

EFFECTS OF ENVIRONMENTAL POLLUTANTS UPON ANIMALS OTHER THAN MAN

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All pollutants are waste products. They include both "natural" compounds that are present in undesirable concentrations in local ecosystems and chemical species foreign to the environment. What distinguishes them from other chemical wastes is, by definition, a potential capacity to inflict harm upon one or more species of an ecosystem. Many populations of wildlife are currently affected by pollutants that decrease the life span of adults or lower their reproductive capacity. Since these species breathe the same air as does man and consume some of the same food, they constitute an early warning system for the future health of man. In some cases it is not immediately evident which pollutants are producing the observed effects and an increasing amount of research is being devoted to these problems. The present paper will attempt to summarize our current knowledge in the field of pollutant ecology that relates to the effect of pollutants upon wildlife populations. Hopefully it will provide a useful background to the formulation of programs that will look for effects of these same pollutants upon human health.

1. Dimensions of the system

It is evident that the capacity of the earth to support life is finite. A convenient parameter with which to discuss the dimensions of the global ecosystem is the amount of organic carbon synthesized per year by the photosynthetic activity of plants. Production of organic carbon in the sea has been estimated to be in the order of 2×10^{16} grams per year [52]. Photosynthetic processes on land produce in the order of 6×10^{16} grams of organic carbon per year [38]. The sum of these numbers, 8×10^{16} grams, is therefore a useful number with which to compare such parameters as annual petroleum production, the annual U.S. production of organic chemicals, global mineral production, and the total amount of waste material formed by the sum total of global technology. The latter might be considered a measure of the current level of human activity.

2. Waste products as pollutants

Carbon monoxide is a waste product that has become a locally dangerous pollutant in urban areas. Worldwide emissions from major industrial sources,