

Forget Asexual vs. Sexual Reproduction- you can have both

By [Eleanor Mason](#), Science Editor (2016/17)

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Having the ability to reproduce both sexually and asexually, a process known as heterogamy, can be highly advantageous when members of the opposite sex are scarce. It could be used as a potential survival mechanism to ensure reproduction in a particular population does not cease. Although it may sound confusing, many known species can reproduce in this way, including the Komodo dragon, some species of starfish, sea anemones, slime moulds and aphids. But the way we view those species who can carry out both reproductive modes may be about to change.

Leonie the female shark, separated fr-



Image: Wikimedia Commons

om her long term partner over four years ago, has acquired the ability to reproduce asexually, after previously giving birth to over a dozen offspring with her mate. The zebra shark (*Stegostoma fasciatum*) met her mate in an aquarium in Townsville in Australia in 1999; they were separated in 2012 when he was placed in another tank. Despite having no male contact for four years, the female zebra shark gave birth to three baby sharks on her own.

Intrigued as to how this was possible, a team of researchers at the University of Queensland in Brisbane, Australia, began fishing for answers. The initial theory was that Leonie had stored the sperm from her previous mate which had fertilised her eggs- but, when DNA samples from her offspring were tested, the babies only carried DNA from their mother, meaning there was no father involved (aka asexual reproduction).

Although some other vertebrates are known to reproduce by both means, including rays, turkeys and snakes, most reports are in females who have never had male partners. There have only been two cases of asexually producing females who have had sexual history with males; a boa constrictor and an eagle ray, both in captivity, made the switch.

Asexual reproduction can occur in many different ways, depending on the species in question. Three key asexual methods are budding, binary fission and fragmentation. While both methods have their benefits and disadvantages, it seems asexual reproduction may prove beneficial when increasing population size rapidly to maintain a stable population, and sexual reproduction proves useful in increasing genetic diversity, allowing adaptation to changing environments. In plants, vegetative propagation is a means of

asexual reproduction, where individuals are produced via spores by meiosis or fertilisation.

Asexual reproduction in sharks can occur when a female's egg is fertilised by an adjacent cell known as a polar body. However, as this mode reduces genetic variation and adaptability it is not a strategy for survival for many generations to come, according to a journal by New Scientist. But this does not dispute its relevance when times are tough. The female's genetic makeup can be passed down until there are available males to mate with- which is where the switch back to sexual reproduction would take place, involving the production of gametes.

It seems the ability to switch between the two modes of reproduction is not as rare as we currently realise; we just haven't known what to look for- Leonie may well have opened our eyes to this adaptation and its potential impact on populations and survival.



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