

Workshop review of: Gender perspectives on the development of sexual selection theory, Uppsala, October 2008

“Despite, or perhaps just because, of my initial skepticism towards gender-issues, I found the workshop extremely fruitful. I feel that my view of sexual selection and reproductive biology in general has undergone a massive paradigm change that is bound to result in better understanding of these phenomena. I doubt I would have ever reached this insight without the workshop.” (Feedback from a workshop participant)

What is a gender perspective? Our colleagues have asked whether only women were expected at the workshop, which may reflect the confusion around the term. Gender perspectives in biology are multifaceted. They can be about discrimination of women in academia, whether women and men do science differently, how we apply human stereotypes of femaleness and maleness on nature, or how to be gender-neutral in theory and research practice. By aiming for gender-neutrality, we do not mean to be blind to differences between the sexes or assume that there are no differences. We merely want to keep our scientific work open to what sex means in our study systems.

Sexual selection is a vivid field of science. The perspective of female choice and male-male competition is, however, often taken for granted. How come? Basically we know that a less constrained and more dynamic perspective will emerge if we face up to the fact that both sexes are choosy and competitive. We want to highlight the variation found in nature, instead of imposing a norm on sexual selection and labeling everything outside this norm as exceptions. We are convinced that we will obtain more objective research (and thus better, in every sense of the word) if we can move beyond our own biases.

A one-day workshop on “Gender perspectives on the development of sexual selection theory” in Uppsala, Sweden, at the Evolutionary Biology Centre in October 2008 gathered about 20 scientists. The participants represented a high diversity, in terms of academic level, research organisms, and the kind of questions in sexual selection they worked on. Distinguished Prof. Patty Gowaty was keynote speaker providing us with *A historical perspective on the development of sexual selection theory*. She reviewed the theory development with some emphasis on how research on females has been neglected, but also pointing out that neutral models have been missed out. Further, Gowaty built a tree of the field of sexual selection, with Darwin (1859), Bateman (1948) and Trivers (1972) growing as the main

stem from which important branches could be identified.

Darwin (1859) emphasised that the within-sex variation in reproductive success is what matters (the very definition of sexual selection) and Darwin himself held the broader view that sexual selection is actually more than just male-male competition and female choice. For a long period, narrow sense sexual selection has focused on sexual selection acting on males (male competitive traits and female preferences for ornamental traits), implying the evolution of *genes for coy* passive females resulting in low variance in number of mates and *genes for ardent* competitive males with high variance in number of mates. We now know that sexual selection on females is not an exception; rather it appears in any system. Females compete for access to mating; both when sex-roles are conventional and reversed, males perform mate choice, females fight over maternity assurance etc. It is of great general interest to explore all these processes and under what circumstances different processes predominate in one or the other sex.

In the organized group discussions that ensued we debated whether it would be possible to reach gender neutrality in sexual selection theory, where we do not have biased assumptions about what being female or male implies. We agreed, of course, that the definition of the sexes (anisogamy) in itself incorporates an initial inequality. The question of whether it is possible to decouple effects of sexual selection and anisogamy lead us to the interesting idea of studying sexual selection in isogametic species.

Moreover, we all agreed on the importance of language and how we use words, because it forms our thoughts. Theoretical phrasings could, for example, benefit from avoiding sex labels; the terms should be mating competition (not male competition), mate choice (not female choice), gamete competition (not sperm competition), etc. when discussing general phenomena. It may also be noted in this regard that, for instance, Trivers (1972) used “in one sex” and “in the other sex” in his writings. Some participants argued that ignoring the definition of sex would render it difficult to identify cases where anisogamy is responsible for secondary sexual characteristics. Other participants stated that the gamete size difference defines the male and female sexes, and thus should not be ignored, but that in principle all other traits are variable and flexible within as well as between the sexes. Also, the generality of the causality implied in Triver’s (1972) parental investment

argument, that sexual selection is a consequence of sexual differences in parental investment, should be questioned as it may very well be the other way around, that sexual selection results in differences in parental investment. This has been recently suggested, both based on theoretical arguments (Kokko and Jennions 2008), and on results from a phylogenetic study on cichlids (Gonzalez-Voyer et al. 2008).

There were also discussions on whether sex and gender mean the same or embrace different contexts. Most biologists were happy to continue using sex as a term of definition. However, whether gender, being different from sex, has a place in biology was a question that was vividly discussed and is open for further input. Differences and similarities between the cultural and natural sciences in the use of *gender* and *gender perspectives* would also be interesting to explore further. Though, the discussion groups agreed that the question of gender awareness is important. Male and female researchers sometimes choose different questions and we all carry biases that may or may not constrain our views.

Prof. Gowaty gave a second presentation where she presented a model of how differences between the sexes can emerge from primarily ecological decisions. In contrast to classical models in sexual selection that use specific assumptions for males and females, the presented model focused on individuals and not on assumed sex differences. The model indicated that it all can come down to three variables – survival, latency and encounter probabilities – as well as underlying fitness distributions (Gowaty and Hubbell 2005). These variables induce choosy or indiscriminate behaviors. By using this model it would be possible to separate between variance in fitness due to chance effects and variance due to sexual selection. The fact that chance effects can have an important impact and that individuals in many cases are constrained in their decisions/choices were highlighted. Thus, compensatory reproductive behaviours/allocations or rejections, when individuals are left to mate with less preferred partners, can also be expected (Gowaty 2008). The fact that individuals are flexible in their behaviour may thus matter in sexual selection more than is usually acknowledged.

Discussions also centred on the historical pathway of how a female perspective in sexual selection has entered and increased in empirical work and theory from the 1970's to today. The insights that females may control and confuse paternity (Hrdy 1977) have been important, and research on what is termed cryptic female choice has been vivid the last years. Thus, focusing on females has become more important and has shown that females

may fight over mates or maternity assurance. This has broadened our perspectives to give a more resolved view on the variation in the sexual selection processes.

In the workshop it was argued that it is now time to approach sexual selection in a more gender-neutral way. This may result in finding sexual selection in the sex where it initially may not have been expected. We discussed the importance of making observations of individuals, not sexes, without an *a priori* expectation that the observations should aggregate into two groups. Any experimental/observational study on mate choice, mating competition, gamete competition should preferably be mirrored and thus carried out for both sexes. At the very least, the options open to both sexes should be considered initially and the rationale for why it is only interesting to investigate one sex should be clarified. Consequently, differences as well as similarities among individuals of both sexes should be investigated with awareness on how gender views may influence both science and scientists.

Finally, we were all given the opportunity to summarize what the workshop had given us. Comments ranged from recommendations of study systems (hermaphrodites allow quantitative studies of sex) and experimental design (mirror all experiments and observations of the two sexes), to political considerations of the importance of being gender neutral when designing and implementing research, to happiness over being part of a stimulating future. It was a highly stimulating and mind-boggling workshop with many interesting discussions, ideas and directions for future work.

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