Journal Club

For the boys!

Sexual dimorphism occurs in many members of almost all animal groups, with males adopting sometimes spectacularly colourful appearances. Such differences are generally explained within the framework of sexual selection: male colouration is associated with heritable traits on which females base their choice of mate. Therefore, the almost universal explanation for gaudy male colouration is that it has evolved to attract females or, more generally, to increase mating opportunities. However, in a new paper, Tom Sherratt and Mark Forbes [1] present an interesting and illuminating counterexample to this paradigm.

Coenagrionid damselflies exhibit sexual differences in colouration that are difficult to explain within the framework of female choosiness. Dorsally, the males are often much more brightly coloured than are the females, and sometimes have different patterning on their bodies. However, males neither defend territories nor engage in courtship displays; they simply rush at resting or slow-moving females in an attempt to mate. Because dorsal male colouration is never fully visible to females during copulation, it seems a very poor character on which female choosiness might be based.

Unable to explain this colouration using sexual selection, Sherratt and Forbes suggest that sexual dimorphism here is driven by males seeking to avoid the costs of being mistaken for females by other males, and such signalling is probably beneficial to both parties. Male–male encounters are likely to cost the participants in risk of injury, energy expenditure and lost opportunity to pursue matings with females. The authors present a model that suggests that if males are selected to avoid harassment by other males, and females are selected to avoid excessive harassment by males, then males should evolve brighter colouration than the females. Crucially, in their paradigm, females want to avoid harassment, but males want to find females: thus, there is a sexual conflict. If males looked only slightly different from females, then there would be strong selection on females to mimic males. To achieve dimorphism, males have to adopt some phenotype that is less profitable for females to mimic – what better than an overtly conspicuous form?

Antiharassment aposematism is an exciting and novel development that can be applied to a specific group. Further work is needed to test its generality and to examine its limits in species with slightly different mating systems. This is an entirely new avenue for considering the evolution of warning colouration, based on signalling unprofitability to conspecifics rather than to predators. No matter how general Sherratt and Forbes' mechanism proves to be (and indeed the authors are cautious themselves), it is a timely reminder that not all signals that differ between genders are aimed at prospective mates. There is an essay to be written on why mechanisms based on attractiveness to the opposite gender are currently so popular in behavioural ecology, but this is not it!

1 Sherratt, T.N. and Forbes, M.R. (2001) Sexual differences in coloration of coenagrionid damselflies (Odonata): a case of intraspecific aposematism? *Anim. Behav.* 62, 653–660

Graeme D. Ruxton
G.ruxton@bio.gla.ac.uk
Stuart Humphries
S.humphries@bio.gla.ac.uk

Sealing the fate of a historical taxonomy

The phylogenetic relationships of the eared seals (family Otariidae) seemed to be a relatively straightforward affair historically. Traditionally, the family has been subdivided into two subfamilies – fur seals (genera *Arctocephalus* and *Callorhinus*) and sea lions (genera *Eumetopias*, *Neophoca*, *Otaria*, *Phocarctos* and *Zalophus*) – largely based on the presence of a thick coat of underfur in the former group. True, relationships within *Arctocephalus*, the only genus to contain more than one extant species, were largely unresolved, but this was due mostly to a lack of research effort. Then, in the early 1970s, the first blow to this traditional arrangement was dealt when it was voiced that perhaps the subfamily of fur seals was not monophyletic (i.e. lacked an exclusive common ancestor). However, strong evidence for or against this claim has largely been lacking.

This evidence has now been provided by Wynen *et al.* [1] in one of the first comprehensive molecular phylogenies of the eared seals. Using partial sequences of the mitochondrial control region and cytochrome *b* for all 16 extant species (both personally sequenced and from the literature), they provide strong support for the northern fur seal *Callorhinus ursinus* being the sister species to all the remaining otariids and therefore not closely related to *Arctocephalus*. They provide further support for this arrangement with evidence from the fossil record. However, their molecular findings go one step further, suggesting that both *Arctocephalus* and the subfamily of sea lions are also paraphyletic. Although the various analyses produced slightly different phylogenetic trees, the species of both groups were consistently intermingled with one another – a thoroughly unexpected result. Although some previous authors held that species of the genus *Arctocephalus* show a high degree of convergence with one another, nothing on this scale was even dreamt of. In hindsight, the statement now has somewhat prophetic overtones.

As admitted by Wynen *et al.*, more (molecular) data are required to verify these findings. However, if their general results hold, they throw otariid taxonomy into complete disarray. Although this is an extreme example, the taxonomy of other poorly investigated groups might also bear little relation to their evolutionary history. Hopefully, the ever-increasing amount of systematic research means that such cases will continually be discovered and rectified.

1 Wynen, L.P. *et al.* (2001) Phylogenetic relationships within the eared seals (Otariidae: Carnivora): implications for the historical biogeography of the family. *Mol. Phylog. Evol.* 21, 270–284

Olaf R.P. Bininda-Emonds
bininda@rulsfb.leidenuniv.nl

