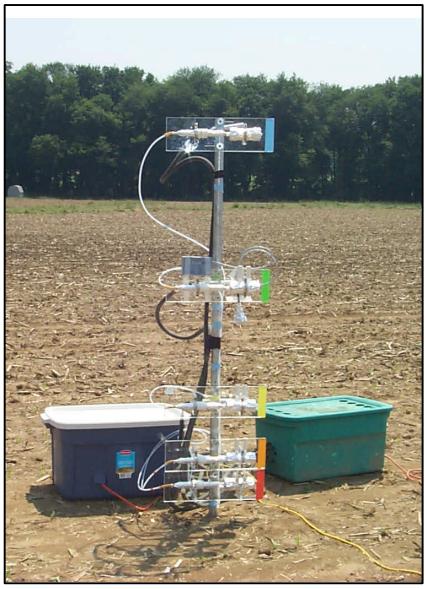
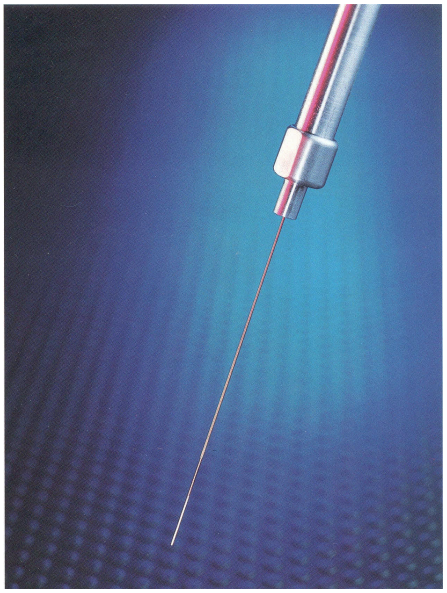
Development of New Air Sampling Technologies for Pesticide Volatile Flux Determination

Pesticides residues are released from soil and plant material during and after application. The magnitude of this loss is dependent on weather conditions, pesticide formulation, application equipment, and soil conditions. Pesticide residues can be transported in the atmosphere and deposited to non-target areas such as rivers, streams, lakes and wetlands where they may cause toxic effects on sensitive plants and animals. Scientists need new ways to quickly measure and compare the pesticide release rate under different conditions. This information can be used to develop new farming practices to limit losses to the atmosphere.

At OPE3, we are testing new, fast air sampling techniques to streamline these experiments. Solid-phase microextraction is a new technique whereby a thin fiber coated with an adsorbent is exposed to air above the field. The amount of pesticide material adsorbed by the coating can be related to the air concentration. By measuring the air concentration at several heights above the soil, the rate of pesticide release from the soil can be determined. These fibers are reusable and provide quicker results than traditional methods without the use of solvents.



Air sampling mast positioned over bare soil treated with Metolachlor.



Close-up of solid-phase microextraction fiber. The tip is coated with an adsorbent that will capture pesticide residues in proportion to their air concentration.

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