

Exoskeleton Safari – the Giant Ichneumonid Wasp



Wasps.

There's no greater divergence of opinion between the general public and bug enthusiasts, than on the subject of wasps. For most people, the term "wasps" brings to mind the paper wasps, hornets, and yellowjackets -- social wasps that build nests. For these wasps, the nest constitutes a big investment of effort and resources, so the social group that lives there feels that they have to defend it, a bit more vigorously than many of us would like.

But most wasps are *not* social in nature at all. The solitary wasps will typically not sting you. More importantly, they are stunningly, incredibly diverse, probably even more than beetles. There are more than 100,000 species of wasps that have been described so far, but most estimates say that in actuality there are more than ten times as many – at least a million species, most waiting to be discovered. Of these, there are only about 1,000 known species of social wasps. (For comparison, there are about 10,000 species of birds in total.)

Along with this diversity of species, there's a ridiculous diversity of lifestyles. If you look for the spectacular, the bizarre, and the unbelievable in nature – you'll probably find it in wasps. And this is especially true with the star of our article, *Megarhyssa macrurus*, the Giant Ichneumonid Wasp. She has abilities that are nothing less than superpowers, in my opinion.

What superpowers does she have? And, *what is that huge appendage behind the wasp?*

Well, to answer those questions, let's first talk a bit about the life cycles of Ichneumonid wasps. Ichneumonid wasp mommas want the best for their babies, and that means provisioning them with food when they're born. The food of choice for discerning Megarhyssa moms is the larvae of the pigeon horntail (which is related to wasps).

Pigeon horntail moms, on the other hand, want their own babies to be safe. They try to accomplish by laying their eggs in dead tree trunks, where the horntail larvae can hatch and immediately chew their way deeper into the tree, towards safety.

The Megarhyssa moms have responded by evolving longer and longer "ovipositors". The ovipositor is the egg-laying organ, and it's what we see in the photo behind the wasp, roughly. To be more precise, what we see behind the wasp is the sheath covering the ovipositor – the ovipositor itself is inside the sheath, and is about as thin as a hair.

Remarkably, the wasp is able to somehow pinpoint the location of the horntail larva several inches deep in the wood of the trunk, by detecting the chemicals that the larva uses to decompose the wood, and by listening to the sounds it makes. I'll call that superpower #1!

Once she's remote sensed the location of that larva, she's somehow able to maneuver her ovipositor into the trunk of the tree, right to that location. Can you imagine how difficult that is? First of all, she has to somehow keep track of where the tip is in the tree trunk without looking.

Furthermore, as we mentioned, the ovipositor is about as thin as a human hair. This makes it difficult to control, since it's not very stiff at all. Just try to imagine taking a hair and pushing it several inches into a tree trunk! And yet – she finds a way. Studies have shown that the amount of force that the wasps are somehow able to transmit through the ovipositor is *ten times more* than what naive theoretical calculations say is the maximum possible!

Evolution has further helped in this task by reinforcing the ovipositor with the metals manganese and zinc, so in addition to everything else, we may call the wasps bionic.

Once she's maneuvered the ovipositor to the horntail larva, she lays one egg from her abdomen, through the hair-thin ovipositor, onto the horntail larva. As her own larva grows, it will feed on the horntail, ensuring its success, and incidentally ensuring the demise of the horntail larva. (From a selfish human perspective, by the way, control of horntails can sometimes be useful, as they can do some damage to forests.)

So it's not easy for a Megarhyssa wasp. She has to accomplish multiple impossible tasks before breakfast just to give her babies a chance. And life is certainly not easy for a horntail, either.

It can be tempting for humans to choose sides in this competition, and wasps often come out the loser in public opinion. But I hope that the reader can learn to appreciate all aspects of nature, and instead of revulsion, to react with wonder and love.