Exoskeleton Safari – Scorpionfly

Some insects look, well, like insects. But now and then we come across one that trips our expectations of what life forms should look like. Meet the scorpionfly!

Scorpionflies belong to the order Mecoptera. The ones we will be talking about today belong to the family Panorpidae, but a lot of what we mention is common to the order.

They're not too common nowadays, and you could spend a lot of time in the woods without noticing one. If you do want to find one, keep your eyes open on low shrubs or shorter leafy trees, often near water. They are pretty brightly colored so if one is there you have a good shot of seeing it!

But they haven't always been this obscure. Go back about 150 million years, before flowering plants took over the trees of the world, and gymnosperms, such as conifers and cycads, dominated the landscape. How did these gymnosperms reproduce? Well, frankly, mostly by wind pollination. But not necessarily only by wind pollination. There is strong evidence that these gymnosperms were also being pollinated by scorpionflies, before bees existed, before any of the other pollinators we love today existed. So -- a little respect, please!

Scorpionflies evolved by diverging from the true flies (Diptera), but their closest relatives, rather strangely, are the fleas. The idea of flying fleas doesn't sound like fun, but scorpionflies will not be found sucking anyone's blood. They are scavengers, eating decaying vegetation and any convenient dead insect bodies they can find. Interestingly, they're often found raiding spider webs for any prey the spider may have caught. And inevitably, dead scorpionflies are often found as prey in those spiderwebs they were trying to raid.

By this point in the discussion, you may be rather impatient to get to the answer: why are they called scorpionflies? And more to the point, are they venomous?

Second answer first: no, not in the slightest. You're in no danger of being attacked by flying venomous flea-folk as you go about your business.

The name scorpionflies is because the hind-parts of the males of Panorpids have a curious scorpion-like appearance. I don't have a photo of my own that makes this clear, so I'm using one from the web:

By Richard Bartz, Munich aka Makro Freak image:MFB.jpg - Own work, CC BY-SA 2.5, https://commons.wikimedia.org/w/index.php?curid=6859399

That tail looks more ominous than you may like, but there's no venom. That's the male Panorpid's reproductive organ. The love lives of scorpionflies, like those of humans, are a little intricate.

One peculiarity is that it's the males of scorpionflies that produce a pheromone that attracts the opposite sex. In other insects, such as moths, it's the females that do this, and it becomes the male's job to trace the scent to its source. I'm not sure why it's the opposite in scorpionflies, but I can hazard a guess, and it's related to the second interesting aspect of the courtship.

Once the female tracks down the male by following his pheromone trail, it doesn't mean she's ready to mate. The male has to entice her by providing a gift of food, which she has to approve of. This is known as a "nuptial gift", and it's found in many different types of creatures. Among Panorpids, there are two main choices for the nuptial gift: either the male can provide a dead insect, or he can secrete a column of saliva that solidifies into a yummy snack. I've seen different opinions in the literature, and I'm not sure which one most females prefer. How's a girl to choose when both the options are that enticing?

The bigger the nuptial gift is, the more time the female spends consuming it, the longer the male has for mating, the more sperm can get transferred, and the more likely the eggs are his. This treat may be why the females are motivated to follow a pheromone trail in the first place, rather than having males do most of the work. These nuptial gifts presumably have quite a bit of nutrition, which leads to healthier eggs and more surviving offspring for the female, so this is not just a bribe, this is an actual paternal investment by the male.

It's not as simple as that, of course. There are other males who don't have the time or inclination to provide this nice protein treat for the females. They have another strategy: pretend to be females, and rob the males that come with the treats of their own. They then use those nuptial gifts to give to other scorpionflies, presumably crossing their fingers that the scorpionflies that they're passing them on to are actually female.

So please keep an eye out for these fascinating, otherworldly creatures next time. I know that every time I see one, I get so excited that it takes me a while to compose myself and get a good photo. I hope you share the excitement.