

BEHAVIOR OF AIRBORNE FLUORIDES IN SOILS

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In the past soil oriented fluorid research focused mainly upon the F-uptake by plants and directly damaging effects of soilborne F on plants. With this Poster we provide some evidence that other questions might be as relevant as the rather short-term and immediate phenomena of F-uptake, leaf injury or crop loss:

1. There are no doubts that F accumulates in soils. The spatial distribution of F-contents in soils does reflect the intensity of the F-immissions. The distribution pattern of F-contents in pine needles and soils are very similar.
2. Atmospheric F is getting dissolved and displaced through the root zone. Even in calcareous soils it is leached downwards through the profile without being precipitated CaF_2 .

This Poster summarized the contents of the following three Contributions, which were submitted to J. Environ. Qual. in September 1980: Polomski et al. 1980 a-c:

- a) Accumulation of airborne fluoride in soils.
- b) Fluoride induced mobilization and leaching of organic matter, iron and aluminum.
- c) Fluoride mobility in soils.

The same Poster was intended to be presented at the Symposium "Effects of Air Pollutants on Mediterranean and Temperate Forest Ecosystems", in Riverside, June 1980, but got lost on its way to California. The interpretive summary in the Symposium Proceedings emphasizes additional aspects of this problem.

⁺) Presented by Dr.W.LANDOLT (same Institute)

3. The mobility of the F in soils depends largely upon the exchange kinetics between the F in solution and the F adsorbed or precipitated. In calcareous soils these exchange mechanisms proceed relatively slowly as compared with the residence time of soil water in one particular soil horizon.
4. F dissolved in the soil solution apparently breaks down substantial amounts of organic matter and solubilizes Al and Fe. Depending upon soil type these effects are quite variabel.

Conclusions

Despite its relatively high mobility the atmospheric F accumulates in F-contaminated soils. Longterm predictions of F-accumulation in soils must include the kinetics of the F-exchange mechanisms between soil water and matrix. In addition, certain important soil properties such as soil organic matter content or composition and the mineralogical composition might change with time under the influence of F-contamination. The slow pace of soil pollution and its invisibility in early stages is a serious environmental threat, but was also one of the reasons that this problem was not recognized in the past.

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