Pollen grains transport and dispersion – comparison of numerical simulation and field experiment

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In this contribution the results of field experiment and numerical simulation dealing with transport and dispersion of pollen grains are presented and compared. The field experiment and subsequent numerical simulation were initiated because of general guidelines for genetically modified crops growing to provide a detailed basis for co-existence rules, are needed. There is a serious interest to set up the threshold distance between locations where the modified plants, natural relative species and conventional crops can be grown to avoid transgene flow. One possible approach is to use some mathematical model describing the transport and dispersion of particulate matters of the same qualitatively and quantitatively parameters as pollen grains of genetically modified plants. The experiment took part in the sugar beet field located in the NE part of the central Bohemian area. As a pollen source, red beets were used that carry a red colour dominant trait. The frequency of pollinated plants placed at different distances and directions from a pollen donor source was tested to investigate the pollen movement under realistic conditions. The data from this experiment are compared with those from numerical simulation. To validate the mathematic model results data from the field experiment will be used.

Area where the field experiment occurred is almost flat one with very moderate slopes. The difference between the highest point and the lowermost one is approximately about 10 meters. The only obstacles are buildings located far from the place where the experiment took lace. These buildings are low and their positions do not affect the flow field with some wake effects. This geometry allowed us to use the dispersion

modelling and results of this modelling to compare with results of more sophisticated approach and, also, with the experimental data.

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