

**Animal sexual signals:  
Do they maximise or optimise information content?**

Submitted by Iker Vaquero-Alba to the University of Exeter  
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Signed: **Iker Vaquero-Alba**

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## **Abstract**

Traditional models of sexual selection based on the handicap principle assume a direct linkage between the degree of sexual signal exaggeration and the bearer's quality, and set out a rather inflexible scenario where handicap exaggeration is maximised for sexual signalling purposes until it reaches the limit imposed by viability selection. Such a scenario makes it difficult to imagine the mechanisms by which multicomponent signalling systems can evolve and persist in time, given the costs of producing, disseminating and receiving signals. Based on non-equilibrium coevolutionary models, it has been suggested that variation in selection pressures derived from fluctuations in ecological and/or social conditions may lead to the emergence and maintenance of redundant and non-redundant multiple signals. Alternatively, the non-equilibrium dynamics to which coevolutionary systems are often subject can maintain multiple signals without environmental variability. Species with severe fitness constraints on costlier signal expression should be selected to utilize "cheaper" signals. And individuals not displaying at the maximum possible level might be selected to "compensate" their lack of fitness using phenotypically plastic traits, like behavioural ones. Here I investigate the effect of several potentially sexually selected barn swallow ornamental traits on several reproductive success indicators and on the habitat quality of foraging areas around breeding sites, and of several quality-indicating guppy traits on predator inspection activity, a behavioural character involved in mate choice. The findings presented here indicate ventral and throat plumage colouration, previously not studied for European barn swallows, to function as quality indicators and predict reproductive success and assortative mating patterns. Additionally, we found evidence for a "compensation mechanism" in both species studied, for individuals investing in "cheaper" sexual signals or not displaying at the maximum possible level.

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