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Literature review of dispersivity lengths for the use in pesticide registration models.

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Registration of pesticides in Europe is based upon simulations of pesticide concentrations in the soil with pesticide fate models for a set of scenarios, which were defined to represent 'realistic worst case conditions'. A study by Boesten (Pest. Management Science 60 (10): 971-980) pointed at the sensitivity of the predicted concentrations to the dispersivity length, especially of compounds with a relatively low leaching potential. Therefore a database of leaching studies in naturally structured soils was compiled. One database entry contains a dispersivity length and information about the experimental conditions: transport distance, flow rate, boundary conditions, soil texture class, pore water velocity, transport velocity, and measurement method. An analysis of the database illustrated that dispersivity lengths strongly depend on experimental factors. Correlations between experimental factors complicate the identification of single factor effects on dispersivity. Saturated flow conditions and high flow rates in naturally structured soils clearly led to larger dispersivities. However relatively more lab scale experiments and experiments in heavier soil textures were carried out under these conditions. Since saturated conditions and high flow rates are less relevant for transport under natural climatic boundary conditions, experiments under these conditions were excluded for further analyses. A further analysis confirmed that dispersivities in soils scale in general with travel distance. Dispersivities were on average larger in finer than in coarser textured soils. But, the variability of dispersivities is large and the number of samples is small so that a relation between soil texture and dispersivity remains uncertain.