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Editorial

WILDLIFE ECOTOXICOLOGY: CONCERTED GLOBAL EFFORTS REQUIRED

The environmental sciences have developed rapidly since the 1960s, responding to the alarming and dramatic effects of pollutants on humans, wildlife, and ecosystems revealed during that period. Much has been achieved in many countries in the fields of emission reductions, product development, legislation, risk assessment, and nature restoration. Although many wildlife species have recovered from the declines of the 1960s, persisting or increasing environmental effects in others are still being reported. In many countries in Western Europe, a shift in environmental policies seems to be taking place. Research budgets for wildlife ecotoxicological studies are diminishing, while budgets for nature restoration and large-scale rehabilitation projects are increasing. Although planting forests and restoring wetlands are much more appealing in the public and political arena, increasing our currently limited understanding of the scale and magnitude of the effects of contaminants on the major wildlife taxa is vital to their survival.

Many studies conducted in the past concentrated on selected populations or subpopulations in exposed environments and were usually directed to easily detectable endpoints, such as adult mortality or breeding success. Much less is known about the status in less polluted regions and about the scale and magnitude of environmental effects on the endocrine, nervous, and immune systems and on complex developmental processes. Many recent studies and conferences have shown that such effects may be much more widespread than previously assumed [1–3]. Often, it is difficult to determine causality due to poor understanding of the natural variability of population dynamics and the influences of other stress factors, such as habitat destruction, isolation of populations, disturbance, food availability or quality, hunting, fishing, and land-use practices.

Despite the obvious complexity of laboratory experiments with wildlife species and the influence of confounding factors in the real world, wildlife ecotoxicology is perhaps better suited to the simultaneous application of modeling, laboratory and field experiments, and observations than any other ecotoxicological discipline. Most of the wildlife studies thus far, however, have relied on one or perhaps two aspects of this trinity, thus failing to reach the convincing evidence needed to persuade policymakers, governmental bodies, and industry to take appropriate measures for improvements.

We can also learn from research, especially that published in the last decade, that our risk assessment models, traditionally and understandably centered around human exposure and effects, may fail to protect some wildlife populations sufficiently. The traditional rodent-to-human extrapolation procedures may not be adequate for other species, such as those in aquatic environments. In fact, examples show that by protecting par-

ticular predators at risk, human protection is inherently provided because of the lesser vulnerability of humans [4].

In addition, current risk assessment models are unable to explain the potential interactive effects of simultaneous exposure to a multitude of man-made chemicals. We need eco-epidemiological studies based on multidisciplinary concepts derived from ecology, human epidemiology, ecotoxicology, and environmental chemistry. Such studies should be based upon integrated field surveys, laboratory studies, and the development and calibration of predictive and diagnostic multistress models. A much more comprehensive understanding is required of contaminant-related effects on a supraregional, continental, and for some species, global, basis.

It is our task to provide protection for all species from anthropogenic stress of their habitat, whether physical or chemical in nature. Hence, it is our duty to provide optimum facilities for the science of wildlife ecotoxicology. As ecotoxicological scientists, we plead for sound and thorough investigations in which theoretical models are developed and subsequently tested in the laboratory while simultaneously verified in the field to better understand the mechanisms and the specific confounding factors that put wildlife at risk. We also plead for global cooperation; otherwise, the efficacy of current fragmentary research efforts all over the world remains debatable. We may then be able to proficiently guide measures to be taken in the design of new chemicals or the application of existing ones in species protection or nature restoration programs and to address such vital issues as safeguarding biodiversity and sustainable development.

We are happy to see evolve from an earlier initiative by our North American colleagues a series of interesting and scientifically sound sessions on wildlife ecotoxicology in Society of Environmental Toxicology and Chemistry (SETAC)–Europe Annual Meetings. During the preparation of this special issue, four more SETAC Annual Meetings in Europe and North America have shown the increasing interest in the field and the growing awareness that an indispensable multidisciplinary field is now well on its way to maturity. It is both pleasing and reassuring that SETAC activities on two continents continue to play an important role in the advancement of research in this challenging discipline.

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