

Ewen lab hihi research update

March 2010



ACCEPTED PAPERS AND MEDIA *publications in scientific journals, popular science and media coverage*

- No papers accepted this month

PRESENTATIONS & VISITS & NEWS *conference presentations, visits to and from group members*

- *New family member – congratulations to Phill and Bec on the arrival of a healthy baby boy Eric Erasmus born 25th March*
- John and Kate were on Little Barrier catching hihi for translocation to Tiritiri Matangi (birds transferred on 27th March).
- Assoc. Prof. Masaoki Takagi (Osaka City University) visited Tiritiri where he helped Leila and learnt all about hihi.

FEATURE STORY *PhD Thesis Summary. **Rose is printing!! Congratulations on a fantastic job!!***

The nestling begging display is noisy, vigorous, and colourful to attract attention from parent birds, which parents must resist to reserve resources for self-maintenance and future breeding attempts. But despite much research, it is unknown whether nestlings or parents have the upper-hand in the resolution of parent-offspring conflict. I performed experiments with Hihi *Notiomystis cincta*, an endemic New Zealand passerine, to explore nestling mouth colour and the influence of the pigment biomolecules carotenoids on nestling and parental behaviour.

The results provide support for a long-standing assumption that carotenoids are responsible for pigmentation of nestling gapes and the surrounding fleshy rictal flanges. Furthermore, carotenoid deposition may act as a filter for the reflectance of ultra-violet (UV) wavelengths. I next modelled these mouth colours in an avian visual colour space to test how parents perceive the different behavioural (vocal and postural) and colour components of the nestling begging display. While behaviour signalled hunger, colour components signalled different information about nestling size and carotenoids. Parents relied only on behaviour when allocating food among nestlings, but this cue was disregarded when nestlings had experimentally carotenoid-laden mouths. I next investigated if parents use nestling mouth colour to determine provisioning levels for the entire brood. Parents supplemented with carotenoids were more likely to invest in a second breeding attempt that season, which modified their response. Parents only increased their provisioning rates to colour-enhanced broods if they were not going to breed again and therefore their responses to signals depend on residual reproductive value, indicating that parents avoid manipulation by nestlings and have the upper-hand in the resolution of parent-offspring conflict. This also suggests that mouth colour provides information for overall brood provisioning, but is less important for deciding fine-scale adjustment of which nestling to feed. Lastly, I adopted a comparative approach to investigate the evolution of mouth colour. Related species did not tend to share similar gape and flange colours, adding support to the hypothesis that mouth coloration is under selection as a signal. The evolution of gape hue in particular may be a result of a trade-off between signal efficacy and production costs.

By approaching the study of mouth colour from both a behavioural and biochemical approach I have added greatly to our knowledge on the function and evolution of this important signal in the nestling begging display and the resolution of parent-offspring conflict and suggest that mouth coloration may not be as simple a signal as previously thought.



FUNDING *our major funders and new funding news*

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