

This Week's Citation Classic™

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Bailey G W & White J L. Review of adsorption and desorption of organic pesticides by soil colloids, with implications concerning pesticide bioactivity.
J. Agr. Food Chem. 12:324-32, 1964.
[Agronomy Department, Purdue University, Lafayette, IN]

Literature pertaining to adsorption and desorption of organic pesticides by soil colloids was reviewed. Factors influencing pesticide adsorption were identified; their roles were discussed in detail. The effect of soil water on the bioavailability of herbicides at the root surface was examined. [The SCJ® indicates that this paper has been cited in over 145 publications since 1964. It is among the three most-cited papers for this journal.]

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"While nearing the completion of my PhD in soil chemistry and mineralogy in 1961, Joe White and I recognized the emerging national concern about the use and possible misuse of pesticides in agricultural ecosystems and the potential impact of such substances on the environment. We sought and received a National Institutes of Health grant to study soil-pesticide interactions and their role in environmental management.

"The review article was the first step in an overall pesticide research program for both of us and the continuation of a research collaboration which has lasted over a quarter of a century. Since we were both new to this field, we decided that a comprehensive literature review on soil-pesticide interactions was necessary. Our initial hypothesis was that the mineralogical characteristics and properties of soils would influence adsorption-desorption and that this process in turn would influence all other pesticide transformation and transport processes in soil. I

was given complete freedom with respect to time and scope to proceed with this review of soil-pesticide interactions (over 400 references were reviewed dealing with all phases of pesticide transport and transformation in soils). It was an exhilarating, rewarding, and fulfilling experience to gain such an overview, and then identify those factors influencing pesticide adsorption, desorption, and bioactivity—using concepts and principles from such widely varying disciplines as soil science, clay mineralogy, physical chemistry, surface chemistry, and plant physiology to explain pesticide behavior in soils and synthesize new hypotheses based on these observations.

"This experience drove three points home: the need to read literature from widely divergent disciplines; the need to recognize the multidisciplinary nature of environmental research; and the need for a team approach to identify, define, and solve complex environmental problems. An even more thorough and extensive review article followed."

"The numerous citations to the 1964 publication are probably the result of its having been the first review to deal with this topic in a systematic and comprehensive fashion. It served as a point of orientation and reference for many workers in the 1960s, 1970s, and even into the 1980s in the surge of research efforts on the behavior and effects of pesticides and other environmental contaminants in terrestrial and aquatic ecosystems.

"In retrospect, this particular article has been the cornerstone of my professional career. It has been good to me both personally and professionally by giving me a network of friends around the world and the foundation to pursue, plan, direct, and manage research in widely diverse disciplines and integrate these studies to develop tools and techniques for environmental decision-making."

1. Bailey G W & White J L. Factors influencing the adsorption, desorption, and movement of pesticides in soil. *Residue Reviews* 32:29-92, 1970. (Cited 125 times.)