

Diversity in Animal Mating Strategies

BY Benjamin Xu  April 25, 2021

What do porcupines, anglerfish, octopi, and sea monkeys have in common? As it turns out, not much. However, they've each got unique mating strategies that are very different from that of humans and even many of the animals we see in our day-to-day lives. From body fusions to time travelers, these creatures have evolved it all. Buckle up, because we are about to blast off from our little corner of the biological universe and explore the most distant frontiers of mating diversity that exist in the world.

North American Porcupine

A uniquely urinary strategy



The Wildlife Biologist. Porcupine Mating. YouTube, 7 Oct. 2014, www.youtube.com/watch?v=Go2Ccw1G25o.

We'll start with one that might be a little closer to home. These rodents have a prickly reputation, and you might wonder how they manage to start families without turning each other into pincushions. Well, we'll get to that, but first we have to take a moment to appreciate the wonderful way in which they find "the one". Love season for these porcupines is a needle in a haystack—the females are fertile for 8-12 hours, once a year. Think about that, out of 8760 hours in a year, the females are fertile for 8 of them. That's 0.09% of the time! It's only during this very brief window that the females will secrete an odorous mucus, along with a particular smell in her urine, that will bring all the males to her backyard.

Now you might have noticed I said "males", plural. This is a problem, considering the female will only mate with one of them. So, as you might expect, things get a little messy. The males will dive into a big brawl, and

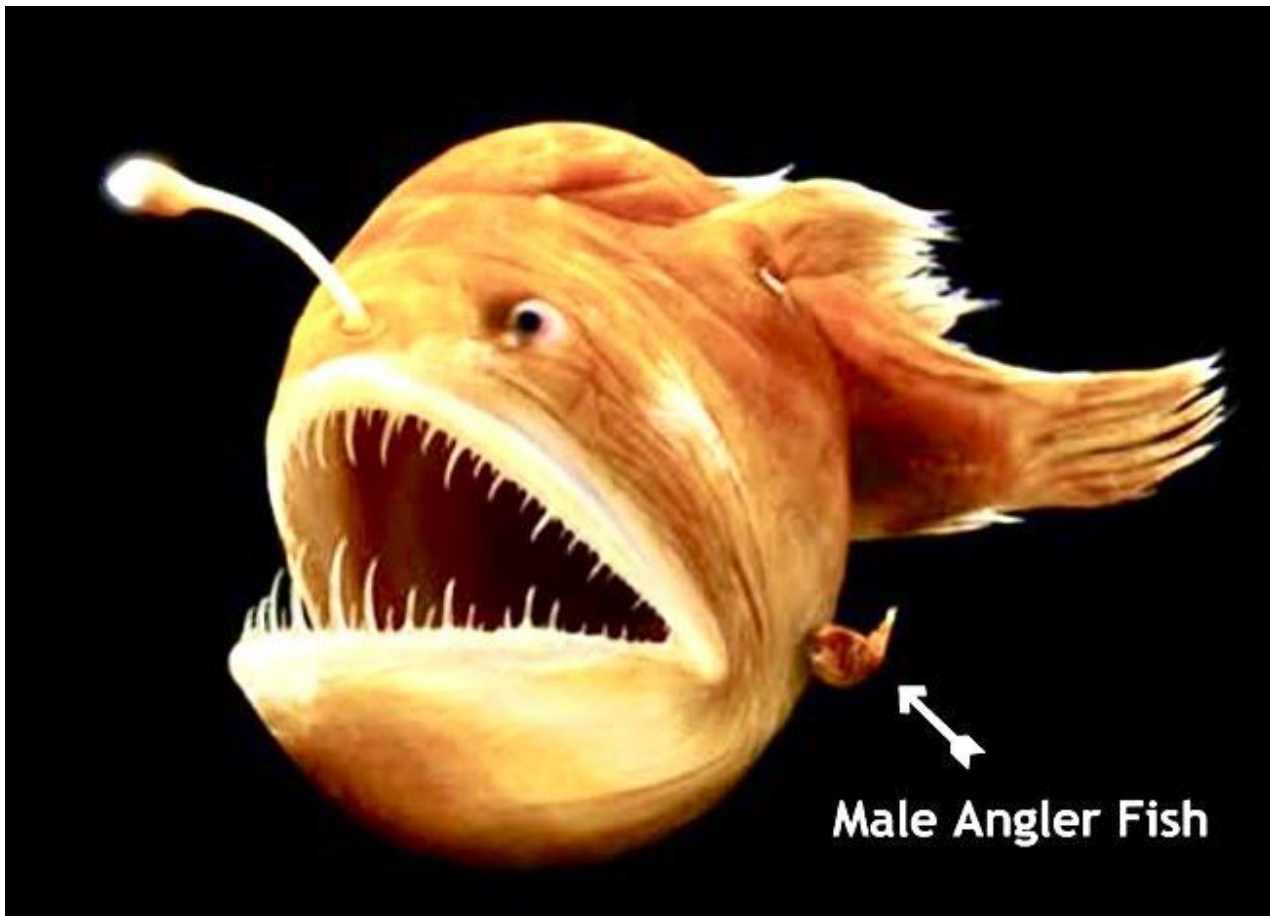
it's the lucky champion that gets to mate with the female. From that point on, he'll guard the female very closely. When he feels ready to break out the wine and roses, he'll use an interesting technique to signal his readiness to his potential partner. Are you ready for it? He urinates on her. But this is quite different from a regular tinkle. It's a high-speed projectile urination that can strike the female from a pretty fair distance away.

It might seem strange, but this is actually a way for the male porcupine to introduce himself to the female. Through the urine, the female porcupine is able to sense whether they would be compatible as partners. If she chooses to reject the male's romantic advances, she'll scream and shake off the urine. Porcupines aren't really into the whole "letting him down gently" thing, I suppose. But even with a rejection like that, some males just can't take a hint. And if he tries to cozy up anyways, there'll be some bites and tail swipes in store for him.

On the other hand, if the female accepts the male, there's a final challenge they have to overcome. The female has to carefully position herself and posture her quills so that her partner isn't impaled during the affair. But if everything goes well, both will remain unharmed. [1,2]

Anglerfish

Extreme dimorphism and sexual parasitism



"THE FEMALE ANGLER FISH." THE WOLF AND BULLDOG CHRONICLES, 19 Apr. 2020, www.thewolfandbulldogchronicles.com/2019/10/25/the-female-angler-fish-the-male-is-just-a-irritating-parasite-no-more-than-just-a-pair-of-living-gonads-or-the-secrets-to-a-long-and-blissful-marriage/.

The deep ocean is a cold, black, nearly lifeless void. Like outer space, but with a bonus of crushing hydraulic pressure. Even here, life finds a way. This is the home of many species of anglerfish. Though these species differ in many ways, a common thread links them: the males are dwarfed by the females. And dwarfed

might be an understatement. In the most extreme cases, the females may be over 60 times longer and half a million times heavier than the males!

The magnitude of the difference is pretty crazy, but the existence of sexual dimorphism itself is pretty common in nature. There's a lot of birds and insects that have big differences between the sexes as well. What's unique to the anglerfish situation is their adaptation to their environment. How do you find a mate when you're all alone in a world of nothingness? That task falls mostly to the males, and natural selection has provided them several powerful tools in their search. Most male anglerfish have evolved large, well-developed eyes and huge nostrils. But what are they smelling for? Female anglerfish leave behind them a trail of species-specific pheromones, which acts as a chemical trail the males can follow to home in. In some species, they give up the sight or smell in exchange for even greater acuity in the other.

But wait, there's more! An even more interesting adaptation is what happens once the male finds the female. Out in the wide-open ocean, finding a mate is a tough task, so it's safer to bond for life rather than risk never meeting another again. But for some anglerfish, bonding for life is taken literally. In these species, the male becomes fused with the female, and they essentially become a single organism. But that's not the whole story; there's actually a whole spectrum of behaviors from full fusion to no fusion at all. Scientists have created three categories to describe this. First is *obligatory parasitism*, where the male is in a fuse-or-die scenario and has no way of surviving on his own. Second is *facultative parasitism*, where the male attaches to the female only until she's ready to mate. There's a twist though: the male will slowly fuse with the female, and if the male remains attached for too long, he might end up getting stuck to her permanently! Third is *temporary attachment*, which isn't really parasitism anymore, because both males and females are capable of independent living. Under this type of behavior, hookups are temporary, without fusion. [3]

Argonaut Octopus

Hit-and-run specialists



While anglerfish males can sometimes enjoy the moocher life, that can't be said for many male octopi. They want to pass on their genes as much as the next organism, but there's a tough challenge they have to overcome. When going on a dinner date with a female octopus, it often turns out they're the dinner! Like anglerfish, female octopi are much larger than the males, and scientists have frequently caught female octopi red-handed strangling their partners and dragging them off as takeout for later. [4,5]

As you might imagine, males have figured out some tricks to avoid getting eaten, but to understand these tricks we first need to understand something about male octopus biology. They have a special mating arm called a *hectocotylus*, used for depositing sperm inside a female. In the argonaut octopus specifically, the *hectocotylus* has another special ability. In 1827, an Italian physician found what he thought was a worm inside a female argonaut octopus. His hypothesis was that this was some kind of parasitic male, like is the case with male anglerfish.[6] Nope! Not a worm, and definitely not a parasitic male. Well, not really, at least. It was part of a male. The severed *hectocotylus* of a male argonaut octopus, to be specific.

But what was it doing there? This is the aftermath of a tactic evolved by male argonaut octopi to avoid being eaten. They are capable of breaking off their own *hectocotylus* and leaving it behind. With this trick up their metaphorical sleeves, the males can protect themselves from female cannibalism through "hit and run" tactics—they stick their *hectocotylus* in, then immediately swim away as fast as they can and hope to get away while leaving their sperm behind. In some species, the males have taken this a step further, and the *hectocotylus* is even capable of autonomously swimming until finding a female! [7]

Sea Monkeys

Mating with time-travelers is hazardous to your health.



Okay, so time-travelling isn't real. But for sea monkeys, or more accurately, brine shrimp, we can simulate a time travel situation. They lay hardy eggs that can survive for a long time under harsh conditions like drought, only hatching once they have re-entered a favorable environment. So hypothetically, if an egg laid from many years ago were to hatch today, it would be as if that brine shrimp travelled to the future. As the above subtitle suggests, this is probably not a good idea. And the reason for that is because of an evolutionary arms race between the males and the females of the species. For female brine shrimp, mating too many times is actually disadvantageous for their survival, so they evolve various strategies for fending off males. The males are evolving in parallel to adapt to these defensive strategies so they can continue to pass on their genes.

Thus, it makes sense that if you took, for example, a female from the distant past and paired her with a modern male, the female would be using outdated strategies compared to the contemporary male, and thus would be less successful in avoiding him. This is exactly what scientists found. The larger the time gap between the female and the male, the greater the danger was to the female. And while the scientists didn't look at the opposite way around, with male eggs from the past being paired with modern females, it's not a stretch to say that you would see the opposite results.

How exactly is mating disadvantageous for females? Scientists aren't completely sure, but the current hypothesis is that males latch onto females during mating but don't let go for a very long time, making them easier targets for predators, and might even affect their ability to get food. A significant aspect of the female strategy in this evolutionary battle may be in their ability to shake off the males. [8]

Closing Thoughts

As we can see, animals have evolved a variety of unique behaviors to ensure their reproductive success. There isn't one "best" way to go about things, because every organism's behaviors are adapted to their environment. There's no need to compare; instead, let's just appreciate the diversity that nature has to offer. More research is needed, and there are many organisms and behaviors that are yet to be documented. Hopefully you feel inspired to learn more and maybe even make some discoveries of your own in the future!



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