

pensate the negative effects caused by simulated microgravity.

— The magnetotropism of the wheat roots is observed only under the conditions of weakening of the gravitational field.

We have applied two methods of simulated microgravity, namely, sprouting of plants in the water and rotation of plants on the clinostate. Neither of the methods resulted in complete weightlessness of all the parts of the plant simultaneously. Therefore, no conclusions can be made so far either on the possibility of compensation of the absence of gravity by

means of a gradient magnetic field, or on the mechanism of its influence. For this reason, we are planning to carry out the same experiments under the actual microgravity conditions on board the space station at the acceleration level below the threshold value, i. e. $10^{-5}g$.

References:

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«Magnet» Experiment USE OF THE MAGNETIC FIELD FOR EVALUATION OF THE PLANT GRAVIPERCEPTIVE APPARATUS AND FOR COMPENSATION OF THE ABSENCE OF THE VECTOR OF GRAVITY

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It is suggested that the influence of the high-gradient magnetic field (HGMF) on a plant is determined by the displacement of starch statoliths in the statocytes by ponderomotive forces generated by HGMF. For this reason, it is highly useful to implement the HGMF for study and simulation of the root gravitropic response in microgravity.

The purpose of the experiment is to study the role of statolithic and non-statolithic mechanisms in gravisensitivity of higher plants. The purposeful stimulation of statocytes by HGMF under gravity (1g) and microgravity will be applied.

The main objectives are as follows:

- to develop the optimal HGMF configurations with the uniform spatial distribution of the high-intensity ponderomotive force;
- to study mechanisms of the gravitropic response using the HGMF effects;
- to design equipment for HGMF application to stimulate gravisensitive cells in microgravity.

It is proposed to use the graviresponsive primary

roots of cress and pea as convenient objects for such a study. The following indices, which are affected by the HGMF, will be analysed by various methods, including the electron microscopy and electron cytochemistry:

- dynamics of root curvatures and root elongation;
- spatial distribution of pH along the roots;
- topography of cellular organelles;
- distribution of calcium ions.

The data on the ultrastructural changes in statocytes and their interrelation with calcium balance in HGMF under microgravity will be obtained. It will allow checking the statolith and non-statolith mechanisms of graviperception in higher plants and the signal role of calcium in statocytes. These data will be also useful to design equipment for HGMF application for stimulation of gravisensitive cells in microgravity and for simulation of the microgravity effects in these cells during ground-based experiments.