

Crawling Around with Baltimore Street Rats

The “urban ecosystem” serves as a research lab for scientist Gregory Glass, who studies the lives of the Charm City’s rats

By Abigail Tucker, Smithsonian.com, November 18, 2009

A trio of tiny rat statuettes stands sentinel in the center of Gregory Glass’s desk. The shelves above are stuffed with rat necropsy records and block-by-block population analyses. Huge, humming freezers in the lab across the hall are chockfull of rodent odds and ends.

Now Glass, a professor at the Johns Hopkins Bloomberg School of Public Health, leads me out of his building and into the streets of Baltimore for a bit of impromptu fieldwork. He asks that I leave my jewelry and purse behind; after all these years of tramping the alleys in the rougher parts of town, the disease ecologist still gets nervous around sunset. Yet mostly he enjoys observing the “urban ecosystem,” which, he says, is just as worthy of study as wilder areas, and maybe even more so: as savannas and rainforests shrink, cities grow, becoming a dominant habitat.

“This is what the natural environment looks like for most people,” Glass says, as we enter a narrow passage behind a block of row houses. Some backyards are orderly and clean, others are heaped with garbage. I promptly step in something mushy. Glass frowns down at my flimsy shoes.

Luckily we don’t have to walk far to find what we’re looking for.

“Right at the base of that plywood door? There’s your rat hole,” Glass says, pointing at a neatly gnawed archway. “You couldn’t draw a cartoon better than that. And they’ll graze on this grass right here.”

Glass has been following the secret lives of wild Norway rats – otherwise known as brown rats, wharf rats, or, most evocatively, sewer rats -- for more than two decades now, but Baltimore has been a national hotspot for rat studies for well over half a century. The research push began during World War II, when thousands of troops in the South Pacific came down with the rat-carried tsutsugamushi disease, and the Allies also feared that the Germans and Japanese would release rats to spread the plague. Rats were wreaking havoc on the home front, too, as Christine Keiner notes in her [2005 article](#) in the academic journal *Endeavor*. Rats can chew through

wire and even steel, obliterating infrastructure. Rodent-related damage cost the country an estimated \$200 million in 1942 alone. Rat bites were reaching record highs in some areas.

Worst of all, one of the only tried-and-true rat poisons –an extract from the bulb of the Mediterranean red squill plant–was suddenly unavailable, because the Axis powers had blockaded the Mediterranean. Scientists scrambled to find a chemical substitute.

At that point, relatively little was known about the habits of Norway rats, which are beefy (they can reach the length of a house cat), blunt-faced, foul-smelling but surprisingly smart creatures that carry a plethora of nasty bacteria, viruses and parasites. They are native to Southeast Asia, but smuggled themselves aboard ships bound for North America and practically everywhere else, subsisting, in large part, on our garbage. They thrived in aging East Coast cities like New York and Baltimore.

Despite the critters' ubiquity, Curt Richter, a Hopkins neurological researcher who was one of the first scientists to become interested in the problem, had to solicit rat-stalking tips from a city sanitation worker. (Richter later recounted these trials in a memoir, "Experiences of a Reluctant Rat-Catcher.") He soon realized that wild rats were craftier and generally harder to kill than their tame counterparts. By 1942, though, he had a squad of Boy Scouts dropping poisoned baits around East Baltimore, in the blocks near the School of Public Health. The new rodenticide, alpha naphthyl thiourea (ANTU), proved effective: city workers once recovered 367 rat casualties from a single block. Unfortunately, the poison was not as harmless to other animals as Richter professed: domestic dogs and cats died and several local children had their stomachs pumped.

But the Rodent Ecology Project, as it eventually came to be called, thrived in spite of these setbacks, nurturing all manner of provocative ideas. Famed psychologist John Calhoun, whose rat colonies at the National Institute of Mental Health inspired the children's classic "Mrs. Frisby and the Rats of NIMH," got his start in the alleys of Baltimore. (Interested in issues of crowding and social interaction, he eventually erected a quarter-acre rat corral behind his suburban home.)

Other project scientists began to map the basics of rat population dynamics, concepts that, Glass says, inform the way we manage endangered species today. Researchers noticed, for instance, that wiped-out blocks took time to repopulate, even though there were rats aplenty in all the surrounding blocks. Eventually, though, the rats almost always

bounced back to their original numbers, the “carrying capacity” for that block.

Scientists even pinpointed rats’ absolute favorite foods; they relish macaroni and cheese and scrambled eggs and detest celery and raw beets. Their tastes are, in fact, eerily similar to ours.

Glass – who started off studying cotton rats in the Midwest – traps the animals with peanut butter baits and monitors the diseases they carry. (Hantavirus, once known as Korean hemorrhagic fever, and leptospirosis – which can cause liver and kidney failure – are of particular concern.) Lately he’s been interested in cat-rat interactions. Cats, he and his colleagues have noticed, are rather ineffectual rat assassins: they catch mainly medium-sized rodents, when they catch any at all. This predation pattern may actually have adverse effects on human health: some of the deceased mid-sized rats are already immune to harmful diseases, while the bumper crops of babies that replace them are all vulnerable to infection. Thus a higher proportion of the population ends up actively carrying the diseases at any given time.

Rats still infest Baltimore and most other cities. A few years ago a city garbage truck was marooned in the very alley we were touring, Glass says: rats had burrowed underneath until the surface caved in, sinking the truck to its axles. The rodents soon overran it, and its fetid load furnished quite a feast.

Even the poshest neighborhoods are afflicted: rats, Glass says, gravitate to fancy vegetable gardens, leaving gaping wounds in tomatoes. (Celery crops, one assumes, would be safer.) Recent surveys suggest that the rat populations of Baltimore neighborhoods haven’t changed much since the Hopkins studies began in the 1940s.

Yet we hadn’t glimpsed a single one on our stroll. Glass stopped suddenly in front of a junked-up yard and listened. “I didn’t see a rat, but I heard one,” he whispered. Rats – though adept at scurrying furtively – are actually quite vocal: they squeak, shriek and hiss. They also emit a series of high-pitched chirps inaudible to humans, which scientists believe may be the equivalent of laughter.