

EFFECT OF DURATION OF OSMOTIC STRESS ON THE GROWTH RESPONSE OF WHEAT SEEDLINGS *Triticum aestivum* L.

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Drought is one of the major abiotic factors limiting wheat growth and productivity, especially during the early stages of ontogeny, when seed imbibition, germination, and initial seedling development depend directly on water availability. Under laboratory conditions, water deficit can be simulated using osmotically active compounds that reduce the water potential of the medium. In this context, the intensity and duration of osmotic stress, as well as the ability of seedlings to resume growth after returning to favorable conditions, are important. The study of these responses makes it possible to identify sensitive growth parameters and assess genotypic differences at early developmental stages.

The hypothesis of the study was that even mild osmotic stress induced by a 3% sucrose solution for different exposure periods would affect shoot and root growth of wheat seedlings differently, and that genotypes would differ in their ability to maintain growth processes after removal of the stress factor. Seeds of two common wheat (*Triticum aestivum* L.) cultivars, Moldova 5 and Meleag, were used as plant material. Exposure to the osmotic factor began from the moment of seed incubation in the respective solutions. In the control treatment, seeds were germinated on water for 14 days, whereas in the experimental treatments they were germinated on a 3% sucrose solution for 3, 6, or 14 days. After 3 and 6 days of sucrose exposure, seedlings were transferred to water for 8 and 11 days, respectively, to assess post-stress effects and growth recovery capacity. On day 14, shoot and root length were determined.

The results showed that short-term exposure to a 3% sucrose solution for 3 days, followed by transfer to water, caused only a relatively slight reduction in shoot length in both cultivars. However, the root system showed a stronger response: even after transfer to water, root length remained substantially below the control level.

This indicates that early short-term restriction of water availability has a prolonged post-stress effect, primarily on root system development. Increasing the duration of sucrose exposure to 6 days intensified growth inhibition. A more pronounced reduction in shoot length was observed in Moldova 5, whereas Meleag maintained higher shoot and root growth values. Continuous cultivation of seedlings on a 3% sucrose solution for 14 days resulted in the strongest growth inhibition in both cultivars, confirming that the degree of inhibition depends on the duration of osmotic exposure.

Thus, the duration of even mild osmotic stress is an important factor determining the subsequent development of wheat seedlings. After short-term stress, shoot growth can partially recover following transfer to water, whereas the root system remains more strongly inhibited. This indicates the high sensitivity of the root system to early water deficit and its diagnostic value for assessing wheat stress tolerance. The cultivar Meleag showed higher relative tolerance of growth processes to osmotic stress compared with Moldova 5. The obtained data may be used for preliminary screening of wheat genotypes by their response to water deficit during early ontogeny and for refining criteria for assessing seedling recovery potential after short-term osmotic exposure.

Keywords: wheat seedlings; osmotic stress; sucrose; root growth; stress recovery.

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