Discuss adaptive use of colour in the vertebrates

This is going to be a presentation. Plan your essay as normal and then each bullet point from your plan should become a slide. Talk for 15 minutes, which should be 12-15 slides. Include references on a slide at the end, cite as usual and please bring a printed handout of your talk (3 slides per page) that I can annotate.

Please discuss between yourselves to cover animals from across the vertebrates.

Probe more into the mechanistic side of the topic. I don't want this to be a list of the diversity of colour-use for your vertebrate clade. Pick an area that is relevant and you find interesting for your animal group and give examples from different animals that support the mechanism you are explaining.

> E.g. What is causing the diversity? Are there arm-races involved? Is the colour-use evolutionary stable? How are genes involved? How does the colour influence speciation of the species? What are the costs and benefits associated with colour-use? Is the colour a signal to another animal? Are there any constraints on the evolution of colour? Etc…

Relevant reading:

Pough, F. H., Janis, C. M., Heiser, J. B. 2009*,Vertebrate Life* (8th Ed). Pearson Benjamin Cummings.

> Chapter 10.5-10.6, chapter 17, 13.

Dawkins, R. *The Ancestors Tale* (eds).

> Peacock's Tale, Cichlid's Tale and Howler Monkey's Tale.

Helfman et al. 2009, *Diversity of fishes* (2nd edition). Wiley-Blackwell, Hoboken.

> Chapters 22 (p477-483), 20 (439-445), 6 (84-87) and 21 (461-465). Good for an overview of relevant things to do with colour, not just for the person doing fish!

Manning, A. and Dawkins, M. S. 1998, *An introduction to animal behaviour* (5th Edition). Cambridge University Press, Cambridge.

> Chapters 3 (especially p160-178) and 5.

www.cichlidworld.com/photo

Greenberg, N. *et al*. 1984, Social status, gonadal state, and the adrenal stress response in the lizard, *Anolis carolinensis*, *Hormones and Behaviour*, 18 (1), pp. 1-11.

Hawlena, D. *et al*. 2006, Blue tail and striped body: why do lizards change their infant costume when growing up? *Behaviour Ecology*, 17 (6), pp. 889-896.

Kiltie, R. A. 2000, Scaling of visual acuity with body size in mammals and birds, *Functional Ecology*, 14 (2), pp. 226-234.

Seehausen, O. *et al*. 2008, Speciation through sensory drive in cichlid fish, *Nature*, 455, pp. 620-627.

Trutt, L. N. 1999, Early canid domestication: The farm fox experiment, *American Scientist*, 87 (2), pp. 160-169.

Valverde, P. *et al*. 1995, Variants of the melanocyte-stimulating hormone receptor gene are associated with red hair and fair skin in humans, *Nature Genetics*, 11, pp. 328-330.

Wang, I. J. and Shaffer, H. B. 2008, Rapid colour evolution in an aposematic species: a phylogenetic analysis of color variation in the strikingly polymorphic strawberry poison-dart frog, *Evolution*, 62 (11), pp. 2742-2759.

For the brave:

Murray, J. D. 1981, A pre-pattern formation mechanism for animal coat markings, *Journal of Theoretical Biology*, 88, pp.161-199.

You don't have to understand all of it, but try to explain the mathematical principle!