

Sexual Propaganda as a new theory of sexual selection

La Théorie de la Propagande sexuelle...

The asymmetry of interest in multiple mating in sexually reproducing organism is a recurrent concern in evolutionary biology¹. When males can increase their fitness by multiplying the number of mating partners, females cannot obtain more offspring by mating with many males. In the book « ***The war of sexes in animal kingdom*** »², were detailed numerous sexual strategies in a great variety of animals exhibiting multiple exceptions and contradictions for “good genes” theories.



Shopping for “good genes” ? Most of sexual selection theories, including Zahavi’s handicap hypothesis³ and its avatars like Grafen⁴ and the age based indicator theories⁵, are basically founded on the assumption that mate choice results in preferences for “good” genes, *i e* genes that promote fitness. Whatever the process acting, “good” genes enhancing fitness in one sex are supposed to be associated with “good” genes allowing the best choice in the other sex and with phenotypic indicators so that mate choice models are complex and imply a series of several linked genes, (even when acting through a runaway process. Hannah Kokko⁶ concludes that the Fisher runaway process did not constitute a different mechanism but one of the possible options of the “good gene” theory).

Nevertheless, none of these theories could explain the maintenance of genetic diversity within population, because “good” genes choice would irretrievably lead to a same preference for the same genes and for the same indicators in every individual. As a result, mate choices based on “good genes” should restrict the genetic pool, a process known as the “lek paradox”⁷⁻⁸. By the way, every individual within the

population should progressively be a descendant possessing every needed “good genes”, thus reducing any opportunity for different choice and variations. Thus, “good genes” theories includes two major concerns: 1) male qualities exhibited by phenotypic characters should be both heritable and basically linked. Furthermore, phenotype traits should give true evidence for genotype. 2) The bad males should be eliminated within population because of the lower heritability of their characters. Consequently, we have no response for the basic evolutionary issue “*why populations exhibit diversity ?*”

Mating strategies and alternative behaviors among males and females are basically shaped by sexual antagonism and its resulting asymmetries in evolutionary fitness⁹. In a recent book « *The war of sexes in animal kingdom* », mainly dealing with sexual conflict, I proposed the new **sexual propaganda theory**. Refuting numerous traditional theories on sexual selection, the propaganda theory is proved to be a very parsimonious and interesting theory of mate choice by providing a non-genetic theory of sexual selection beyond Neodarwinism.

By contrast with “good genes” theories; the **sexual propaganda theory** only argued that mate were opportunistically lead, on the basis of various factors determining the choice such as phenotypic characteristics, apparent vigor of individual, strength of mate signals, trophic resources, territoriality etc... Mate choice could be very opportunistic because each individual could mate with anyone showing temporary a strong propaganda strategy whatever its own other qualities. The propaganda theory could also be compatible with the often-observed *advantage of the rare phenotype*¹⁰. Furthermore, a phenomenon as the *dear enemy effect*¹¹ could be easily explained by the propaganda theory. Moreover, if individuals are chose for their so-called “good genes”, the reasons for numerous mechanisms as mate guarding, divorce, animal sex-same coalition and sexual conflict remain obscur¹² while, in the propaganda theory and sexual conflict, it is expected that control mechanisms were achieved along the mate process. Noticed that the propaganda theory does not only concern animal kingdom but could also be used for vegetal.

Coupled or not with a mechanism of inbreeding avoidance¹³ in one sex, the preference for a propaganda style remains able to maintain a high genetic diversity within population facilitating the exercise of mate choice and then entailing the diversity of immune response. The development of arguments is deeply detailed in the book including 600 references. Thus, the *propaganda theory* may be a very heuristic hypothesis because opportunistic mate choice favored both genetic diversity and immune responses without implying a complex model including the association several genes.

Numerous examples of the **sexual propaganda theory** could be found in the wild, from courtship call in frogs, fighting in deer, to vocalizations in lions, and the propaganda theory should be easy to test in natural conditions. Nonetheless, by refuting the “all genetic model” of the Neodarwinism, the propaganda theory has also some enemies... Darwin did not have any theory of heredity, and the validity of “genetic theory” should be questioned¹⁴.



1. P. H. Harvey, J. W. Bradbury, Sexual selection, In "Behavioural ecology, An evolutionary approach", J. R. Krebs, N. B. Davies, Oxford, Oxford University Press, 203-233, 1991.
2. Th. Lodé, "The war of sexes in animal kingdom". Eds O Jacob, Paris, 2006
3. A. Zahavi, "Mate selection - a selection for a handicap", *Journal of Theoretical Biology*, 53, 205-214, 1975
4. A. Grafen, "Biological Signals as Handicaps", *Journal of Theoretical Biology*, 144, 517-546, 1990
5. J. T. Manning, "Choosy females and correlates of male age", *Journal of Theoretical Biology*, 116, 349-354, 1985.
6. H. Kokko, "Fisherian and 'good genes' benefits of mate choice: how (not) to distinguish between them", *Ecology letters*, 4, 322-326, 2001
7. P. W. Trail, "Why should lek-breeders be monomorphic?", *Evolution*, 44, 1837-1952, 1990.
8. Pomiankowski, A. P. Møller, "A resolution of the lek paradox", *Proceedings of the Royal Society of London B*, 260, 21-29, 1995
9. Rice, W. R. 2000. Dangerous liaisons. *Proc. Natl. Acad. Sci. USA* 97:2953-12955.
10. P. O'Donald "Rare male mating advantage" *Nature*, 272, 189, 1978 and P. Knoppien, "Rare male mating advantage: a review", *Biological Review*, 60, 81-117, 1985
11. E. J. Temeles, "The role of neighbors in territorial systems: when are they "dear enemies"?", *Animal Behaviour*, 47, 339-350, 1994 or D. Lesbarrères, T. Lodé, "Variations in male calls and response to unfamiliar advertisement call in a territorial breeding anuran, *Rana dalmatina*: evidence for a dear enemy effect", *Ethology Ecology & Evolution*, 14, 287-295, 2002
12. see numerous examples in "The war of sexes in animal kingdom" as R. Heinsohn, C. Packer, "Complex cooperative strategies in group-territorial African lions", *Science*, 269, 1260-1262, 1995.
13. see for instance P. W. Hedrick, "Female choice and variation in the major histocompatibility complex", *Genetics*, 1332, 575-581, 1992.
14. A Pichot *Histoire de la notion de gène*. Flammarion, 1999.

Citation of this paper:

Lodé T 2007 Sexual propaganda as a new theory of sexual selection. *Evolutionary Ecology and Ethology Univ Rennes1* <http://evolutionaryecology.fr/gd/Sexual-propaganda.htm>