

Name _____

Date _____

Reproductive Strategies

Animal Profile:

BRITTLE STAR (*Ophiactis savignyi*)

Peer into the hole of a sea sponge and you may catch a glimpse of “the world’s most common brittle star,” *Ophiactis savignyi*. These brittle stars are tiny - only an inch or two across with arms stretched. They inhabit virtually all of the world’s tropical and sub-tropical ocean habitats.

Brittle stars are related to sea stars, or starfish, and have a similar body structure. They’ve got a central disk, which holds all the important stuff like the mouth, stomach and reproductive organs. Then there are the arms - long, slender, wavy and edged with short spines. These arms are what give brittle stars their name. They can break off voluntarily and regenerate.

O. savignyi takes the ability to regenerate one step further and actually splits in half in order to reproduce. When fission happens, the brittle star fractures down the middle of its disk, creating two identical 3-armed brittle stars. These stars then grow new arms from their empty arm-spaces. But this isn’t the only way *O. savignyi* reproduces. Like all brittle stars, they also reproduce sexually. At certain times of the year, large females and males raise their disks off the surface, balance on their legs, and release sperm and eggs into the ocean. When the sperm and eggs meet they produce larvae that float away to new habitats.

Fission is the main way that *Ophiocomella* reproduces, but since they don’t move far or fast, this results in large groups of brittle star clones in one area. Scientists believe that sexual reproduction might be a good way for the brittle star to populate new areas far away from their clone-filled sponge homes.



Ophiactis savignyi

Michael Roy



A recently divided *Ophiactis savignyi*. Three tiny arms are beginning to regenerate.

Tamara McGovern



Brittle star spawning.

Ellen Muller - www.phase.com/imagine

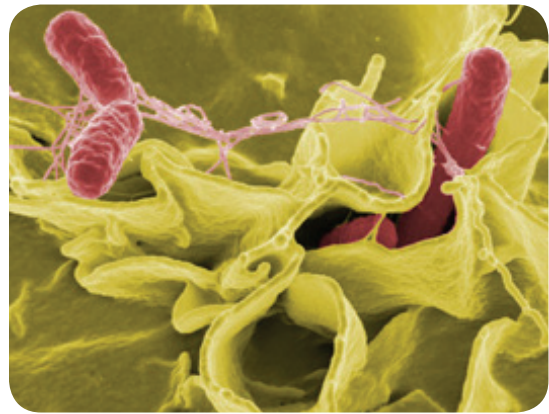
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Reproductive Strategies

Animal Profile: **SALMONELLA** (*Salmonella typhimurium*)

There are times when we eat something and our stomachs hurt badly, and then there are times when they hurt REALLY badly. When it hurts dreadfully bad, it could be from food poisoning, which leads to fever, nausea and diarrhea. Yick. And that's a mild case of food poisoning! Some of the more life-threatening cases can send a person to the hospital.



Rocky Mountain Laboratories, NIAID, NIH

Salmonella (rod-shaped) invading human cells.

The interesting thing is, it's not poisoning at all, but the result of a sinister bacteria known as *Salmonella*. This one-celled, rod-shaped bacteria is fairly common, and can be found naturally in raw eggs, raw meats, on the bodies of some reptiles, and in animal feces. It's when *Salmonella* finds itself in the warm growth chambers of our bodies that it hits pay dirt.

When *Salmonella* from infected food reaches our small intestine, it divides rapidly, producing copies of itself through simple division. These bacteria continue to rapidly divide, increasing in number and infecting other cells. This causes our immune system to respond, but *Salmonella* does a good job of fending it off. It takes about 12-72 hours to feel the effects of a *Salmonella* invasion. Our bodies can fight off some *Salmonella* infections, but we generally need the help of antibiotics to overcome them.

Thankfully, *Salmonella* is not one of those extreme bacteria that can survive the freezing temperatures of the Arctic or the boiling heat of volcanic thermal vents. Humans have adapted to *Salmonella's* existence by cooking, pasteurizing, and freezing our foods and drinks, which does a good job of killing the bacteria. Still, *Salmonella* infection is common enough and turns up where people aren't washing their hands or cooking meat thoroughly.

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Animal Profile:

SAND SCORPION (*Paruroctonus mesaensis*)

Sinister beasts are underfoot when the sun goes down in the dunes of the Mojave Desert. The sand scorpion, which spends its days in a burrow underground, emerges to sting, kill and munch its prey. Shine an ultraviolet light into the night, and the ground will come alive with yellow-green glowing scorpions, out devouring beetles, crickets, other scorpions, and even cannibalizing their own kind. If it's the right time of year, glowing scorpions might also be dancing the night away.

Yep, that's right, sand scorpions dance during courtship. Males grasp the females by their pinchers, or pedipalps, and move them around in circles. After dancing for a while, the male deposits a packet of sperm on a stick or other surface. Then, he moves the female until she is on top of the sperm. She takes in the sperm and fertilizes her eggs internally. The dance ends here, and the male usually skitters off to find more mates. But every now and then, the female rears back, stings the male, and eats him for her next meal!

Young sand scorpions spend about 12 months developing inside their mother before they are born live. After they're born, they quickly crawl onto their mom's back where they stay until they're big enough to leave the burrow. On average, a sand scorpion mom has about 33 newborns hitching rides on her back. But things aren't always easy there either, and sometimes the young eat each other or the mom eats the young. Clearly, stingers don't make life trouble-free for the sand scorpion, but they're still able to be a very successful organism in their dry, sandy habitats.



Philip H. Brownell, Ph.D.

Sand scorpion (*Paruroctonus mesaensis*) capturing a burrowing cockroach. Photo taken under UV illumination..



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Scorpions (*Tityus trinitatis*) engaged in courtship dance.



<http://scorpion.amnh.org>

Mother scorpion (*syntropis*) carrying babies on her back.



<http://scorpion.amnh.org>

Spermatophor from a male scorpion.