Environment and Chemicals in Agriculture


The Commission of the European Communities and the Irish Government jointly organized a symposium in Dublin in October 1984, from which the papers in this book are presented. Environmental concerns related to intensive agriculture provided the impetus for the symposium. Because of high population density and limited arable land, agriculture in western Europe is now facing environmental problems that may be typical of much of the world in the future. Western European countries have only 7% of the world's arable land, but use about 25% of the world's resources in agricultural production and 17% of the chemical fertilizers. Eighteen papers, including five in French and three in German, are presented under three general topics.

Handbook of Polycyclic Aromatic Hydrocarbons, Volume 2, Emission Sources and Recent Progress in Analytical Chemistry


A variety of organic and inorganic compounds enter the atmosphere and biosphere through natural and anthropogenic sources. Ever since the British surgeon Sir Percival Pott in 1775 reported that chimney sweeps in Britain often developed cancer of the scrotum, there has been an awareness of the harmful effects of soot, tar, and pitch on human health. More than 150 yr passed, however, until carcinogenic constituents in pitch were identified as polycyclic aromatic hydrocarbons (PAH). By 1976 more than 30 PAH compounds and several hundred derivatives of PAH were reported to have carcinogenic effects, making PAH the largest single class of chemical carcinogens known today. Potential hazards from the occurrence of PAH in the environment have been noted in the drinking water standards set forth by the World Health Organization's Committee on the prevention of cancer, as well as by several national agencies concerned with PAH in food, working atmospheres, and effluents from industries and mobile sources.

Although it is recognized that there are natural sources of PAH (i.e., volcanic activity and biosynthesis), the anthropogenic sources of chemicals used in agriculture, (ii) need for and benefits from fertilizers and pesticides, and (iii) ways for economical and ecological optimization of the use of fertilizers and pesticides. However, the topics are so interrelated that papers under each topic frequently bring up points that are also discussed under the other topics. The book concludes with summaries of the general topics and the overall symposium.

More than half of the papers deal with economic or extension aspects of environmental protection. It is stressed that uniform standards and regulations are not reasonable, since soils, climate, and farming systems vary.

With respect to pesticide use, emphasis is placed on integrated pest management through improved pest forecasting, more specific targeting of pesticide applications, and farmer education. It is pointed out that intergovernmental action may be required, because integrated pest management is not profitable to industry and perhaps not to farmers. The development of pesticide resistance is a serious concern that will require research into new techniques for pest control.

The primary environmental problem with fertilizers is the leaching of NO\textsubscript{3} into groundwater, with many areas exceeding the acceptable level of 50 mg/L. The Netherlands, in particular, has the highest average rate of N fertilizer use in the world, 240 kg/ha, with about 400 kg/ha of N applied in areas with intensive dairy (Bos sp.) farming. Nevertheless, areas in the Netherlands where the NO\textsubscript{3} concentration in groundwater exceeds 50 mg/L are associated with large amounts of manure produced in intensive pig (Sus sp.) and poultry (Gallus sp.) farming, rather than with fertilizer applications. There is a need to balance nutrients added with those removed in intensive agricultural systems. Dr. Cooke, of Rothamsted, points out that the aim of both environmentalists and agriculturalists should be that no fertilizer nutrients be lost to the environment. This will require balanced and timely applications of nutrients, with accurate prediction of requirements (crop yields, weather, amounts of nutrients supplied by soil and manure, etc.), and control of insects and diseases. Manure presents a difficult problem in this regard, since an unknown amount of N is often lost during application, and that remaining becomes available to plants at an unknown rate.

The book is well-produced and remarkably free of typographical errors. It gives a good picture of the current environmental concerns of agriculture in western Europe, concerns that some of us may face in the future. —R.G. MENZEL, Soil Scientist, USDA-ARS, Water Quality and Watershed Research Laboratory, Durrani, OK 74702.

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