conclusions are presented here.

The majority of oilseed rape pollen is dispersed only a short distance from the mother plant and the probability of dispersal normally decreases rapidly with distance. However, pollen of oilseed rape may disperse by wind or insects for several kilometres, but is diluted by the pollen produced in the receiving field. The main questions, which were studied by modelling, are how the distance between fields affects gene dispersal and the effect of the field size on the total GM dispersal and the percentage of seeds containing GM.

Results from the modelling (**Figure 1**) show as expected that the GM-content of the seeds from an organic field will be reduced with increasing distance to the GM field. This is particularly evident for small fields. Furthermore, the results indicate, that an increase of the size of the organic field (field width) has a relatively larger effect in reduction of the average GM-content than increasing the isolation distance. This effect is mainly caused by a dilution of the GM pollen by pollen from the receiving field. Other results from the study indicate that the use of a protective buffer zone (i. e., 5 m border, which is excluded from the harvest) will reduce the GM contents by approximately one third. Consequently, if the fields for some reasons cannot be separated by distance, then the use of a buffer zone may be a possible solution.

The results indicate that a critical level of 0.1% GM content in the organic crop of oilseed rape can be obtained by an isolation distance above 100 m if the field is at least 200 m wide (Figure 1). For small organic fields (width = 50 m), a low level of GM pollen dispersal (up to approx. 0.3) may be expected even with an isolation distance of 200 m.

There are a number of critical assumptions for the conclusions above, which must be mentioned. It is important to stress that the employed method of study and the consequent results has some scientific restrictions, which may result in a higher level of gene dispersal than indicated by the model results. Hence, the results are based on the assumption that the GM field and the organic field are relatively equal in size. If the GM field is significantly larger than the organic field or if several GM fields are situated in the surroundings of an organic field, the extent of the GM dispersal will increase. It is also well known that the dispersal of pollen into a field may be irregularly distributed, and small pockets with higher concentration of GM-content will arise.

The assumptions for the model include that varieties with normal fertility are used. If hybrid varieties with male-sterile plants are cultivated in the organic field, the probability of GM pollination will increase depending on the percentage of male sterile plants. Furthermore, pollen dispersal from hybrids between GM oilseed rape and weedy relatives or from GM-volunteers in the surroundings has not been included in the model simulations.

When the relevant management measures are taken to reduce GM pollen dispersal, we expect that an isolation distance of 100 m will result in a GM content in the range of 0.1 % to 0.3 % of the total oilseed crop in the organic field (very small fields excluded). Single test samples collected from especially the field margins may however show a higher GM content. A threshold value of 0.1 % is normally regarded as the lowest measure, which can be detected by field sampling and genetic analysis.

The present model results do not consider the topographic conditions or the different possible scenarios for the extent of GM cultivation in Denmark. Therefore, NERI is also constructing a model of atmospheric dispersion in order to predict the wind dispersal of pollen of oilseed rape and grasses in the landscape based on e.g., biological and meteorological data and the location of cultivated fields. The dispersion model may be used to predict conditions under which the risk of GM pollen dispersal is

particularly high (e.g., the number of GM fields in relation to the number of organic fields, particular wind situations and the topographic structure). Furthermore, the model could perhaps be used to select the fields where monitoring of GM dispersal are most urgently required.

The model results for oilseed rape will be presented at the **First European Conference on Co-existence of Genetically Modified Crops with Conventional and Organic Crops** the 13th to 14th November 2003 in Elsinore, Denmark.

References

Bio-Society, Research on-line (2003) Agriculture, sustainability: round-table looks for common ground on GM crop 'co-existence'.