SIMPLE METHODS TO EVALUATE NEW EMISSION REDUCTION METHODS

Scott R. Yates*, U.S. Salinity Laboratory, USDA-ARS, Riverside, CA
Daniel Ashworth, U.S. Salinity Laboratory, USDA-ARS, Riverside, CA
Wei Zheng, U.S. Salinity Laboratory, USDA-ARS, Riverside, CA

In California, growers face significant challenges due to restrictive regulations planned for soil fumigation. Use of soil fumigants in agricultural production can result in the unwanted transport to the atmosphere, soil and water resources. This may lead to the potential for workers or bystanders to be exposed to fumigant vapors. The volatile organic compounds in a soil fumigant may also contribute to the formation of near-surface tropospheric ozone, which has become a serious concern now that U.S. EPA has established a new federal 8-hour ozone standard.

Methyl bromide is currently being phased-out due to its role in stratospheric ozone depletion. Other soil fumigants have been banned because of adverse environmental behavior, most notably transport to the atmosphere. And this has led to serious problems for producers. For example, because of high methyl bromide (MeBr) emissions, it is being phased-out, and there is some urgency in the search for alternatives. 1,3-D was suspended for four years from 1990 to 1994 in CA because of high values measured in the air near treated fields. Most of these problems can be avoided by limiting fumigant movement to the atmosphere.

Over the last decade, various application methods have been developed to reduce fumigant emissions. These methods include deep placement, covering soil surface with polyethylene sheets or virtually impermeable films, irrigation after fumigation or water sealing, surface packing, and drip, and the use of surface amendments.

The current information required by regulators before allowing new reduced-emission methodology to be used in practice is costly and time consuming to obtain and analyze. New methods are needed that significantly reduce the cost and time required to determine the effectiveness of reduced emission methodology. The new methods should also ensure that theoretically consistent results are realized. This would help to ensure more rapid adoption of reduced-emission methods and better protect workers, the public and environment. This would also help maintain the availability of this important class of chemicals for food production.

The goal of this presentation is to (a) describe recent efforts to develop comprehensive information for other, generally simpler, approaches to obtain total fumigant emissions to the atmosphere. These methods include laboratory experiments, small plot experiments, and mathematical modeling. (b) As part of the evaluation process, the results from simplified methodology will be compared to the results from large-scale field experiments. (c) Comparing results from different methodology will help to identify strengths and weaknesses. (d) Use of

models allows testing of new ideas for obtaining emission estimates and to determine if they will produce valid results.

For a more detailed summary of this research, please see the Power Point presentation at http://www.mbao.org/.