Beneficial Effects of the Complex Humic Microfertilizer Applied to the Ornamental Plum *Hessei*

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1. INTRODUCTION

There is a whole variety of industrial humic-based products on the market, which includes humates produced from peat, lignites, sapropel, and organic wastes. Many humate producers incorporate nutritional elements into the commercial products. These elements are usually introduced as water soluble salts, e.g., iron(II) sulphate, or a broad spectrum of salts is mixed with the humate as in case of Humate+7 product (Irkutski Gumat Ltd., Russia). The objective of this work was to test the efficiency of the new complex humic microfertilizer containing Fe(III), Zn(II), Mn(II), Cu(II), and B in the field conditions. The major difference of the tested humic microfertilizer from the industrial humic preparations currently available on the market is a high total content of the nutritional elements (up to 9 % mass) which makes it comparable to the artificial chelates (e.g., DTPA, EDTA, EDDHA).

2. MATERIALS AND METHODS

The plants of the ornamental plum Hessei were used. The experiments included: 1) blank (no microfertilizers added), 2) soil application of the commercial iron(II) humate (Humiron) – Humintech Ltd. (Germany), 3) soil application of artificial Fe(III) chelate in the form of EDDHA complex, 4) soil application of the synthesized complex humate enriched with Fe(III), Mn(II), Zn(II), Cu(II), and B, 5) soil application of the sodium humate (Sakhalin Humate, Russia), 6) foliar application of microelements without humates (Fe, Mn, Zn, Cu, B); 7) foliar application of the synthesized complex humate (Fe(III), Mn(II), Zn(II), Cu(II), and B).

Two years old plants of plum Hessei grown on the common carbonate chernozem were used in these experiments. The amount of plants used for each experiment was from 30 to 34. The plants from the blank experiment did not receive additional microelements. The plants from the humate experiments were treated three times per season with 0.5% humate solution. At the same time the foliar application was conducted for the appropriate experiments using microelement mixtures and complex humate solution at concentration of 0.05%.

Efficiency of the microfertilizers used was estimated by measuring stem diameter, size of the plant, and increase in size of the plant. The latter was calculated by multiplying the length of new branches with their amount.

3. RESULTS AND DISCUSSION

All experiments were conducted during three months. The obtained results are described below: the “stem diameter” has increased up to 205% for blank and sodium humate experiments and it has reached 216% for the complex humate experiment. Foliar application of the complex humate also did not influence this parameter – it accounted for 207%. An increase in the plant size characterizing the growth intensity of the plant foliage, was 335 % for the blank experiment, and 408% for the experiment with the complex humate. Of importance is that the complex humate not only improved the growth of the foliage, but its quality as well. The trees looked much prettier with a thick, uniformly developed foliage. The pure microelements did not provide the difference in the foliage quality observed for the complex humate.

4. CONCLUSIONS

The conducted research has revealed beneficial effects of the application of the complex humate tested on the conditions of the young plants of the ornamental Hessei plum. The observed beneficial effects were the most distinct for the quality of the plants foliage. The conclusion can be made of the promising potential of the application of the humic-based microfertilizers in the organic agriculture.

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