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The interactions of scarab beetles with *Pristionchus* nematodes: A model system for integrative studies in evolutionary biology

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Abstract

Life on Earth shows an astonishing diversity of form, but our understanding of how this diversity was generated is still limited. We use a highly interdisciplinary approach that integrates development, ecology and population genetics to unravel the mechanistic changes that give rise to evolutionary alterations and novelty. For this to be achieved, we established the free-living nematode *Pristionchus pacificus* and its necromenic association with scarab beetles as a model system in evolutionary biology. This interaction combines laboratory studies on genetic, genomic and transgenic tools with field-work in ecology and population genetics.

The tight interaction of *Pristionchus* and other diplogastrid nematodes with scarab beetles is based on a necromenic associations: Worms rest on the living beetle in the arrested dauer stage and only start feeding on microbes after the beetles´ death. Here, I will highlight three areas of our research that are of outstanding importance for entomology.

1. Phylogeny. We have conducted detailed surveys on scarab and other beetle groups and found that the interaction of *Pristionchus* and diplogastrid nematodes with beetles is deeply rooted into the phylogeny of both groups. There are strong signs for co-evolution, but also host-switching events.

2. Genomics. Pioneering work on nematode genomics revealed horizontal gene transfer as a common theme in nematodes. Our most recent studies revealed that the insect partner represents an important donor of DNA material.

3. Symbiosis. One striking finding was the cellulase activity of *Pristionchus* cultures. I will discuss how the nematode might be involved in scarab beetles exploring the decaying wood ecosystem.

Biography

Ralf J. Sommer has completed his Ph.D at the age of 28 years from the University of Munich and was a postdoctoral fellow at CALTECH, Pasadena. He became director of the Max-Planck Institute for Developmental Biology in the age of 35 and has developed the nematode *Pristionchus pacificus* and its scarab beetle association as a model for integrative studies in evolutionary biology. He is adjunct Professor at the University of Tübingen and has published more than 140 papers in reputed journals, also serving as an editor and board member of many scientific journals.