PhD Opportunity at Monash University
Climate adaptation and speciation by mitonuclear interactions: the case of the Eastern Yellow Robin

Supervisors: Prof Paul Sunnucks, Dr Alexandra (Sasha) Pavlova
(Persistence and Adaptation Research Team: https://sites.google.com/site/sunnucksresearchgroup/home)

The Project: The Eastern Yellow Robin is a small passerine bird native to eastern Australia. Recently two divergent mitochondrial DNA lineages were discovered in this species, despite gene flow at the majority of nuclear genome. One lineage is found inland in warmer, drier conditions, while the other occurs in coastal areas (Figure, right). The two forms naturally meet, admix and interbreed to a limited extent.

There are no apparent physical barriers preventing gene flow between the mitolineages, and natural selection is inferred to keep the lineages apart (Pavlova et al. 2013). Indeed, investigation of complete mitochondrial genomes suggested that the mitolineages diverged under molecular selection (Morales et al. 2015).

Mitochondrial DNA genes encode 13 proteins that interact directly with the proteins from ~80 nuclear genes to do a task that is essential to any animal – making energy available. The details of this can impact every aspect of biology (see Background Reading p2).

Remarkably, we have discovered that members of the two lineages living at the same site can share most of their nuclear DNA, and yet can be starkly contrasting at some nuclear genes that have mitochondrial functions (Morales et al. 2016a,b,c).

Focussing on an area where the two lineages meet, we are investigating the biological differences between the two lineages: how and why are they apparently on the path to speciation?

If you would like to work in great team, gain diverse skills, and research local adaptation and speciation, with field work and/or population genomics – get in touch!

Monash University is in the top 1% of world universities. It is located in Melbourne, Australia, which offers inclusive and multicultural environment with opportunities to enjoy music, great sporting events, world-class exhibitions and shows, cultural and culinary festivals, as well as beautiful natural scenery and wildlife. Melbourne commonly ranks in the top five of the most liveable cities on many criteria.

Eligibility & application
Applicants for consideration for the PhD position will have a Masters or 1st class Honours degree in a relevant field. They will work well in a team, have enthusiasm for conservation biology and publishing strong science, a good work ethic, relevant research experience, high academic achievement and excellent English. The position offers the opportunity to design the project around the student’s strongest skill set and interests, be that field biology, genomics and/or modeling, and to expand their expertise in other areas. Applicants chosen to go forward in the process to fill the PhD position must secure Monash PhD scholarship support, for which there are several options open. The successful scholarship applicant can commence the project as soon as possible. More details on p2.

To apply, please contact Paul Sunnucks: paul.sunnucks@monash.edu, +61 (0) 3 99059593

Max. temp. of warmest month (degrees C)
- 11.0 - 28.0
- 28.0 - 33.0
- 33.0 - 41.9

Persistence and Adaptation Research Team: https://sites.google.com/site/sunnucksresearchgroup/home
The application process has two stages:

(1) Send an initial application to Paul Sunnucks (paul.sunnucks@monash.edu), consisting of:
- a letter of motivation
- a CV
- overview of your academic results, and translation if required, preferably indicating cohort rank or percentiles
- English test results if available
- the names and contact details of 3 academic references.

(2) If you are selected, you will be sent an invitation to submit a formal application through the Monash University web portal. There is assistance for this process.

Successful applicants for scholarship support will be offered a Monash PhD stipend scholarship (and fee-waiver in the case of international students) of approximately AU$26,000 AUD, tax-free for 3.5 years, for full-time research. Expenses for research, coursework, and conference attendance are covered, although students are encouraged to apply for some funding to build track-record and experience.

Some more information on the postgraduate experience in the School of Biological Sciences at Monash University, Melbourne can be found at: http://www.monash.edu/science/schools/biological-sciences/postgrad

For additional information on the activities of the Persistence and Adaptation Research Team see https://sites.google.com/site/sunnucksresearchgroup/home

References:
- Morales et al. (2016 c) Mitochondrial-nuclear interactions maintain a deep mitochondrial split in the face of nuclear gene flow. http://biorxiv.org/content/early/2016/12/20/095596

Background Reading: