



Party of One

We humans are really fascinated with our own genitalia aren't we? From a very early age humans are curious about, and well aware of, the special properties that exist in the machinery of our nether regions. Perhaps it is an unconscious appreciation for the parts of our anatomy that will ultimately catapult our genetic code into future generations. Whether we will admit to it or not, everyone engages in solo sex. Masturbation, we are told by health professionals, is a natural and necessary process that is enjoyed by males and females, young and old. Although on first analysis one might think that masturbation in males is wasteful (genetic blueprints are being released without a potential egg-target in sight), there may be some biological use for this behavior after all. Sperm expulsion by males is a common occurrence in several vertebrate and invertebrate species, and in some cases is a strategic maneuver enabling a higher level of reproductive success.

It has been observed in house crickets (*Acheta domesticus*) that males routinely expel spermatophores outside of copulatory events. Spermatophores are 'packages' of sperm that are transferred to the female sperm storage organ (the spermatheca) during copulation in many invertebrate species. However, not all such ejaculates are created equally. Female house crickets are more likely to store *young* sperm in their spermathecas¹ (as with many other examples in this chapter, a polyandrous sexual system in this species means that multiple males can mate with a female in order to fill up her sperm storage organ). Young sperm can be superior to older sperm for a number of reasons including a higher fertilization ability and a higher survival rate of resultant embryos. Due to the fact that younger sperm is dominant in the spermathecas of the female crickets, a male's chances at reproductive success are greatly improved if he provides a package that is relatively new. How does he preferentially deposit young sperm? By discarding the old sperm of course! *Autonomous sperm ejection* (aka cricket masturbation) is the mechanism by which male crickets create a younger sperm content, thereby increasing their chances of successfully fertilizing the eggs of a female sexual partner.

Not all masturbatory emissions are so carelessly discarded...male marine iguanas in the Galapagos archipelago (*Amblyrhynchus cristatus*) have developed another strategy for improving their reproductive success via storage of their own ejaculates. As you have read in a previous section (see 'Sneak it in when you can'), there are large size differences between sexually mature marine iguana males. The largest males are the most aggressive and hold territories on which the female iguanas nest and feed. Smaller males must somehow sneak into the territories and copulate with females when the larger males are otherwise occupied. Since female iguanas only copulate once per season, smaller males have developed elaborate strategies to get the most bang for their buck (yes pun intended) during these rare opportunities. It takes approximately 2.8-3.1 minutes of intercourse before a male iguana initiates ejaculation². For the large dominant males this time interval is easily achieved (who's going to argue?), and such males have a high rate of successful copulations (95%). The story is not as positive for the smaller males, who generally realize a much lower copulatory success rate and are often forcefully separated from their female partners by territory holding males prior to ejaculation (29% of the time). However, the crafty underdogs are able to increase their fertilization success by masturbating prior to the sexual encounter and storing the 'prepared viable ejaculate' in small pouches near their penis. Having this extra stored sperm that can be transferred to the female almost immediately upon mounting her increases the overall fertilization success of the small male iguanas by a respectable 41%². This kind of 'stored ejaculate' strategy may be common in species where there is a size dominance hierarchy and sexual interference...where there's a will there's a way!

So why do humans masturbate? The aged sperm scenario seems like a good reason in some cases, indeed: controlling for sperm age is a standard procedure in human in-vitro fertilizations³. However, this doesn't explain the absurdly high frequency of masturbation in males and its existence at all in females (also observed in other primate species like bonobos and macaques⁴). Although the clitoris is found in all female mammals, scientists have yet to come up with a suitable biological explanation for it or for the existence of the female orgasm⁴. The long and short of it may be that it's just plain fun! Maybe we'll have to call it a day on the science and just enjoy its non-biological value ☺

¹Reinhardt, K. and Siva-Jothy, M.T. 2005. An advantage for young sperm in the house cricket *Acheta domestica*. *The American Naturalist* 165: 718-723.

²Wikelski, M. and Baurle, S. 2009. Pre-copulatory ejaculation solves time constraints during copulations in marine iguanas. *Proceedings of the Royal Society of London B Biological Sciences* 263: 439-444.

³Watson P F. 1990. Artificial insemination and the preservation of semen. Pages 747–869 in *Marshall's Physiology of Reproduction*, Volume 2: Reproduction in the Male, Fourth Edition, edited by G E Lamming. New York: Churchill Livingstone.

⁴Bagemihl, B. 1999. *Biological Exuberance: Animal Homosexuality and Natural Diversity*. St Martin's Press, New York.