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Mitotic activity stimulation in apical root meristems of maize at different frequencies of an alternating magnetic field

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For various agricultural crops the effect of mitotic activity (MA) stimulation in apical root meristems of seedlings under the influence of a low-frequency magnetic field (MF) is established. We already marked a stimulating effect of a low-frequency MF with the certain parameters in maize apical root meristems (Belyachenko et al., MNL 84:38, 2010). It is shown, that for different maize lines and hybrids various levels of MA stimulation can be observed (Belyachenko et al., MNL 85:33, 2011).

MF frequency is an important parameter influencing on biological response value. Regularities search in stimulating effect level according to varying frequency magnitude is important for different theoretical and practical purposes. The aim of the given work consists in comparison of different MF frequencies effects on apical root meristems MA of hybrid maize PO 176 seedlings. Following parameters of MF were applied: frequency in the range from 2 to 20 Hz, induction of 25 mT and 1 hour exposure.

Dry maize seeds were exposed to MF influence. Root tips 1-1,5 cm long were fixed for cytological analysis. Amounts of cells at different stages of a cellular cycle were estimated on temporary acetocarminic squash preparations. In each of three repeatabilities it has been analyzed not less than 3000 cells and mitotic index values were calculated. Results of research are presented in figure.

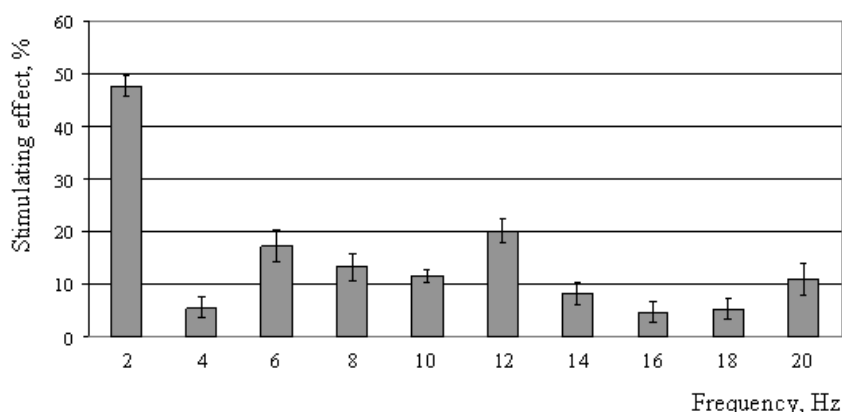


Figure – Stimulating effect of alternating MF on apical root meristems MA of hybrid maize PO 176 seedlings

The MA increase under the MF influence is observed at all frequencies used in present research. It is shown, that at different MF frequencies the size of stimulating effect can be various. The greatest effect attains at 2 Hz frequency. Frequencies in the range from 6 to 12 Hz as well as 20 Hz give stimulating effect level above 10%. The rest frequencies lead to lower rise in apical root meristems MA. The lead experiments show importance of frequency as biologically significant parameter of MF and show an opportunity of optimal parameters selection for achievement of maximum levels of maize meristems MA stimulation.