What about Fitness?

Biologists use the word fitness to describe how good a particular genotype is at leaving offspring in the next generation relative to how good other genotypes are at it. So if brown beetles consistently leave more offspring than green beetles because of their color, you'd say that the brown beetles had a higher fitness.

		
Number that survive compared to total	95 %	33 %

The brown beetles have a greater fitness relative to the green beetles.

Of course, fitness is a relative thing. A genotype's fitness depends on the environment in which the organism lives. The fittest genotype during an ice age, for example, is probably not the fittest genotype once the ice age is over.

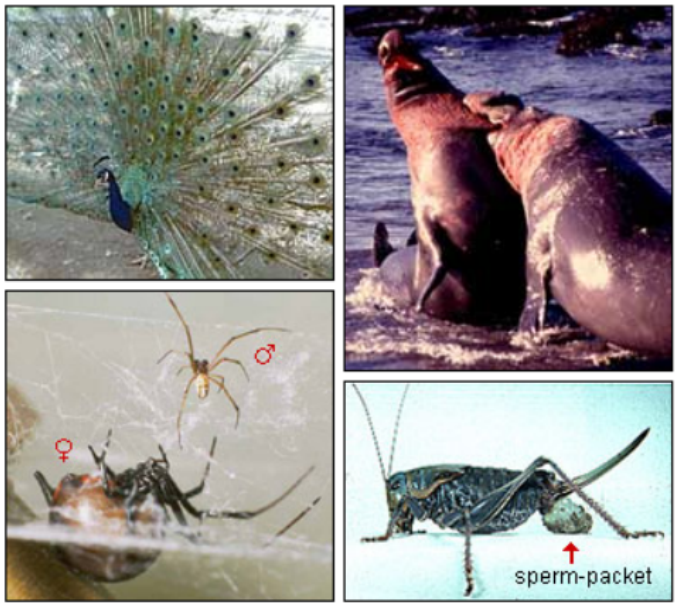
Fitness is a handy concept because it lumps everything that matters to natural selection (survival, mate-finding, reproduction) into one idea. The fittest individual is not necessarily the strongest, fastest, or biggest. A genotype's fitness includes its ability to survive, find a mate, produce offspring—and ultimately leave its genes in the next generation.

Caring for your offspring (above left), and producing thousands of young—many of whom won't survive (above right), and sporting fancy feathers that attract females (left) are a burden to the health and survival of the parent. These strategies do, however, increase fitness because they help the parents get more of their offspring into the next generation.

Sexual Selection (1 of 2)

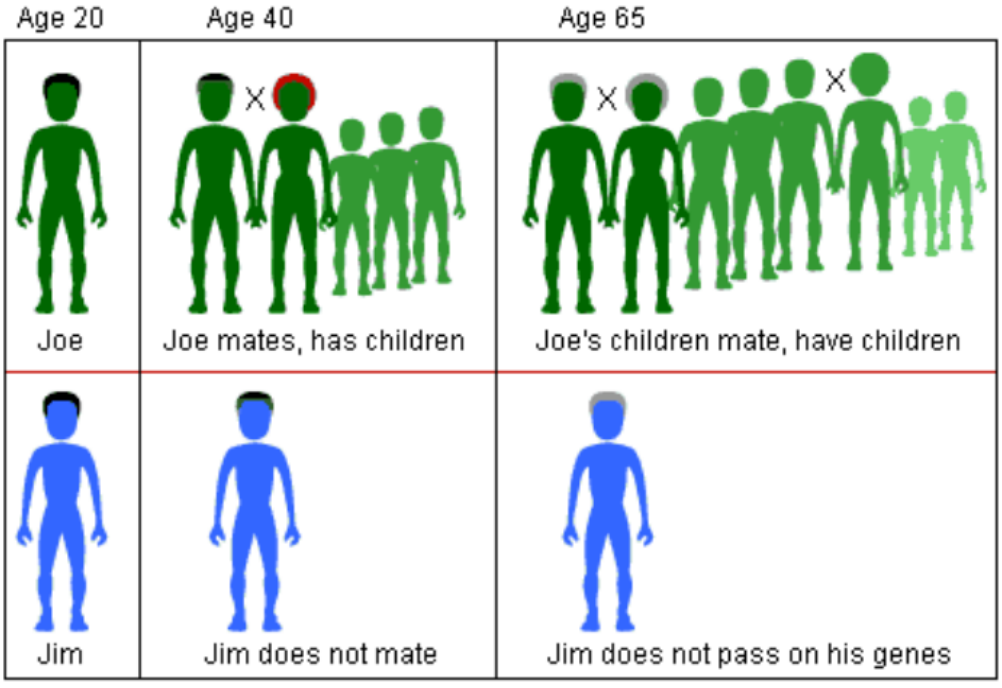
Sexual selection is a "special case" of natural selection. Sexual selection acts on an organism's ability to obtain (often by any means necessary!) or successfully copulate with a mate.

Selection makes many organisms go to extreme lengths for sex: peacocks (top left) maintain elaborate tails, elephant seals (top right) fight over territories, fruit flies perform dances, and some species deliver persuasive gifts. After all, what female Mormon cricket (bottom right) could resist the gift of a juicy sperm-packet? Going to even more extreme lengths, the male redback spider (bottom left) literally flings itself into the jaws of death in order to mate successfully.



Sexual selection is often powerful enough to produce features that are harmful to the individual's survival. For example, extravagant and colorful tail feathers or fins are likely to attract predators as well as interested members of the opposite sex.

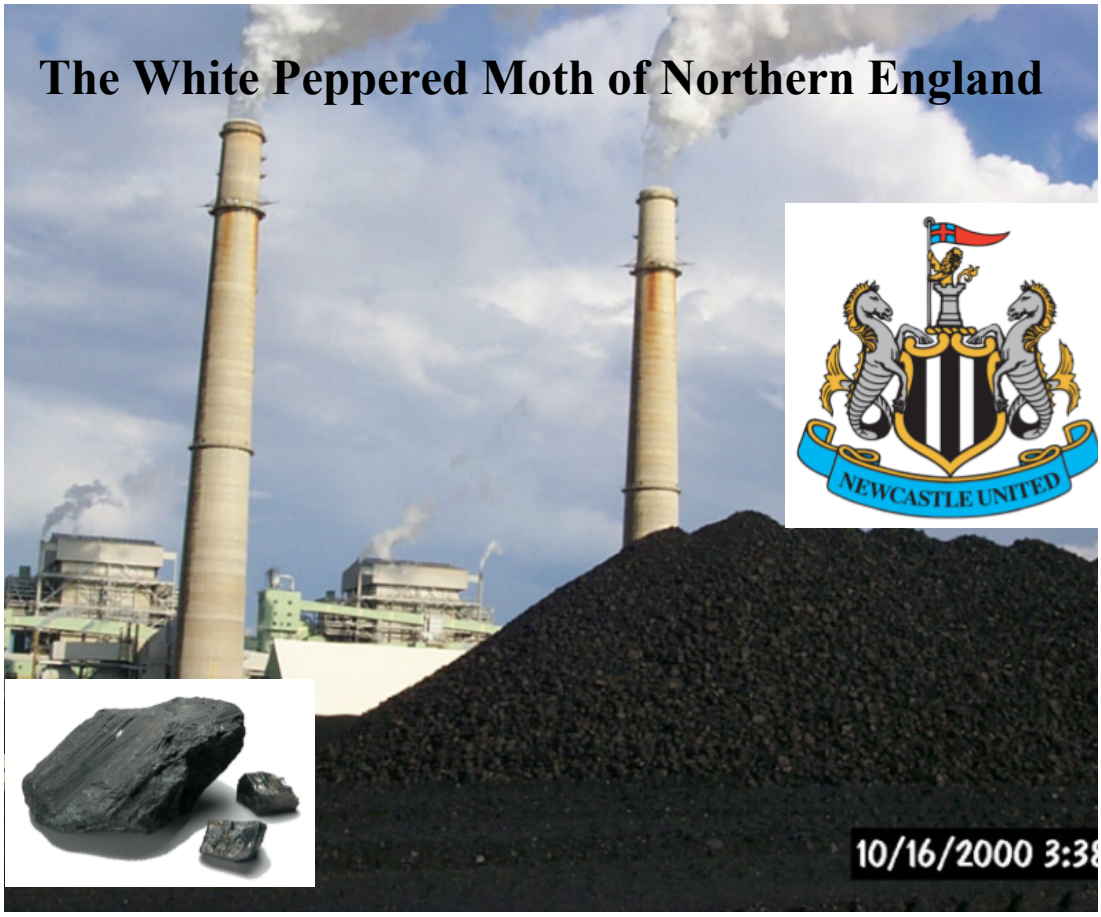
It's clear why sexual selection is so powerful when you consider what happens to the genes of an individual who lives to a ripe old age but never got to mate: no offspring means no genes in the next generation, which means that all those genes for living to a ripe old age don't get passed on to anyone! That individual's fitness is zero.



Selection is a two-way street.

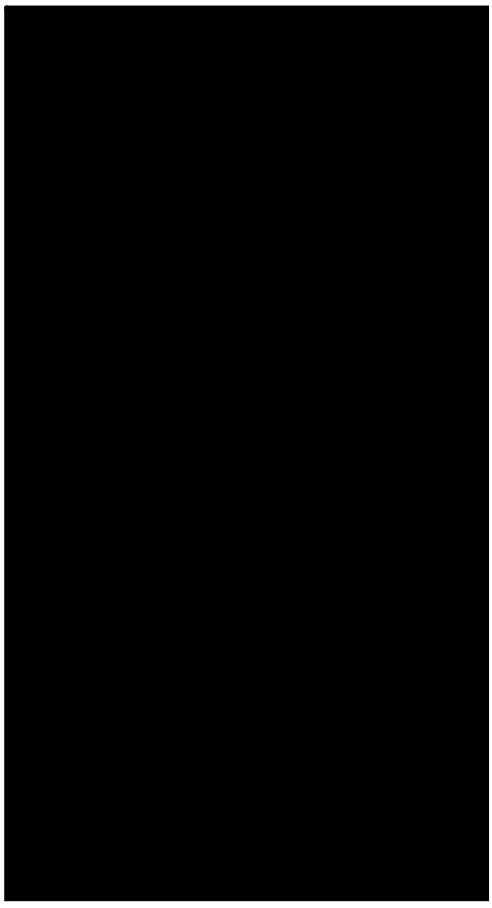
Sexual selection usually works in two ways, although in some cases we do see sex role reversals:

- **Male competition**
  Males compete for access to females, the amount of time spent mating with females, and even whose sperm gets to fertilize her eggs. For example, male damselflies scrub rival sperm out of the female reproductive tract when mating.
- **Female choice**
  Females choose which males to mate with, how long to mate, and even whose sperm will fertilize her eggs. Some females can eject sperm from an undesirable mate.



White peppered moth

Black morph in peppered moth evolution



Attachments

steps of non repulsion.ppt