Altruistic wasps? More like plain self-interest

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Social insects may not love their fellow bugs as much as once believed.

"Altruistic" insects such as ants and bees are thought to sacrifice their own chance to reproduce in the name of the greater good - that way, their genes are passed down through the community's queen. But new research published in the journal Science explains why certain wasps, rather than set out to establish their own colony, choose to serve another queen completely unrelated to them. They do so for purely selfish reasons - because it gives them a shot at the throne in an already thriving hive. Evolutionary biologist Ellouise Leadbeater of the University of Sussex in Britain, the study's lead author, discusses the research and how it reinforces our understanding of altruism.

Q: What's so special about wasps like Polistes dominulus?

A: This particular species is kind of a model of the evolution of altruism. Their behavior is generally explained by something called inclusive fitness theory: You devote your time and resources to helping others produce their offspring if the other animal that you're helping allows you to produce some of your own offspring while you're helping them. Or (you help) if the other animal is a relative - because by helping your relatives you're passing on your own genes too, just indirectly.

But this particular species was a real problem for that theory because they were helping nonrelatives to breed but didn't seem to be producing any of their own offspring. It was kind of an evolutionary mystery.

Q: Describe what you did to get to the bottom of it.

A: We went to Andalusia in the south of Spain (to study the wasps). We collected the nests and looked at how many eggs the subordinates were laying over the course of the season. We compared this number to the number of eggs that wasps that nested alone were laying.

At the beginning of the season, there didn't seem to be any advantage to helping others. But what we found is that subordinates were occasionally inheriting the nest. So when the dominant died, a subordinate would take over.

She'd get a nest that's large, that's productive, that's got the whole workforce that the original dominant had. It's only a small number that get to take over, but when they do, they produce a large number of eggs.

Toward the end of the season, none of the wasps that had tried to reproduce by themselves were producing any offspring. But the subordinates ... were doing really well.

Q: What do the findings mean for how we view these wasps' behavior?

A: It's really great to have this evolutionary puzzle explained. Now we know why these individuals help out at the nests of nonrelatives and we know it fits in really well with inclusive fitness theory.

This explains why these wasps haven't become advanced "eusocial" insects. Unlike honeybees, they don't have sterile workers - they're all potential queens. You absolutely have to be helping your relatives if you're going to be sterile.

The wasps' inheritance mechanism, on the other hand, means sometimes it pays to help nonrelatives. That could be something that's preventing

the next step in evolution, the next level of society from forming in these species.

Q: The study answered some questions about wasps' survival tactics. Did it raise any, as well?

A: What we would really like to know is why any of the wasps decide to nest alone. Because really, what we've shown is it always pays to be a subordinate wasp. You should never go off on your own, especially if you don't attract any helpers. That's what our data seem to imply. So we'd like to know why it is that a small fraction of wasps do still decide to carry on and do it by themselves.

One possibility is perhaps these wasps have tried to join other wasps and they've been rejected. We don't know if that's the case yet but that's something that we could be looking at next.