

# Finding clues to bat disease


**IN THE FIELD**
**Jennifer Smith**

jennifer.smith@newsday.com

In caves upstate and laboratories across North America, researchers are racing to unlock the secrets behind white nose syndrome, which threatens to wipe out much of Long Island's bat population. The devastating new disease has killed off more than a million bats in the Northeast since 2006.

A critical component of those efforts sits in cold storage in a basement lab at the American Museum of Natural History in Manhattan. There, big stainless steel containers called cryovats hold tissue samples from sick and healthy bats, preserved at subzero temperatures so scientists can access them for decades to come.

"We've taken everything from large Baggies of dead bats collected on the floor of caves to tissue samples that come in in these little sample tubes," said Nancy Simmons, who chairs the museum's division of vertebrate biology.

## Repository of bat samples

The museum's cryo collection functions as a kind of scientific lending library whose wonders comprise more than 70,000 samples of animals, reptiles, fish and even bacteria.

"It is the largest repository of biological samples representing nonhuman genetic diversity on the planet," said George Amato, director of the museum's Sackler Institute of Comparative Genomics.

Many of the recent samples came from little brown bats — the most common type on Long Island, and the species hardest hit by the disease. Those specimens have already been loaned out to researchers working hard to learn more about white nose syndrome.

## Fungus tied to die-off

The disease is linked to a fungus that invades bats' tissues as the animals hibernate. Affected bats tend to arouse more often during winter and have a lower body weight than normal, something scientists think could



Julie Feinstein, manager of American Museum of Natural History's frozen tissue collection, handles bat tissue samples in the cryogenic storage facility at the museum. The samples are used in the study of white nose syndrome, which threatens to wipe out much of the local and Northeast bat population.

Many of the recent samples came from little brown bats — the most common type on Long Island.

the tubes are lowered into the cryovats, where 8 inches of liquid nitrogen keeps everything a chilly negative 238 degrees Fahrenheit.

"This whole chamber is filled with cold vapor," Julie Feinstein, manager of the museum's frozen tissue collection, said on a recent day downstairs at the lab.

She knocked on the side of a squat, 5-foot-tall cryovats. "Large thermos bottles," she said. "They're highly insulated, that's why they have kind of a rounded shape."

Feinstein donned safety glasses and thick protective gloves, then clambered up a ladder. She popped open the top, which had a plug of insulation about one foot thick. Nitrogen vapors billowed forth as she pulled out a rack containing dozens of samples.

"The bats themselves, the skins and skeletons, are upstairs," she said. "So if anyone wants to do some genetic analysis and then go back and look at the bat, we have the specimen."

Many come from scientists who encounter bats, both live and dead, during fieldwork at hibernation caves.

## Studying the samples

Some scientists are looking at differences in how white nose syndrome affects North American bats compared with species from Europe, where the fungus has also been found. Others might request samples from infected bats to learn more about the fungus itself, called *Geomyces destructans*.

"The samples can be used to potentially obtain DNA sequences from the fungus as well as from the bat," Simmons said. "So we're storing this material for whatever use researchers think they can put it to to help them."



Nancy Simmons, who chairs the museum's division of vertebrate biology, said samples can be used to potentially obtain DNA sequences from the fungus as well as from the bat.

burn through fat reserves necessary to last the winter.

Some experts predict white nose syndrome will kill off all the Northeast's cave-hibernating bats in the next decade or so. Because bats are the prima-

ry predators of night-flying insects, the die-off could have profound implications for public health in areas including Long Island, which is already vulnerable to mosquito-borne disease.

As bat researchers drop other projects to concentrate on what many say is the biggest wildlife crisis in recent years, the museum's six active cryovats are rapidly filling with samples of cave-hibernating bats from all over the United States, only some of which have been affected by the disease. All provide genetic snapshots of species vulnerable to the disease, which has spread to at least 11 states.

"As white nose continues to basically knock the population for a loop and we lose large numbers of animals, we want to know what's going to come out the other end and how that's going to affect the health of the populations," Simmons said.

## Unique bar codes

The samples are housed in plastic vials the size of a Chapstick tube. Each comes with a unique bar code that helps track where it came from, what it contains and where it is stored. Placed in plastic trays,

PHOTOS BY CRAIG RUTTLE