

# Six-Legged Freak

**A new cockroach has landed on our shores, a stowaway from Asia with impressive staying power. For one thing: Its babies have been known to scurry around on ice.**

By [Christopher Bonanos](#) Published Jan 26, 2014



Japanese cockroach *Periplaneta japonica*  
(Photo: Shinya Kawai)

Several live cockroaches nibbling at the bait, and they looked odd. Most New York roaches are from just a couple of species, and these were something else. They set off a small alarm in his head, enough for him to gather the samples and take them back to his office in New Jersey.

There they landed on the desk of Ken Schumann, an entomologist at Bell. The tech had thought these might be a species known as the Oriental cockroach, a bit player in New York's insect world. (Schumann says he's seen "a couple of dozen" cases of them in 30 years.) As Schumann started looking, however, his own antennae began to flick. Both males and females had wings; Oriental-cockroach females don't. The bodies were thinner. The morphology was a little off.

He had to keep this quiet. The High Line (like a lot of Bell's clients) has a nondisclosure agreement with its exterminator, and Schumann couldn't reveal publicly where his guy had found the insect. But his curiosity was more than piqued. For one thing, it was entomologically interesting; for another, invasive species are a big deal. Schumann's mentor, Austin Frishman, was in town shortly thereafter, and Schumann eagerly showed the samples to him. Frishman is one of the most prominent pest-control experts in America, but he was puzzled too, and he and Schumann sent a sample to a researcher at the University of Florida, who then called someone at the Smithsonian, whose entomology department has drawers full of insects mounted on pins. No luck. A half-dozen scientists at the top of their field had been stumped.

Although plenty of people have studied roaches over the years, there are thousands of species, and the protocol for making a definitive I.D. is surprisingly fuzzy. Even among scientists, it often involves simply getting your bug to an

**I**n July 2012, a pest-control technician from Bell Environmental Services found a parking spot near the High Line, got out of his car, and headed upstairs. He had arrived early in the day to beat the heat on his rounds, which today involved checking rat-poison dispensers on the High Line. When he opened one of them, he found

expert who has seen one like it. When the insect finally made its way to the Rutgers University lab bench of a grad student named Dominic Evangelista, he was that expert. He has looked at a lot of cockroaches in his life—he'll refer to a rack of roaches preserved in vials of alcohol as “my collection” the way you might point out a shelf of signed baseballs, and he and his doctoral adviser, Jessica Ware, have hiked into the Guyanese jungle to spot new species. Evangelista could narrow down the identity of this new find by sight, based on a few things: A distinctive plate on the bottom of its abdomen made it clear that this was a member of the family *Blattidae*, from which descend two large branches of the roach family tree. From that detail and a few others, he guessed that it might be *Periplaneta japonica*, the Japanese cockroach.

### A Visit to the Roach Lab

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If so, it was real-world, not just entomological-journal, news: Nobody had ever identified a Japanese cockroach in America outside a research lab. And *P. japonica* is especially well suited to New York, because it is one of relatively few cockroaches that can handle winter weather. Most urban roaches spend the cold months indoors, or deep in a trash dump where decomposition keeps things cozy, or in a barely warm-enough nook of the subway system. In Asia, baby Japanese cockroaches have survived long stretches on ice.

A few days later, DNA barcode analysis confirmed it: New York had a new immigrant. Schumann was excited enough about the findings to immediately write a story for a trade journal—which sat on it for a few months before publishing. “I got scooped!” he says. “I was like, *Dude! This is pretty important stuff! Why are you holding?*” Ware and Evangelista, with their Florida colleague Lyle Buss, got a paper into print first, and it identified the High Line as the source of the find, blowing Bell Environmental’s cover and causing some

consternation at the park. “They didn’t want to be associated with this thing,” Schumann says. “If they found an exotic plant on the High Line, they would’ve released it. But when you find an insect ...”

**M**ost of us say “cockroaches” as if they were one creepy-crawly entity, but in fact there are many kinds, two of which dominate the dark corners of New York. *Blattella germanica*, the German cockroach, is the small, slim-bodied one. *Periplaneta americana*, the American cockroach, is the big oval one that squishes when you step on it, the kind that’s often called a water bug. Five other species—the Oriental cockroach, the Surinam cockroach, the brown-banded cockroach, and the Australian cockroach, plus the new one spotted on the High Line—have a minor presence in New York, encountered rarely in certain favored settings. (The Surinam roach, for example, likes to burrow into the soil of planters in office lobbies.)

Our relationship with cockroaches is long-running and unbalanced. They are pests, but not often deadly ones. They’re not technically parasites because they don’t feed off our bodies, as bedbugs do. Nor are we symbiotic, because one side (ours) doesn’t get anything out of the relationship. Instead, we are commensalists: They benefit, we don’t. They do provide minimal services to us, notably cleaning up decaying material by eating it. (They have for a long time; the excrement of one Cretaceous cockroach, preserved in amber, suggests that they fed off dinosaur dung.) And they are meals for animals up the food chain, like lizards and birds.

It’s impossible to know exactly how the Japanese cockroach made it to New York. The most popular early speculation was that it came across the Pacific in the roots of a plant. That is a theory with flaws, since the High Line’s plantings are from nurseries in the United States. Odds are that these cockroaches made the



#### The Roaches of New York

From top, Oriental cockroach *Blatta orientalis*, German cockroach *Blattella germanica*, American cockroach *Periplaneta americana*

(Photo: From top, Newscom; Alex Wild/Visuals Unlimited/Corbis; Getty Images)

trip in a shipping container, aboard a slow-moving freighter, which establishes *P. japonica* in a long tradition. Three hundred years ago, a sailing vessel was an excellent place for a roach to hide out: loaded up with food, abundantly equipped with dark, slimy crevices, and inclined toward warmer waters. In the Age of Exploration, they made their way around the world. Sir Francis Drake inadvertently took a shipful of cockroaches back to England after capturing a Spanish vessel off the Azores. Galleons took other species from the Philippines to the Americas.

The German cockroach did not come from Germany. The Germans—off-loading the responsibility—call it the Russian roach, though it's not from Russia. The Russians call it the Prussian roach, because it is believed to have spread across Europe in the breadbaskets of the Prussian Army, but it's not from Prussia either. It almost certainly came from Southeast Asia, likely tagging along with the pigs that European sailors brought with them for food. As for American cockroaches, they came over from Africa to the Caribbean on trade ships, possibly even on slave ships, and then, when those ships reloaded for the next leg, made their way to Europe and mainland North America.

By the nineteenth century, roaches were almost universal, and rapacious. An entomologist traveling from England to Australia in the 1830s on a cargo ship loaded with cheese reported that some cases in the hold were half-empty on arrival, their contents eaten by cockroaches. The author David George Gordon (*The Compleat Cockroach*) reports that in 1908, a researcher saw “ships come into San Francisco ... with the sailors wearing gloves on their hands when asleep in their bunks, in a desperate effort to save their fingernails from being gnawed

off by the hordes of roaches which infest the whole ship.”

It was a golden age for vermin. There was an incredible amount of blattarian sustenance around: piles of horse manure at every curb, garbage unbagged in open barrels, an outhouse in every tenement’s courtyard. Cities like New York were a lot dirtier—and *organically* dirtier, with earthen floors and wooden structures everywhere—than they are now, and slum neighborhoods were unimaginably dense with people and their effluent. People tried everything to get rid of insects, from sorcery to traps baited with jam and beer to a trained roach-snuffling hedgehog. (Gordon quotes the story of a Victorian householder who tried this and found that the hedgehog got so fat he could no longer squeeze under the closet door to hunt.) The one thing that consistently got cockroaches out of clothes or bedding was dumping boiling water on them.

Only when pyrethrin, a strong general-purpose insecticide, arrived in the late 1800s did the tools for eradicating roaches get better. The ability to kill accelerated in the mid-twentieth century, when, in the space of just a few years, roaches had to contend with effective new pesticides, principally malathion, chlordane, and the inorganic standby known as boric acid. Better sanitation helped. So did other changes you’d never think of, like refrigeration and packaging: Before the twenties, most people bought food from open bins and barrels, and sealed boxes made a huge difference. There’s a reason Cole Porter, in “You’re the Top,” name-checked cellophane as a brilliant creation on a par with the Louvre.

The catch, of course, is that roaches reproduce often and in volume. Evolutionarily, they fight back against many poisons and baits almost as fast as we can come up with new ones. Only boric acid, by virtue of its inorganic compounds and simple action—it irritates roaches’ stomachs, and its grains abrade their bodies—does not cultivate resistance. By the eighties, when chlordane was banned over possible carcinogenic effects, many termites and roaches didn’t respond to it. A colony found in the U.S. House of Representatives building turned out to be the superbugs to end all superbugs, resistant to nearly all known poisons. (The descendants of those congressional roaches, cultivated in labs, became an entomological standard on which new insecticides were tested for roughly twenty years.) The best tool homeowners have today is Combat. But a study last year found that some roaches have even evolved to find glucose—which used to be Combat’s main bait—bitter rather than sweet, so they avoid those traps.

That said, you can definitively declare one thing: Exterminators are better at getting rid of roaches than they’ve ever been, even in the gnarliest situations. Schumann recalls one of the worst cases he ever dealt with, and resolved: “It was in the Bronx, in a high-rise. We kept sending back the technicians, and nothing worked—the homeowner kept complaining. Finally I said we’ve gotta check

above and below and on either side. Turns out that the neighbor upstairs was a hoarder. That person had some issues and had never complained about the bugs. We had to figure out how to treat that apartment without moving any of that person's stuff. We ended up taking big lengths of plastic pipe and drilling holes all along them and putting the bait inside. Then we'd slide the pipe in among the person's belongings, and the roaches would crawl in through the holes and eat the bait. It took about six months, but we got it done."

There'll always be more of them somewhere, though. A German cockroach can live for about a year and will reproduce every three to four weeks, despite some sex practices that most species would find off-putting at best. (Broadly speaking, the male grabs the female with a genital hook, tows her in, then adds more grapples, locking them together for an hour till he's done—though male roaches that are breeding for the first time can finish in as little as nine minutes.) Moreover, they are fantastically well adapted to living among humans. They can survive on almost no food: The fat stores in an American cockroach's body can support it for over a month without a meal. Ware's lab once dissected a roach that had cotton fibers in its stomach, meaning it had nibbled on someone's clothes to stay alive. If they get really hungry, they will eat their dead. If they get even hungrier than that, they will eat one another, babies first. They also can go for days without water, and even a little bit will attract them. "I used to have a lab in a very dry building," Ware says, "and I'd leave my teacup on my desk after washing it out at night, with a few drops of water inside. When I'd come in the morning, it would be *full* of cockroaches."

The battle against cockroaches, in short, ebbs and flows. We create a new treatment, it knocks them back hard, and then natural selection kicks in and they creep forward. Then we hit back again, and they crawl back. One small human advantage: Unless they hitch a ride aboard an airplane or ship, roaches do not move around so easily. A DNA analysis at Rockefeller University last year isolated four subgroups of the American cockroach distinct to particular neighborhoods of New York. They had, it turns out, different geographical origins, and because they stick to their own turf, their genes had been not entirely commingled. Even decades after they arrived in New York, Upper East Side roaches are slightly different from Upper West Side roaches and Roosevelt Island roaches.

**T**here has never really been a time when roaches had good PR. That's not true for most pests. Mice and even rats are depicted variously as pets, Disney characters, and vermin. Many people dislike snakes, but you'll also see guys walking around Central Park with pet boa constrictors wrapped around their shoulders and kids reaching in to touch. Bees sting and can cause terrible allergic reactions, yet we see children's books about them.

In literature, too, cockroaches almost uniformly stand in for disgust and horror. Franz Kafka knew that roaches are a nearly universal gross-out, which is

probably why he metamorphosed Gregor Samsa into a giant one. Though, as scholars will tell you, that's a translator's flourish: Kafka's Ur-text has the protagonist turn into an *ungeheures Ungeziefer*, or "monstrous vermin." Maybe it's a roach, maybe not.

There has been just one successful attempt to offer the world a lovable cockroach. (Apart from a few children's books, none of which has reached canonical status.) When the writer Don Marquis wanted to create a working-class artist-hero for his six-days-a-week column in the old *Evening Sun*, he came up with Archy, a cockroach turned poet who would (Marquis explained) hop around on the keys of the columnist's office typewriter at night, composing free verse on a blank sheet of paper his boss would leave in the machine. He worked entirely in lowercase letters, because he wasn't heavy enough to press the shift key. The poems were wry and satirical, and often funny: *there is always / something to be thankful / for you would not / think that a cockroach / had much ground / for optimism / but as the fishing season / opens up i grow / more and more / cheerful at the thought / that nobody ever got / the notion of using / cockroaches for bait.*

For a few years during and after World War I, Archy and his feline torturer, Mehitabel, were honest-to-god New York celebrities. (One of their fans was E. B. White, and it is just possible that Archy is the literary great-uncle to Charlotte and her web.) The poems even inspired a Broadway musical, *Shinbone Alley*, improbably co-written by a young Mel Brooks in 1957. It's sort of like *Cats*, but with a guy dressed as a bug instead of Grizabella. It lasted six weeks.

But most people cannot find anything cute about cockroaches, and that is a question that intrigues Paul Rozin, a psychologist at the University of Pennsylvania. He does research on disgust in all its forms, and in particular the ways in which people are repulsed by smells or textures or foods. Why are roaches so much ickier than, say, ants? "They're big: Cockroaches are among the biggest insects we see," he says after a pause to consider. "They're seen as disease vectors—they're thought of as filthy—because they eat everything. Like rats, which are also prototypical disgusting animals, they eat garbage. Also, rats have this other property: They scurry around quickly. They appear and they whip across your path, just as cockroaches do. There's something about the creature, in the fact that it surprises you." They also like the dark. In short, they check almost every box on the repulsiveness roster. The only quality that's missing, he points out, is visible squishiness. "They're dry, which is odd. Soft and mushy things are more disgusting than dry things.

"You know," Rozin continues, "I'm studying eating insects—getting people to eat insects, a very healthy food and a very cheap food. But nobody's thinking about using cockroaches as the exemplars. I think most people would be quite upset if any bug fell in their drink, but that doesn't mean they'd be *equally* upset." In one

study he conducted, people were offered a cookie that had visibly been in contact with (they were explicitly told) a sterilized cockroach. They still wouldn't eat the cookie: "It's the *cockroachness* itself that is upsetting," explains Rozin. Has he ever eaten a roach? "No. I would try it, but I've never been offered an edible cockroach. Though they're sold in the markets in Thailand."

Naturally, where most people are disgusted, a few people enjoy gleeful reveling in that disgust. Hence the popularity, such as it is, of blattarian pets. Typically, they're exotic tropical species, large and less scuttly than the ordinary pests. (Some individuals raise those as well, but usually as feed for pet iguanas and the like.) The Madagascar hissing cockroach, about three inches long, is enduringly popular, in part because it makes a startling *fss-fss-fss* sound if you shake it from your hand and it falls to the ground. The Australian giant burrowing cockroach is the world's heaviest, nearly the size of a cell phone and heavier than a silver dollar. Other, less terrifying species have their fans. The late Harvard entomologist Louis Roth, a blattarian enthusiast if there ever was one, kept in his files a copy of a 1960 paper called "Japanese Cockroaches As Household Pest." After his death, a colleague, Christine Nalepa, noticed that Roth had firmly scratched out one letter, turning *Pest* into *Pet*.

**O**n the High Line a summer ago, Schumann and his team did what they could to stop *P. japonica* in mid-scurry. There has been enough trouble with invasive species in the past few years—the Asian longhorn beetle has required the destruction of thousands of trees in New York, and millions of dollars have been spent (so far successfully) trying to keep it out of Manhattan and away from Central Park. Though it may not be quite as destructive as that bark-eating beetle, *P. japonica* is able to colonize new spaces that others can't because of its cold resistance. You really don't want a roach infestation in, say, your car.

Since the roaches were found outdoors, Schumann's technicians couldn't use the gel baits they'd deploy in your apartment; instead, pyrethrin, in a granular form that looks like the salt you'd sprinkle on an icy sidewalk, went into the plantings. "It worked pretty well," he says. "We'll know better in the spring, because they slow down when the temperature drops."

His technicians may have caught them all; they may not have. It only takes one—or, really, two, genitally hooked together—to establish a species on a new continent forever.