substances /untreated control, 1000 ppm Atonik, 5 ppm kinetin, and 500 ppm Cycocel/. The subplot treatments included five NPK combinations namely; Unfertilized control 200 kg N, 200 kg N + 150 kg P_2O_5, 200 kg N + 200 kg K_2O, and 200 kg N + 150 kg P_2O_5 + 200 kg K_2O/ha.
The results could be summrised as follows:

Plant height was markedly decreased by application of Cycocel on both soil types than the untreated control or other growth-regulating substances. The resulted reduction in height could be useful and easier to harvest as well as resisting lodging. On the other hand, kinetin lead to a non-significant increase in plant height than the untreated and Atonik.

No significant enhancement of stem diameter, number of leaves and fresh weight yield were observed for growth-regulating substances under investigation. However, Cycocel and Atonik on Soil A increased leaf area by 17 and 11 % respertively and on Soil B by 11 and 10 % respectively over the control in 1983.

On soil A, when N dose was combined with K_2O or P_2O_5 plus K_2O showed significant increase in plant height in each case compared to the application of N alone of N plus P_2O_5. Moreover, application of K_2O in combination with N or N plus P_2O_5 have increased stem diameter, leaf area and fresh weight yield. A greater response to N and P_2O_5 were found when K_2O had been applied. NPK fertilizers were found to have no effect on number of leaves.

On soil B, N alone was found to have no significant effects on sunflower characters when compared to the unfertilized control. In contrast, stem diameter, leaf area, and fresh weight yield were markedly influenced by application of NP, NK and NPK treatments. Application of N dose markedly increased stem diameter over N plus K_2O treatment. In the present study, a greater response due to the use of P_2O_5 was recorded on Calcarieous loamy chernozem soil than to N or K_2O.

The results indicated a significant interaction between growth-regulating substances and NPK fertilizers on leaf area and fresh weight yield. In soil B, this interaction caused a significant increase in both leaf area and fresh weight yield in 1984. The highest average for leaf area was obtained with a combination of N + P_2O_5 + K_2O treatment at 5 ppm kinetin, although, the highest fresh weight yield was recorded with a combination of N plus P_2O_5 at 1000 ppm Atonik.