



The role of microbes in chemosignalling and antimicrobial protection in birds

Symbiotic microorganisms have been shown to coexist with their hosts across a wide variety of animal taxa and substantially affect host physiology, behaviour, fitness, and health. In birds, the bacterial communities found in the preen gland and on feathers are poorly understood. Preen oil has been found to contain organic compounds (VOCs) and antimicrobial compounds that contribute to the host's antimicrobial defence and can act as chemosignals during communication. The preen gland microbiome is hypothesized to synthesize these compounds, however, there is limited knowledge on whether and to what extent the preen gland microbiome is involved in the production of VOCs and antimicrobial compounds.

We will perform microbiome transplant experiments, where we will collect the preen gland and feather microbiomes from free-living donor species and transplant these microbiomes onto captive Java sparrows (*Lonchura oryzivora*).

Our aims are to:

1. Test whether preen gland microbiomes determine the antimicrobial and VOC profiles of preen oils
2. Determine interactions between preen gland, feather, oral, and gut microbiomes
3. Investigate how the preen gland and feather microbiomes affect feather quality and preening behaviour

Methods:

- Experiments in captivity
- Fieldwork
- Preparation and application of microbiome inocula
- Behavioural observations and analyses (preening behaviour)
- Feather quality analysis *in vitro* (damage of feather microstructures, feather brightness, feather degradability)
- Data analysis in R



During this project you will have the opportunity to work with birds in an experimental setting, collect samples from birds in the field, prepare microbiome inocula in the lab, and gain experience with behavioural observations and/or *in vitro* feather quality analysis. The project can be adjusted to your own interests.

Staff member:	Irene Tieleman	Contact:	b.i.tieleman@rug.nl
Daily supervisor:	Maureen Baars	Contact:	i.m.baars@rug.nl
Expertise group:	Behavioural and Physiological Ecology/GREEN		
Type of project:	<input type="checkbox"/> Bioinformatics	<input checked="" type="checkbox"/> Fieldwork	<input checked="" type="checkbox"/> Laboratory
MSc program:	<input checked="" type="checkbox"/> Biology	<input checked="" type="checkbox"/> Ecology and Evolution	<input type="checkbox"/> Theoretical
	<input type="checkbox"/> Biomedical Sciences	<input type="checkbox"/> Biomolecular Sciences	<input checked="" type="checkbox"/> Data analysis
ECTS:	<input checked="" type="checkbox"/> 30	<input checked="" type="checkbox"/> 40	<input type="checkbox"/> Behavioural and Cognitive Neurosciences
		Language:	<input type="checkbox"/> Marine Biology
Start date:	Early 2024		<input checked="" type="checkbox"/> Dutch
		Location:	<input checked="" type="checkbox"/> English
			Linnaeusborg