

## Morphological Convergence in Papyrus Dwelling Passerines

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### SUMMARY

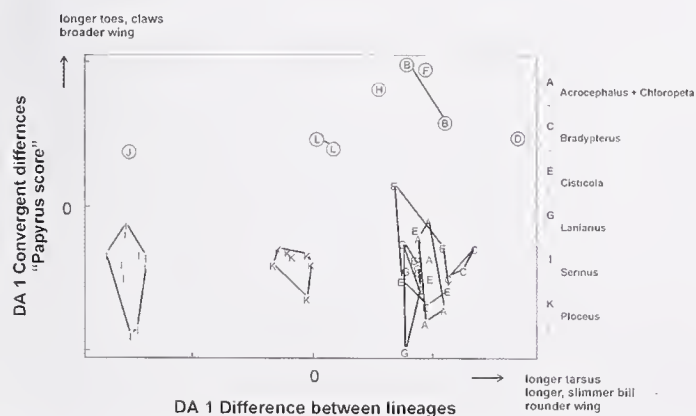
Ecomorphology investigates the way how animal design, behaviour, ecology, and evolution interact.

For example, the morphology of eight African papyrus-dwelling passerines (*Laniarius nufumbiri*, *Cisticola carruthersi*, *Bradypterus carpalis*, *Acrocephalus rufescens*, *Chloropeta gracilirostris*, *Ploceus (Sitagra) pelzelni*, *Ploceus (Textor) castanops*, *Serinus koliensis*) out of six lineages was compared with the morphology of congeneric species inhabiting various other habitats. Their morphology was analyzed by using 17 external characters of three functional complexes taken from study skins. A principal component analysis of these data revealed general patterns of morphological variation but did not reveal specific convergent features. We first used a discriminant function analysis to identify those traits which best separate the six lineages (x-axis in Fig. 1).

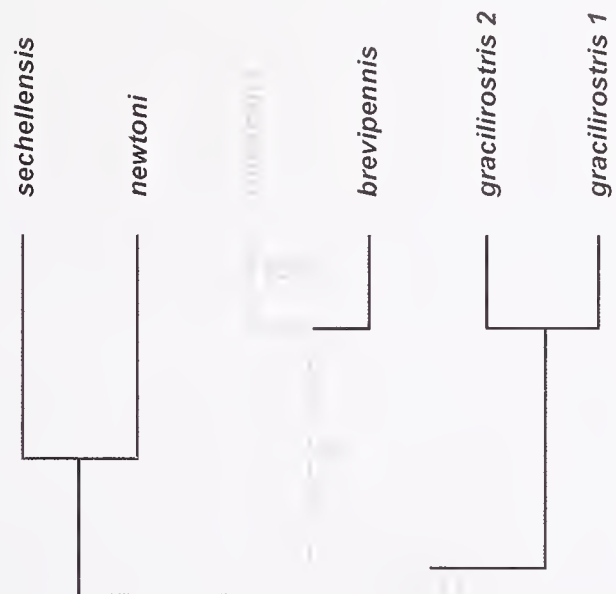
In a second discriminant analysis we searched for possible morphological differences between the papyrus-dwelling species and the non-papyrus species (y-axis in Fig. 1, „papyrus score“). By this new approach, existing convergent adaptations could be demonstrated and visualized. Convergence affected

only few traits but not the overall phenotype. The papyrus species showed convergent adaptations in traits of the hind limb and to a lesser extent in the flight apparatus. These results have been published in detail by LEISLER, B. & WINKLER, H. (2001): Morphological convergence in papyrus dwelling passerines. *Ostrich Suppl.* 15: 24-29.

A reconstruction of the „papyrus score“ on the molecular phylogeny of one lineage (*Acrocephalus*) revealed a fast and significant morphological change. Thus, subtle changes in shape between species can have profound ecological effects.



**Fig. 1:** Plot resulting from two discriminant analyses separating lineages (x-axis) and papyrus vs. non-papyrus species (y-axis), respectively



**Fig. 2:** Reconstruction of the „papyrus score“ on the molecular phylogeny of *Acrocephalus* warblers by maximum likelihood. Indicated is the magnitude of change.

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