Trade-off between species recognition and individual discrimination in tropical *Turtur* doves

Acoustic signals are crucial for several animal taxa. In birds, song is a fundamental signal associated with sexual selection, used for mate choice and intraspecific competition. Regardless of how sexual selection acts, animals are faced with the problem of recognition. This can be for whole species recognition as well as the discrimination between different individuals or even the recognition of particular individuals. From a human perspective this does not seem special, as we are extremely capable of such discrimination. We use many cues like a persons' face, voice, gestures, or even smell, depending on the situation, to guess whether we know the other person or not. For us, recognition of tens and hundreds of individuals is an easy task. However, the evolution of such abilities and details of processes underlying recognition are still not fully understood. In many bird species, when signallers and receivers are distant from each other, acoustic signals are very important and song can be the sole signal birds rely on for decisions about mate choice and territory defence. This is especially true for species inhabiting tropical forests where visual communication is often critically limited. The majority of studies on bird vocalisations have been conducted on species that are able to learn songs, a similar process to the way in which humans learn speech. Learning abilities are suspected to promote faster signal alteration and – in general – higher plasticity for these birds to adapt their communication to any habitat or social environment. Much less is known about non-learners, which are assumed to produce less complicated signals and evolve slower. However, recent findings suggest that non-learners can also develop sophisticated communication systems and are able to adapt interesting strategies for mate attraction and territorial defence.

The basic problem that we want to deal with in this project is the evolutionary compromise between maintaining a species specific uniformity of a signal, whilst also maintaining the individual specific traits of acoustic signals that are produced in a sexual selection context in a small group of non-learning wood doves (genus *Turtur*). These five species inhabit forest-woodland-savanna habitats in Sub-Saharan Africa, exhibiting both song and biologic features useful for testing the hypotheses we are interested in. The premise for planning this project was through the observation of within- and between species variation in advertisement calls of male Turtur doves. We found that, based on a full set of measured song parameters, it was easier to discriminate between individuals of a single species than to discriminate between different species.

We want to quantitatively describe the advertisement song variation among and within all *Turtur* species across the continent. We would like to identify species and individually specific song features. We plan to use molecular methods to confirm phylogenetic relatedness among the five species and analyse the genetic structure of same- and different-species populations living in sympatry and allopatry. Comparing song and genetic divergence among the studied populations and species living in different spatial configurations should give an insight into the role of the level of gene flow in shaping acoustic diversification among them. Molecular analyses will also allow for the potential detection of hybridization among sympatrically occurring species. If the occurrence of hybrids results from the misinterpretation of acoustic signals it would be expected to be more frequent in species with very similar songs. Second, we want to experimentally test how male birds respond to songs of the same species and different species in populations occurring allopatrically and sympatrically, and if birds can discriminate between neighbours and strangers and how similar, co-existing species affect this process.

The results of this project are important in many ways. The recognition of own species as well as specific individuals underlies almost any social behaviour, and so a detailed understanding of species and identity signalling will also help us better understand the social behaviours. The study system, seems to be perfect to attempt to understand how animals 'resolve' species-identity recognition conflict in practice, when occurring with congeneric, potentially signal-confounding species in different spatial combinations. Results of this study will also improve methods for species and individual bird recognition for nature conservation and long-term monitoring purposes. Automatic sound recorders are more and more frequently used nowadays and fast and correct recognition of different species signals is necessary for accurate analysis of such data.