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Wasp spiders won't let their sisters eat them after sex

For some animals, sex involves the ultimate sacrifice. Some species of spider, for example, redefine the concept of a dangerous liaison when the female turns around and devours her mate in a post-coital attack of the munchies. For males, it's important that this act of sexual cannibalism isn't in vain and that they die while impregnating the best possible mate. And for the wasp spiderArgiope bruennichi, that means no sisters allowed.

Klaas Welke and Jutta Schneider from Hamburg's Zoological Institute found that male wasp spiders are more likely to succumb to their grisly fate if they have just mated with an unrelated female than a sibling. Doing so allows them to avoid the heavy costs of inbreeding, where two copies of the same harmful or faulty genes have a high chance of ending up in the same individual. That's bad news and both sexes do their best to avoid it, but for these spiders, the female holds all the cards.

She can mate with multiple partners and she can even control whose sperm actually fertilises her eggs. So the male must do everything he can in order to ensure that his genes pass on to the next generation. His job is even more difficult because he can only ever mate twice in his life. He has a pair of sexual organs – pedipalps – and each has only one use. And of course, his mate invariably attacks him after sex with murderous intent. Around 80% of sexual encounters end with the male becoming a meal and even if he survives his first time, the second time will kill him.

The male's chances of living to mate again depend entirely on how long he lasts during his virgin encounter. If he jumps off the female within the first five seconds, he has a shot at survival. If he hangs around for more than ten seconds, he will almost certainly die. The trouble is that the longer he sticks around, the more sperm he can pump into the female and the greater his odds of fathering the next generation. It's a tricky dilemma – with only two chances at mating, he should only make the choice to stay, inseminate and die if his mate is worth the trouble.

And according to Welke and Schneider, that's exactly what happens. They found that males escaped being eaten almost half of the time (47%) if they were mating with their sisters, but just a fifth of the time (22%) if they mated with an unrelated female. This was directly related to the length of their flings – when they had sex with sisters, they left after 5.8 seconds but they kept at it for 9 seconds when it came to unrelated females.

Of course, it's possible that this represents a choice on the part of the female – perhaps she cuts the male off early if he's a relative. However, Welke and Schneider think that this is unlikely because females will attack any male regardless of how closely related he is. They get their say by choosing to mate with another male if they wish. The decision to end sex early appears to be the will of the male.

But why should a male mate with their sister at all, if she's such an undesirably partner? The duo suggests that males lead precarious lives anyway, and the longer they spend searching for a mate, the greater their odds of dying before becoming fathers. So high is this risk that they'll accept even undesirable mating opportunities; they'll just try to move on to better things without getting eaten first.

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