

The Thing About Wasps

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The Ethologist Jordi Casamitjana gives an overview of the amazing world of wasps, and how to deal with them when we see them getting too close for comfort.



I have a thing about wasps.

If I see a wasp in peril, I must drop whatever I am doing and try to help her. For decades, I felt this compulsion, which has led me to some awkward situations when I try to stop people from being violent against wasps — normally because of a completely over-the-top reaction to their presence.

You may think this is weird. After all, wasps sting, which can be quite painful and distressing. And when you look at them, especially flying around their nests, people feel genuine fear, even if they have never had a bad experience with them. How can I side with them when they see a human trying to hit them? How can I get upset when I see people destroying their nests? How can I get closer to them without feeling shivers down my spine? You may think that this is one of the effects of having been an [ethical vegan](#) for more than 20 years. That's a good guess, as all ethical vegans should respect wasps as they respect any other sentient being. But that's not it. In fact, I can say — and I said many times in the past — social wasps are my favourite non-human animals in the whole world (and I only know a vegan who may share the same feeling).

I love dogs and love spending time with them, but I find them half-humans now (after all the thousands of years of domestication from wild wolves). They should not count in the favourite non-human animal “competition” anymore, because we bred them to be super friendly and cute, and that is unfair to the other participants. Wasps, on the other hand, are wild animals, and they haven't changed in the few thousand years that we have been making puppies, kittens, and lambs. They haven't changed since the first [anatomically modern humans](#) evolved on Earth tenths of thousands of years ago. Or even since the [first hominids](#) evolved millions of years ago in Africa. Or even since the first primates started flourishing right after the big dinosaurs got extinct about 65 million years ago.

Wasps are earthlings who have lived their lives completely independent of humans, and yet, already mastered architecture, pottery, papermaking, fast food, trade, and civilizations well before our ancestors began jumping from tree to tree. They are very special. And they are very special to me, as I studied them for almost ten years from the moment I chose them as my main subject for my PhD studies of Ethology (a branch of Zoology specialised in comparatively studying animal behaviour by looking at animals in the wild).

What Are Wasps?



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Wasps are a group of insects of the [Order Hymenoptera](#) (which they share with ants and bees) composed of not-too-hairy insects with four membranous wings (two of them much smaller so it may look like they only have two wings) who also have a narrow waist between their thorax and their abdomen (the famous waspy waist sometimes used to describe some glamorous people wearing corsets and the like). To be more precise, proper wasps belong to the sub-order Apocrita, which separates them from the broad-waisted sawflies (Symphyta), which sometimes are also labelled as wasps, as they are clearly neither bees nor ants. There are at least 30,000 species of wasps worldwide.

The genetic make-up of all the insects of the Order Hymenoptera made them very apt to evolve into social species, so many wasps are also social as are all ants and many bees. But like in the case of bees, not all wasps are social. Some are solitary and don't live in colonies. But even those who are solitary may still build a small nest for their offspring, although they look very different and when their offspring reach adulthood, they leave the nest (which is not really a home, but just a "nursery").

For instance, [potter wasps](#) build little amphoras with clay that look suspiciously similar to the amphoras made by prehistoric humans (with a rim, a neck and a belly) — I bet that one of them got the idea by looking at a potter wasp and seeing how she made it. [Mason wasps](#) make a nest with mud with more irregular shapes. All these mud nests are then filled with food, a wasp larva is placed inside, and then the nest is closed so the larvae can eat and grow well protected. The mother abandons the nest once this is done and goes to build a new one elsewhere. So, in a way, it's like the mother wasp builds tents with supplies, places the kids in, and leaves them there to grow up by themselves (hence being "solitary" wasps).

Some wasps are parasitical of plants, other insects, or spiders, and they may not build nests but rather place their eggs inside other organisms. Other wasps are symbionts with some plants that need them to survive (as in [the case of figs](#) which

cannot reproduce without the tiny wasps that live inside them). But the rest are predators who would hunt all sorts of animals small enough for them to handle. Both solitary and social wasps can be predators, and the latter hunt not just to feed them and their offspring, but to feed the rest of the colony. They can be extraordinary effective hunters, as there are the insects with the faster flying acceleration — a sort of the peregrine falcon of the insects — achieved with their very aerodynamic bodies (wasps are built to speed). This is one of the main differences between bees and wasps. Bees are mostly plant-based in their diet, while wasps are mostly animal-based. Because of that, I guess you could say a vegan like myself should not like wasps that much, but my thing with wasps precedes my veganism.

It precedes it, but it is not disconnected from it. In fact — and I said this many times to [journalists who interviewed me](#) when I secured ethical veganism as a protected philosophical belief in the UK — I would say they were the animals that made me start on my vegan journey. It was an encounter with a particular guard of a social wasp colony in the mid-1980s that made me realise how similar other animals are to humans and how unfairly we treat them (and if you want to learn that story, it is described in detail in my book “[Ethical Vegan: a personal and political journey to change the world.](#)”) That experience operated as some sort of epiphany that made me want to study social wasp and dedicate several years of my life in Catalonia — where I am from — doing it.

That wasp belonged to one of the European species of the genus *Polistes*, often known as paper wasps or umbrella wasps. There are about [200 known species](#) and you can find them in most of the world, except Antarctica, the Arctic, very cold habitats, and the British Isles (which is ironic considering this is where I have lived for the last 30 years). They look more slender than other social wasps, and although the European species are black and yellow, in other parts of the world you can find them in many other colours.

The Social Life of Wasps



Polistes wasp floating on water (c)Jordi Casamitjana

All social wasps are vespids (members of the family Vespidae) and make their nests with paper they create by scratching wood and plants and mixing it with water (in this case saliva), which is pretty much what the Chinese did when they “invented” paper about 2000 years ago — I bet whoever did it was copying a social wasp at work. These include the common wasps, yellow jackets, and similar species with the typical black and yellow bands (most of them of the genus *Vespula*), and the reddish-looking [hornets](#) (from the genus *Vespa*, the biggest social wasps). However, compared with other social wasps, *Polistes* wasps do not cover their nests with several protected layers of paper, so you can actually see from outside the hexagonal cells where the larvae grow— and their colonies are smaller, never reaching thousands of individuals like the other social wasps. The rest of the social wasps of the family Vespidae can also be found in many parts of the world, including the British Islands, and some colonies can reach very big sizes of over 10,000 wasps — I once rescued a German wasp nest of almost a meter of diameter.

Apart from the nests and colony sizes, *Polistes* are also different in their behaviour than the rest of vespids. In many respects, I would say that *Polistes* wasps, although social, are less social than the other social wasps, so they are in a kind of intermediate state between solitary wasps and very social wasps. And this is what makes them so fascinating to study, as we, humans, are in a similar intermediate stage.

People tend to believe that *Homo sapiens* is a very social species of primate, but this is not quite true in the wider biological sense of the term “society”. As running societies go, we are not very good at it. People are quite selfish, they can easily live by themselves if they want to, and many communities and societies of humans are very inefficient and unstable. We compensate for these deficits with technology and laws, but without them, we would keep destroying each other and getting extinct (all species of humans but one have become extinct). Ants and termites, on the other hand, have very efficient societies where one could say that the colony has become the organism, and each individual is almost like a cell of it. Without the colony, individuals cannot survive anymore, but their collective work for the group, which includes looking after each other’s offspring, is unprecedentedly efficient and altruistic. When we see humans giving their lives for others, we find this so exceptional that we label them as heroes, but in social insects, each individual would be a hero that would do that for their sisters at any time.

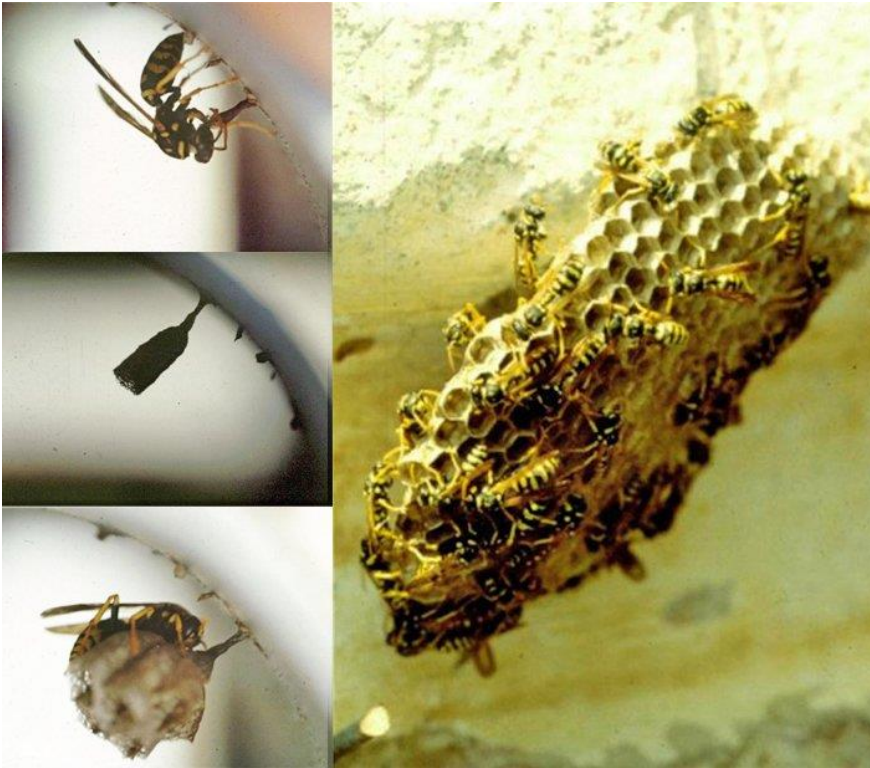
Biologists use the term [eusocieties](#) to describe the highest level of organization of sociality, and this is something that, after millions of years of evolution, several invertebrates have achieved, but is extremely rare in vertebrates (we only know of two species that have achieved it, the naked mole-rat and the Damaraland mole-rat). Eusocieties are characterised by cooperative brood care (including care of offspring from other individuals), overlapping generations within a colony of adults, and a division of labour into reproductive and non-reproductive groups. Also, these societies are structured into castes when individuals of one caste have lost the ability to perform at least one behaviour characteristic of individuals in another caste (such as breeding).

No primate has developed eusocieties at the species level yet (some people claim humans have, but I am not convinced), but ants, bees, and wasps, who have existed on our planet for much longer, have. It could be argued, though, that most species of the genus *Polistes* have not quite achieved the eusociety level yet, compare with other social wasps (although some say that they are primitively eusocial and use the term ‘hypersocial’ for the even more social wasps, bees, ants, and termites). *Polistes* and *Homo* have this in common. We may be aspiring to become the “next level” of society, but we haven’t reached there yet. For this reason, when I was studying the lives of *Polistes*, I was constantly astonished when discovering similarities between their lives and ours.

Polistes, the “Human-Like” Wasps

Did you know that wasps were involved in “politics” before humans evolved? You are probably familiar with the concept of “queens” in social insects such as bees and ants. Do wasps have queens? They do, and as in the other social insects, these are the females who breed (while all the other females, the workers, are sterile). But in the case of *Polistes*, the queens can be very different. In fact, I think we should not call them queens, but “presidents”. In humans, presidents are not those born in any particular family (at least in theory) from any particular bloodline. Anyone could become the president, if the community votes for them, or if they take power by force. Well, the same happens in many species of *Polistes*. The breeding female may have got to that position if she is accepted as such by all the other wasps and may

have reached there by fighting other high-status wasps and winning the fights. *Polistes* have a dominance hierarchy of wasps with different power, but the one on top, the alpha female, ends up being the only one that breeds, while the others, after the “elections” have passed, become sterile after some time.



Polistes omissus wasp building a nest (c)Jordi Casamitjana

But, as in human societies, things can change very quickly, politically speaking. A high-ranking wasp — and her influential friends — could stage a *coup d’etat* and push the queen out of power. In that case, the new queen will become fertile again.

This ability to [switch between being fertile and sterile](#) is quite unique, which gives *Polistes* much more versatility than other wasps (but it is also why they may not be classed as true eusocial species because workers have not lost completely the ability to breed). Perhaps the fact the nest is more exposed to the outside world than other social insects is what drove this adaptation, as [losing the queen](#) would be more likely so the colony should be able to “crown” new queens if necessary. During my studies, I was privileged to meet V5, who I titled “the most extraordinary wasp that ever lived.” She was a queen that lost her throne due to the work of a “malevolent” entity, but she did not let her misfortune beat her down and kept fighting to recover it. I am not going to tell you what happened, but instead, I will, unashamedly, direct you to the novel [The Demon’s Trial](#), in which, under the pen name J.C. Costa, I narrate her true extraordinary story.

In this article I am just giving you the simplified version of the life of these wasps because the versatility of *Polistes* has created many more interesting combinations of societies. Some species are social parasites (like the bird cuckoo) who lay eggs in someone else’s colonies. Others allow for queens to start several colonies close to each other at the same time, and commute between them to take care of things (creating, in effect, something like metropolitan cities with several colonies together operating in a higher level of complexity).

As you can now guess, social wasps do not live in patriarchal societies, like many human communities, unfortunately, have in the past (and still do). The power is reserved exclusively for females, and males are neither kings nor knights with any chance of climbing in society. In fact, they are the lowest ranking members of the colony. One of the things about social wasps is that, in colder latitudes, the colony only last a year, as the paper of the nest doesn’t provide good enough

insulation for winter (the wax of bee nests does, so they do survive). Therefore, their lives unravel in just a few months, and during most of the year, no males will be found in the nest (interestingly, when you start to see them, this marks the rapid decline of their civilisation).

In most social wasps, each colony starts up with one simple fecundated queen (the “foundress”), and sometimes with **two or three sisters** in some species of *Polistes*. This would happen in spring in regions of the planet with four seasons. The foundress begins by fashioning a petiole (a short stalk which will connect the new nest to a substrate) out of paper she manufactured using plant fibres and particularly thick saliva (wasps use different kinds of saliva for different paper qualities). At the end of it, she will build a single brood cell. She will lay an egg inside and keep building more cells around it, repeating the process. When the eggs hatch into larva, she will then go out hunting to provide for them.

What does the wasp feed their young larvae? Believe it or not, she feeds them “burgers”. The queen goes out hunting, and after finding a potential pray (it could be anybody, but they prefer non-hairy caterpillars, as they are easy to get and process), she paralyses it with the venom of her sting, and as lions or a cheetahs do, tries to kill the unfortunate victim as quickly as possible by biting the head. Once the prey is dead, she will process the body on the spot. She would open it and remove the flesh, and with her jaws and legs make a “burger-like” ball of mashed meat out of it. That is what she will take back to the nest, and feed to her children (so, yes, they kind of feed them “fast food”).

Each larva would grow inside the cell, and when she is ready to metamorphose into an adult, she will close the entrance with a silk cover. After a few days, she will emerge as an adult, and help her mom and sisters in all tasks (building more cells, going out hunting, feeding the young, etc.). Somehow, collectively, they know how to build the nest in a way that is strong and stable, using different types of paper for different parts, and sometimes even building reinforcements on the sides. Perhaps human architects designing a cathedral got the idea of buttresses (an architectural structure projecting from a wall which serves to reinforce it) by watching wasps building their nests.

Matriarchal Traders



Polistes associus wasp feeding flesh to her larvae (c)Jordi Casamitjana.

In addition to politics, papermaking, architecture, and fast-food, *Polistes* also invented (together with other insects) what we could call rudimentary “trade”. When the colony begins to grow, many kids need feeding, so they need an efficient

system that guarantees that everyone will be fed (as during most of the colony's history they are all sisters, every one of them considered "equal"). To solve this logistical problem, evolution created "trade" in the wasps' world in the form of a reward for the workers who feed more larvae.

Those workers that have been out hunting come back with their "burgers", and via a tactile communication system called [trophallaxis](#), begin sharing them with other adults in the nest, who tend to be higher in the hierarchy (the older you get, the higher you can climb, and that give you the privilege to spend more time in the safety of the nest). With a piece of the "burger", the workers would go to a cell, and trade that piece with the larva for a drop of a sweet liquid the larva can produce — and the adults love. In order to get more of this sweet drink, the adults would need to get another piece of "burger" to trade for it. With this effective system, adults get energy drinks to move about, and larvae get proteins to keep growing. Therefore, the addictive enticement with sugar-rich drinks we see in burger chains in the form of fizzy drinks seems to have also been first invented by the wasps' civilisations.

And where are the males in all this? They only are born in the last months of the colony when the queen runs out of sperm (which she collected the year before when she mated but kept it separated from her eggs and only used it to fertilise one egg at a time). Males are the result of eggs which have not been fertilised (and this is why they are a bit smaller). And what do the males do for the colony? Nothing, really. In fact, females often kick them out during the day as they regard them as useless social parasites (the only thing I have seen them do for the colony is ventilating, the collective air conditioning system wasps engage in emergencies when the nest overheats). While they are out, males often hang out around flowers drinking their nectar (sometimes getting drunk if it has fermented) and fighting with each other around these "pubs". At night, though, females will let them return to the nest — sounds familiar?

Sadly, for wasps in temperate latitudes, "winter is coming" (something for the *Game of Thrones* fans there) is a real threat. Almost all of them will die during winter (including all males and the queen), and only future queens may survive. In late summer, one of these males may manage to mate with a new queen, who will start a new colony next year after spending the winter hibernating somewhere hidden and safe. Everyone else would be gone by the time she starts the colony (except in some *Polistes* species where occasionally several sisters survive and start a colony together).

Now, tell me, do you think I have exaggerated when I used the term "human-like" to describe *Polistes*? Do you need more? Ok, what about this: *Polistes* have a head shaped in such a way that it shows an actual flat front with a face, that has distinctive markings that allow each wasp to identify each individual by sight (and yes, proper [research has proven they can do that](#)). Ah, and when they fly, contrary to other wasps, they tend to keep their first four legs close to their bodies, while leaving the last remaining two hanging out, which gives them the appearance of having two legs only — like a human.

I think I will rest my case now.

What to Do When Meeting a Social Wasp

You probably have started reading this article to get to this part, as you may be a vegan who does not want to harm wasps but cannot help fearing them, like anyone else. Ok, no worries, you will get my tips on what to do in a minute. Before going into this I wanted to introduce you to the amazing world of wasps, so you can conclude that they are, after all, just a slightly smaller version of us, so whatever rules you apply for behaving in a civilised manner with other humans, you should apply them to wasps too.

I could have gone in another direction. I could have told you how important wasps are for the Earth's ecosystems. Like bees and flies, wasps are pollinators too, as while they are hunting, from time to time they also drink nectar from flowers to get some energy. There are over 160 plant species that are completely dependent on wasps for pollination, and as many wasp species are generalists, they pollinate a wide variety of plants and not just one type. I could also have told you how important they are for our crops (and even more for [veganic crops](#)) as they are top predators who would do the natural job of eliminating the insects farmers want to kill when they use pesticides. If wasps go, the crops would either be eaten away or forced to be covered with harmful pesticides. I did not choose any of these arguments. I did not want to defend wasps

with environmental or economic arguments (unfortunately, people are starting to talk about eating wasps' larvae and using their venom for medicine), but just for who they are, not for what they can do for us (which is [the vegan approach](#), not harming them and not exploiting them in any way).



Photo By Amani A via Shutterstock (Royalty-free stock photo ID: 1166190907)

Wasps may not be gentle herbivores living in perfect societies, and their individuals may be more aggressive with each other and less altruistic than those in other insect societies. But these are the shortcomings that make them remarkably similar to us. We are trying hard to live in a better society ([the vegan world](#)) because we recognise that the current societies we have created are not good enough. But when I watch *Polistes* civilisations, I see the same handicaps and struggles of living halfway between altruism and selfishness. They are like a tiny mirror where we can see our faults, and perhaps learn from them — as happened to me when I interacted with that guard which set my veganism journey in motion.

Wasps might have been our teachers all along, and many of the technologies and social structures we give for granted might have been learnt by humans observing wasps and being fascinated by them. I would not be surprised that, *Polistes* in particular, are the sources of legends in many ancient cultures that talk about fairies and similar civilisations of magical tiny people (so magical, that can get a giant bully run for his life). So next time you meet a social wasp, thank them for everything and give them the proper respect they deserve. How? Try this (this applies to all social wasps):

- Move slowly and do not make threatening gestures (such as trying to swat them with your hand), as they are very intelligent, and they will interpret this as an act of aggression — because it is. Gradually step back and give them space.
- Talk to them in a respectful and calm manner (not because they will understand what you say, but because this will calm you, your behaviour will become less threatening, and the CO₂ you will emit will inform them that you are an animal better to move away from).
- If you see a nest, don't get close to it, as they will sting you to teach you a lesson not to approach another nest again (as they are trying to protect their children). The black and yellow colour of their bodies (called [aposematic colouration](#)) is there to warn you to step back (and this is why we have an instinctive reaction to it), but if you seem to ignore the message, they will “teach” you how to remember it with pain.

- Remember that in temperate areas the colony only survives until winter, so if you discover a nest in an inconvenient spot, just wait, and they will be gone when winter approaches.
- If for whatever reason you cannot wait for a nest to die out in winter and you feel that you cannot co-habit with the colony until then, you don't have to destroy it. Some specialist wasp-friendly people may be able to relocate it to a better place. If you try to do it yourself (I do not recommend it unless you have done it before and use protective gear), do it at night when all the wasps are in, and don't use smoke as apiculturists do with bees, as this trick does not work with wasps (when there is a forest fire, which is what the smoke indicates, bees can leave the nest with the queen and relocate elsewhere. This is why their behaviour change, but wasps don't do that).
- Males cannot sting (don't even have a sting), and they appear in late summer or beginning of autumn, so if you discover an inconvenient nest then, it is less likely you will get stung, as fewer wasps can sting then. Solitary wasps do not sting mammals, by the way.
- Wasps are intelligent, so if they can get meat without having to hunt, they will get it, so they are also scavengers, and they may be looking for a bit of your sandwich. If you are nervous around them when they are looking for easy food, take off a bit for them and place it far from where you are.
- If it is very hot the nest may be overheating, which may kill the larvae. To save the colony, many of the wasps will go out trying to get some water to spray on the paper to cool it down. If you see them close to liquids, this is what they may be doing (their mind may be preoccupied with their emergency at home, so they are unlikely to sting you).
- If they land on you thinking that you are a tree or a rock, don't panic. Let them be, but ensure they do not accidentally go under your sleeve or the neck of your shirt, as if suddenly it becomes dark, they may think this is your mouth and you are trying to eat them, so they may sting you then (best slowly move your sleeves and clothes to prevent this to happen, giving them enough space to fly away when they realise you are a mammal, not a tree).
- If you see them scrapping some wood, they are taking fibres to make paper, so they are focusing on that task and are unlikely to bother you (unless you bother them).
- If you see a wasp flying in a zig-zag way in front of your face, she is scanning you. Wasp's eyes see better with movement, so she is trying to figure out which kind of creature you are and what are your intentions. If they don't move, and you don't move either, they may not see you, so if you want to observe a stationary wasp, approach very slowly and she may not even notice you.
- If they do sting you, wasps do not normally die as bees do, so they can sting you several times, and decide how much venom you "deserve" depending on the threat they think you pose. Once you have been stung, though, don't get closer to any other wasp for a while, as they leave on you a pheromone that tells other wasps you deserve to be stung. Wash with water the area of the sting to get rid of that smell.
- Wasps are individuals, so, like you and me, some are more friendly than others. Older wasps are wiser too, so they probably understand human behaviour better.
- On windy days, stay even further away from any wasp nest as the wind may shake it and that makes wasps more nervous and more likely to sting.
- If you see a lonely wasp inside your house in late autumn flying very close to your ceiling repeatedly, she is likely to be a recently mated young queen just trying to find a place to hibernate. Let her be, as she will not risk her future offspring by attempting to sting you. You are unlikely to see her again, as after hibernation she will go somewhere else to build the nest (they tend to choose spots facing south or east, which are warmer in early spring).

In other words, behave with wasps as you behave with people. Be polite, respectful, give them space, don't get close to their children, and don't attack them because they might attack you back (and you don't want that, believe me; wasps can fly at [25 Miles per hour](#), faster than most humans can run).

Wasps are powerful. They have six dexterous legs, four fast-biting wings, four sharp jaws, two sensitive antennae, five multi-purpose eyes, a retractable sting, an aerodynamic hairless abdomen for great speed, and an articulate flashy body armour that would ridicule the most flamboyant medieval knight — you should have seen the incredible fight between the wasps V5 and V1 of the colony I was living with, comparable only to the mythical fight between [Gandalf the Grey and the demon Balrog](#) (something for the *Lord of the Rings* fans there).

Wasps are clever. They can hunt all sorts of prey, even dangerous spiders. They can process food, package it for travel, and deliver it where it is needed. They can make papers of different qualities and strengths. They can build sophisticated nests that can give a safe home to thousands of individuals. They can create air conditioning currents and use water to cool down the nest. They recognise each other, [have friends and enemies](#), and become involved in complicated political intrigues. They can read people's behaviour and "judge" whether you need a lesson about interspecific manners. And some of them can start an entire civilisation by themselves.

Wasps are awesome, so if you meet one, consider yourself lucky.

I am honoured to have met many.