

Nanochemistry and Nanobiotechnology

Nanometals effect on morphometric parameters and water regime of wheat plants

O.I. Kosyk, O.O. Babushkina, I.M. Khomenko

*Plant Physiology and Ecology Department, Educational and Scientific Centre «Institute of Biology», Taras Shevchenko National University of Kyiv. Ave. Glushkov 2, Kyiv-03022, Ukraine.
E-mail: o_kosyk@ukr.net*

Application of nanotechnology in crop today is one of the most promising areas of research. Studies of metal nanoparticles on plants during ontogenesis will enable a more thorough understanding of their effects on plant biochemical and physiological parameters. Therefore, the purpose of our experiment was to investigate the nanometals action on morphometric parameters and water regime of wheat plants at different stages of ontogenesis. The field experiment was conducted on winter wheat plants (*Triticum aestivum* L.) Stolychna and Brilliant varieties. The test plants were treated with a nanometals mixture (Cu, Fe, Mn, Zn) pre-sowing treatment of seeds and foliar application of compositions of Cu + Zn and Fe + Mn.

Our results showed that pre-treatment with a mixture of nanometals leads to elongation of the root system. We also observed an increase in the length of root in plants treated with foliar mixture of Cu + Zn. The height of the stem and leaf length plants treated with a composition of Mn + Fe were significantly higher than control plants. The leaf width of plants grown experienced only at the stage exit in the tube.

Our data shown the increasing of water deficit level in the wheat plants Stolychna variety pre-sowing nanometals mixture treatment. But in both variants of foliar treatment, the data were three times smaller than control plants. The free water content at test plants does not differ from the control. At earing phase we noted different reaction in the experimental plants Brilliant variety where experienced increasing of the free water content and reducing of the shortages water. In the variant of foliar treatment by the composition Cu + Zn was observed the reduce of water scarcity, while the other variants data were slightly lower compared with control. Thus, the results of the experiment indicate varietal differences of the nanometals effect in wheat plants on indicators of water regime. Application of nanometals as micronutrients can enhance the stability of the plant to adverse environmental conditions and point the prospects for further researches in nanotechnology crop plants.