



Basis for the development of a scenario for ground water risk assessment of plant protection products to banana crop in the frame work of regulation 1107/2009

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The risk assessment to ground water of pesticides and their main metabolites is a data requirement under regulation 1107/2009, concerning the placing of plant protection products on the market. Predicted environmental concentrations (PEC) are calculated according to the recommendations of Forum for the Co-ordination of pesticide fate models and Their Use (FOCUS). The FOCUS groundwater working group developed scenarios for the main crops in European Union. However there are several crops which grow under specific agro-environmental conditions not covered by these scenarios and it is frequent to use the defined scenarios as surrogates. This practice adds an uncertainty factor in the risk assessment.

One example is represented by banana crop which in Europe is limited to sub-tropical environmental conditions and with specific agronomic practices.

The Canary Islands concentrates the higher production of banana in the European Union characterized by volcanic soils. Banana is located at low altitudes where soils have been eroded or degraded, and it is a common practice to transport soil materials from the high-mid altitudes to the low lands for cultivation. These cultivation plots are locally named “sorribas”.

These volcanic soils, classified as Andosols according to the FAO classification, have special physico-chemical properties due to noncrystalline materials and layer silicates. The good stability of these soils and their high permeability to water make them relatively resistant to water erosion.

Physical properties of volcanic clayey soils are strongly affected by allophone and Fe and Al oxyhydroxides. The rapid weathering of porous volcanic material results in accumulation of stable organo-mineral complexes and short-range-order mineral such as allophane, imogolite and ferrihydrite. These components induce strong aggregation that partly favors properties such as: reduced swelling, increased aggregate stability of clay minerals, high soil water retention capacity, low bulk density and high infiltration rate. They are also characterized by a pH around 6, high concentration in organic matter and a great capacity to fix P, which make them very fertile soils.

Most of Andosols have excellent internal drainage because of their high porosity. Regarding this fact, the main distributive source of the drainage under banana plant is the stem-flow. It is a spatially localized input of water in the soil at the foot of the banana plant and it has a significant influence in the ground water recharge.

In this work, we present a literature review of agronomic aspects for banana crop and specific hydraulic properties for soils in the Canary Islands. These data are compared with the ones for the surrogate scenarios. Based on the results, recommendations for further work on the development of specific scenario for banana crop are given.