

Going Wild, Going Global: International Collaborations in Movement Ecology

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Satellite telemetry resulted in a quantum leap forward in animal ecology and is a key technology in 21st century biology. The Max-Planck-Institute for Ornithology, 'Vogelwarte Radolfzell', was one of the first users of terrestrial animal PTTs in Europe with its program "Bird Migration in Africa and Eurasia - a Pilot Study". The pioneering efforts by Peter Berthold's team resulted in the first lifetime tracks of White Storks. Our 'Princess' was tracked by various PTTs for about 12 years, still one of the most beautiful individual data sets in movement ecology.

Meanwhile, some 20 years later, satellite telemetry has become an integral component of our day-to-day work. Birds are the quintessential world wanderers - thanks to the PTTs we can now move with them, personally and virtually. Whereas our initial scientific focus was more towards simply understanding 'Where do birds go?' and 'When do they migrate?' we are now contributing to international scientific investigations in four specific fields:

- i) What ecosystem services do birds provide? Specifically, how important are birds in dispersing seeds of trees across forest gaps? Here we are collaborating with Tom Smith's Center for Tropical Research at UCLA (USA) to analyze over which distances hornbills disperse rainforest seeds in tropical Cameroon/Africa.
- ii) What health risks do migrating birds pose? In collaboration with the FAO/Rome, USGS/USA, as well as universities and organizations in the UK, India and Mongolia, we are tracking Bar-headed geese across the Himalaya mountains. In this international research group, different interests feed off each other: How can birds cross the mountains at high altitudes? How quickly do they move in case they are diseased, that is, how far can they potentially carry a virus? How are different populations connected? Is there leap-frog migration, with more northern breeding populations migrating to more southerly non-breeding sites?
- iii) Conservation and population connectivity: Together with the Wildfowl & Wetlands Trust, UK, and researchers in Mauritania, Botswana, Ethiopia and Kenya we are tracking Lesser flamingos in Africa to determine whether spatially separated populations in Africa are connected by individual movements. This is a long-term project and will ideally soon include Lesser flamingos from India, too.
- iv) Inter-continental navigation in Lesser black-backed gulls: Here we engaged in the largest bird navigation project by tagging more than 120 individuals simultaneously, and experimentally changing their sensory systems on a temporary basis. In collaboration with Risto Juvaste and his Finnish team, Grigori Tertitski and his Russian team working in the White Sea area, the German Institute of Avian

Research in Wilhelmshaven, as well as sensory physiologists Anna Gagliardo from Italy and Martin Wild from New Zealand, we altered the perception of environmental signals via the magnetic nerve or the olfactory nerve. We then translocated individuals by plane towards the West (from Finland to Germany's Heligoland Island) and the East (to the city of Kazan in the Volga valley, Russia) and followed their individual decisions throughout their voyage towards their non-breeding areas in East Africa (Lake Victoria).

None of these projects would have been possible without international collaboration involving many countries, institutions and dedicated individual researchers. Although it is often tedious to get all the paperwork in order to be able to track animals across the globe, it is perhaps the most rewarding part of our job to see a world on the move.

It is our deep conviction that animal movements are part of the human cultural and scientific heritage, particularly during times of unprecedented habitat alteration and climate change. Roland Kays, Mammal Curator at the New York State Museum, USA, and I have therefore started 'Movebank', a global data repository and online research platform that allows scientists and the public around the world to share their movement data. The current beta-version www.movebank.org already features real-time ARGOS feeds and additionally stores animal attributes that are collected from onboard sensors such as 3D-acceleration. We plan to expand



Photo by Grigori Tertitski

Martin and Vladimir Semashko transporting gulls in Russia.

Movebank into a Virtual Research Platform for movement ecologists. Data entered into Movebank will remain sole property of the individual researchers, who can then decide how and with whom to share the data if they wish to. Movebank is free to use and funded internationally, by the US National Science Foundation

(NSF) and the German Max-Planck Society and the German Science Foundation (DFG), and is part of the New York State Museum archives for eternity. Data in Movebank will remain under the auspices of the Food and Agriculture Organization of the United Nations (FAO), a truly international patronage for the animal data that are so dear to all of our hearts.

'Panta rei' - Everything moves, and movement is the essence of life, as the Greek philosopher Heraclitus said in 500 BC. I foresee that movement ecology and its most important technique, satellite tracking has not even started yet to enter its golden age. The world has become a small place for us; it always was for birds.

Finnish gulls on the dump.

Photo by Markku Kangasniemi

