



Seewiesen Colloquia

Speaker invited by: Wolfgang Goymann; Dept. Gahr

Thursday, 20 October 2016, 13h, House 4, Lecture Room

Convergent evolution and genetics of red coloration in weaverbirds

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Red is arguably the most conspicuous color in terrestrial habitats, and commonly involved in sexual, social or interspecific colour signalling. In birds, highly chromatic (“bright”) red integument (skin, scales, feathers) is typically caused by C4-ketocarotenoids (C4KC), such as astaxanthin, which are metabolically derived (‘ketolated’) from dietary yellow carotenoids, such as lutein or zeaxanthin. While this has been known for many decades, the molecular mechanism (the “C4-ketolase”) underlying this key innovation behind avian ornamentation and sexual dichromatism has remained obscure.

Here we outline our recent discovery of a gene – CYP2J19- that is responsible for red coloration in passerines, including multiple lineages of African ploceids and estrildids. High expression of CYP2J19 is found in the liver of male ploceids with red coloration in plumage or beak, and in the red beak of male estrildids. Intriguingly, CYP2J19 is also expressed in the retina, for pigmenting the red oil droplets, in all species studied so far, and this is likely its original function from which it has been recruited for red integumentary coloration in some lineages. Finally, CYP2J19 is a member of the large group of cytochrome P450 enzymes, which may indicate new mechanisms of honest signalling.

Most important, however, along with our results on receiver biases for red in *Euplectes*, is the illustration of how striking diversification may derive from differential constraints rather than differential selection.

Who is Staffan Andersson?

- 1992 PhD University of Gothenburg
- 1994-1996 Postdoc, UC San Diego, USA
- 1998-2002 Ass Prof, Dept of Zool., University of Gothenburg
- 2002-now Professor, Dept of Biological and Environmental Sciences, University of Gothenburg