Ecophysiology - Metabolic Physiology

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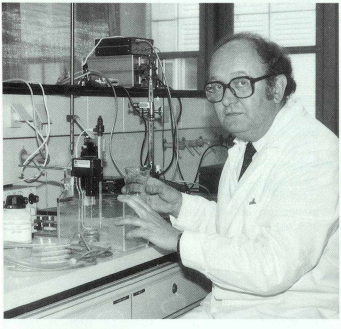
Research

The main topic of our research during the past decade has been the impact of heavy metal pollution on arthropod development and reproduction: The well known phenomenon of forest decline has been accompanied by less striking but nevertheless important changes in the population dynamics of pests and other arthropods.



One reason for this may be that the transfer of pollutants within food webs leads to significant accumulations in single links of food chains based on the physiological or ecological peculiarities of that species. The above-mentioned changes thus stem from disturbed equilibria between members of the ecosystem.

Particular attention was paid to the metal transfer (Cd, Pb, Cu, Zn) within well-defined, short experimental food chains (artificial diet - prey - predator or artificial diet - host - parasitoid) and its effect on both the predator and parasitoid. In the latter host - parasitoid relationship (*Lymantria dispar* larvae - *Gyptapanteles liparidis* larvae), the precise fate of the pollutants (assimilation, distribution within the body, regular and episodic excretion during development) was monitored. Based on established influences of metal pollution on ecological parameters (duration of development or of single instars, life span, mortality, reproduction success), the physiological basis of these effects was investigated (i.e. hemolymph composition of hosts compared with developmental retardation of parasitoids).

Our studies confirm a distinct hazard for parasitoids and predators due to pollutant transfer into hosts or prey.

The research done in the laboratory is accompanied by field studies on heavy metal burdens of invertebrates in localities with varying immissions (i.e the vicinity of a Pb - Zn - smelter versus control areas). These analyses led to a search for genetically adapted ecotypes at long - term exposure sites.

This main line of research is complemented by a series of further investigations at the department: spatial distribution, cold resistance and ecology of certain lepidopterans, development of wing veins in lepidopteran pupae etc. In addition, we supervise external diploma theses and dissertations carried out by zoology students at various medical departments (e.g. tumor biology) and other institutions (Austrian Research Centre Seibersdorf, Int. Atomic Energy Agency...).

Teaching

Introductory animal physiology II (metabolism in a wide sense) (L,2h)
Practical course in animal physiology II (metabolism; for zoologists and ecologists) (P,4h)

Practical course in animal physiology (for future high school teachers) (P,3h)

Selected References

Ortel J, Gintenreiter S, Nopp H (1993) Metal bioaccumulation in a host insect (*Lymantria dispar L.*, Lepidoptera) during development - ecotoxical implications.In: Dallinger R, Rainbow P.S. (eds) Ecotoxicology of Metals in Invertebrates. Lewis Publishers, Boca Raton, Ann Arbor, London, Tokyo