

PhD thesis by Eric Djomo Nana *Drivers of avian diversity on an altitudinal gradient of Mount Cameroon*

Thesis review

Altitudinal gradients of tropical bird assemblages are an important but less-well studied topic, especially in Africa. Mr Djomo presents a suite of papers from field work in Cameroon, addressing the following issues: (1) Effects of nest type and position on artificial nest predation at low elevations, (2) Relationships between artificial nest predation risk and forest structure along the elevational gradient, (3) patterns of hemosporid (intra-erythrocytic protozoa) infestations, (4) morphometry of the western mountain greenbul, (5) exceptions from the range-size abundance relationship in high elevation birds, and (6) effects of human disturbance on avian assemblages based on data from Mt Cameroon and Mt Oku.

Mr Djomo successfully published as first author four of these papers in international peer-reviewed ornithological (*Ostrich*), zoological (*African Zoology*), ecological (*Biotropica*) and conservation (*Biodiversity and Conservation*) journals. He co-authors one more paper which has been submitted to *Oecologia*. Furthermore, he adds to the thesis a first authored but – seemingly- unpublished manuscript on Haemosporidians and in an appendix another paper published in *Ostrich* which he co-authors, on the use of bio-acoustic bird sampling methods.

Mr Djomo used an extensive array of field and analytical methods. In the field, he applied artificial nest experiments, mist netting, point counting and random bird observations. He also undertook morphometric measurements of birds, as well as taking bird blood samples. In the lab, he extracted DNA, applied the PCR technique, and amplified and sequenced the mitochondrial cytochrome b gene to identify haemosporids. As for statistical analysis, Mr Djomo uses non-

parametric statistics, variance analysis techniques (ANOVANCOVA), maximum likelihood modelling (phylogenetic trees), discriminant functions (morphometry) and bipartite network analysis, conducted with R software. Having acquired all these skills, he is one among very few ornithologists in Sub-Saharan Africa.

Significant results of his thesis are contributing to the following general fields of research which are of wide interest to ornithologists, ecologists, biogeographers and conservation biologists: (1) patterns of spatial variation in breeding success, (2) effects of traits (host abundance and vertical strata) on prevalence and species richness of avian parasites, (3) sexual dimorphism in monochromatic birds, (4) variation in the abundance-range size pattern, and (5) landscape effects on avian species assemblage in montane endemic bird areas.

From my personal interest, I found most significant his documentation of species assemblages along the elevational gradient that uncovers patterns of changing species richness with constant overall abundance possibly mediated by competitive release. When reading the interpretation of these results, a few questions come to my mind, which may be clarified during the defense:

- What do we know/think we know about the speciation of Afromontane birds?
- How 'ecologically specialized' and *in what way* 'specialised' are Afromontane versus lowland forest species?
- What are the evolutionary and ecological mechanisms that result into distinct altitudinal niches of individual bird species?
- Can we make predictions for any given species from autecological knowledge/known traits?
- What is the relative role of stochasticism vs determinism in driving species into altitudinal niches?
- How do species-rich taxonomic groups differ from species-poor groups in regard to (realized) altitudinal niches?
- Competitive release at the level of congeneric species: can we find species-pairs in adjacent niches?
- Can we hypothesize competitive release for ecologically similar but taxonomically different species?
- How could we experimentally prove the existence of competition between species?
- May there be competitive interactions with other vertebrates (primates, squirrels, rodents?)
- What role do driver ants play along the altitudinal gradient and how does ant following change along the altitudinal gradient?

Above all, with the submitted works, Mr Djomo has fully proven his ability to conduct and communicate scientific research in an independent manner. I therefore fully support the application of Mr Djomo for obtaining the degree of Doctor of Philosophy.

Sincerely,

A handwritten signature in black ink, appearing to read 'Waltert', with a stylized, cursive script.

PD Dr. Matthias Waltert