ROB SIMMONS

FYNBOS ENDEMIC BIRDS

VULNERABILITY AND ADAPTATION TO LAND USE AND CLIMATE CHANGE

There are few greater challenges facing biodiversity today than that posed by climate change. Climate change impacts on southern African biodiversity will likely be significant, given our high levels of species endemism, particularly when species' options for moving into newly suitable climate space are constrained by land use change, including fragmentation. South Africa's fynbos biome, a precious global biodiversity hotspot, is threatened by urbanization, invasive alien plants and climate change.

Fynbos endemic birds have highly constrained global ranges at the tip of a continent, and are a valuable system for testing current hypotheses about endemic species vulnerability and adaptation to climate change in distinctive biodiversity zones. They are also an excellent opportunity for deepening our understanding of vulnerability by looking at the 'whole bird' – its behavioural, physiological, ecological and demographic responses to change.

KEY QUESTIONS AND HYPOTHESES

The research requires several PhD and/or MSc students to build on preliminary demographic, behavioural and ecological data from colour-ringed populations to answer the following questions:

- Do populations at range margins show lower survivorship or reduced breeding output than more central ones?
- What behavioural, plumage or morphological variables are reliable stress indicators?
- Are inland populations more affected by heat stress?
- Are feeding guild and niche breadth good predictors of demographic vulnerability?

Cape Grassbird

STUDY SPECIES
Focal fynbos endemics
- Cape sugarbird *Promerops cafer*
- Orange-breasted sunbird *Anthobaphes violacea*
- Cape rockjumper *Chaetops frenatus*
- Victorin's warbler *Cryptillas victorini*
- Protea seedeater *Crithagra leucopterus*

Focal non-endemics
- Karoo prinia *Prinia maculosa*
- Southern double-collared sunbird *Cinnyris chalybeus*
- Malachite sunbird *Nectarinia famosa*
- Cape robin-chat *Cossypha caffra*
- Cape white-eye *Zosterops virens*
- Cape bulbul *Pycnonotus capensis*
- Cape grassbird *Sphenoeacus afer*

- How does urbanization alter adaptation options?
- Are nectarivores most vulnerable to frequent fire?
- Is avian pox frequency a function of urbanization?
- Do individuals show spatial (including altitudinal) or phenotypic shifts consistent with predictions?
- How can conservation planning, policy and management respond to these challenges?

STUDY SITES

The Fynbos Endemics and Climate Change research theme consists of several interlinked projects at three main sites along a wildland/ urban edge. Each site has an altitudinal gradient, available recent fire and land use history, and a cluster of ringing sites to maximize dispersal data:

Cape Peninsula – Silvermine

Our main study site is in the Table Mountain National Park (Elsies Peak) on the urban edge, on south- and north-facing mid-altitude proteoid and restioid fynbos slopes (100-300 m asl). Nearby sites are Silvermine East and Glencairn Vlei/Cairnside.

False Bay East– Kogelberg

Cape rockjumpers and other endemics are studied on a steep altitudinal gradient outside Rooi Els hamlet, in the Kogelberg Biosphere Reserve buffer zone (0-120 m asl). The FitzPatrick Institute's higher-altitude nearby former study site, Sir Lowry's Pass/Steenbras Dam is monitored, though rockjumper numbers have declined, possibly due to fire succession.

Langeberg – Wildcliff

Mid-altitude populations of endemics are currently being investigated in the Langeberg mountains outside Heidelberg, at a private research station in the Wildcliff Nature Reserve. Establishment of a formal study area here will require additional team members to work intensively at this site.

PHD FELLOWSHIP BURSARIES SOUGHT FOR THIS STUDY

Funding is sought to support three student research bursaries at PhD level (R100 000 per annum including field expenses) and/or MSc level (R80 000 per annum) to help develop the behavioural, molecular, ecological, demographic and physiological components of this research. National capacity building is especially needed in statistical ecology and demography, skills needed for effective analysis.

Orange-breasted Sunbid

KEVIN DRUMMOND-HAY