

## Where the rats are

That consummate urban survivor, the domestic rat, has kept a remarkably low profile in scientific circles—until now. Collared with radio-frequency emitters, Norway rats and roof (or black) rats are providing Michael Recht of the University of California at Los Angeles with a new and detailed picture of their urban California lifestyle.

Recht's research, which he says is the first to employ covert radio-frequency surveillance of these animals in the United States, has chronicled in space and time the every movement of these rodents 24 hours a day, for up to a month at a time. His studies have shown that both types of rats divide their time between a home nest or burrow and secondary, retreat residences. The largely ground-dwelling dark Norway rats, for example, may spend two to nine consecutive days close to home, then spend a night (or, if they are nocturnal, a day) in one of several previously established "hotel" burrows in the neighborhood in which they are foraging. For that nimble climber, the roof rat, the primary dwelling is usually one of four or five well-camouflaged bowl-shaped nests it has woven of twigs and branches deep inside a bush (such as a bougainvillea), large ivy or palm tree. (They also nest in piles of wood or a dark, cluttered corner of the garage.)

Recht's rat reconnaissance shows the Norway rat can have a home range up to 20 times greater than the 1 acre formerly deemed typical from research based on limited trap and recapture data. Moreover, the animals are distinctly shy. Those about to cross a lawn or sidewalk from one ivy-covered patch to another, for example, will stop and look both ways before venturing out. When they spy a human, they retreat back under cover until the coast is clear. However, once they decide to move, they can be swift. Recht clocked one Norway rat covering 96 meters in less than 10 seconds.

Recht says the rodents' ability to keep out of sight is one reason so few of the homeowners whose yards he surveyed had any inkling they harbored rats. However, in the area of Orange, Calif., that he studied in one project—where the vegetative landscape was very overgrown—each yard provided part of the home range for an average of four rats.

Southern California "has been landscaped for rats extensively," he says. Rats not only will live in ivy and palms, but they also find the young shoots of these plants gourmet fare. Rats offered toxic bait in one of Recht's studies ignored it in favor of even tastier fallen nuts and fruit littering area lawns. And these rats "will devour hibiscus flowers like candy," he has found. "Personally," says Recht. "I like rats." But the lesson in this for rat-shy homeowners, he says, is to keep lawns groomed, to pick up ripe, fallen fruit and to avoid landscaping with thick ivy, palms or dense bushes.

## Depression in the family

Many complex disorders, such as manic depressive illness, often run in families but do not show the simple, fixed patterns of inheritance observed in diseases caused by a single defective gene. Will the new applications of molecular biology, such as those being used to locate the gene associated with Huntington's disease (SN: 12/24&31/83, p. 408), be applicable to disorders with more complicated genetics? Kenneth K. Kidd of Yale University School of Medicine now reports the "first strongly positive" finding in the molecular genetics of depression.

Kidd has examined the DNA of members of an Old Order Amish family studied by Janice A. Egeland of Miami University (North Office) in Hershey, Pa. Of 51 family members, 11 have an affective disorder, either manic depressive illness or major depression. Genetically, the disease in this family is associated with a single position near the tip of the short arm of chromosome 11, near the gene for insulin, according to preliminary data of research by Kidd and Daniela Gerhard and David Housman of the

Massachusetts Institute of Technology. The presence of a specific marker (a restriction-fragment-linked polymorphism, or RFLP) on the short arm of chromosome 11 increases 100-fold the likelihood of affective disease in a member of this family, Kidd reports. But the gene on chromosome 11 is only part of the picture. It appears to be required, but is not sufficient, for the disease to occur—only half the family members who appear to carry the gene show symptoms of depression. This type of research is expected to clarify the heterogeneity of affective disorders and lead to better diagnosis and treatment. An international effort is now under way to identify more large families with members affected with manic depressive illness.

## China's growing deserts

In northern and northwest China, there are 1.1 million square kilometers of desert. But only 61 percent of this represents true climatic desert, caused by less than 100 millimeters of precipitation annually. Roughly 170,000 square kilometers are human-made deserts; another 260,000 are arid steppes undergoing or seriously threatened with desertification as a result of human activities, according to Bill Dahl of Texas Technological University in Lubbock. Dahl, who has toured affected areas studying the human abuse of these arid lands, says Chinese scientists now cite population pressures "as the primary cause of environmental deterioration in this area."

"Exploitative land management," he says, has produced a vicious cycle: Expanding cultivation of the steppes leads to wind erosion, which reduces soil fertility, which reduces the land's agricultural productivity, which in the end leads to an expansion of cultivation. It's analogous, he says, to what is occurring in Africa. Dahl cites Chinese data suggesting overcultivation was responsible for 45 percent of the desertification, overgrazing for 27 percent, firewood collection for 18 percent, urbanization and roads for 3 percent and misuse of water resources for 1.5 percent. Fostering this problem, he says, is a population growth rate in northwest China, "where birth control is not enforced on the minorities," of roughly 2.8 percent—a rate about as high as anywhere in the world.

## Cigarettes and dental health

A staining of those pearly whites is not the only adverse effect cigarettes pose to a smoker's teeth, a major dental study suggests. Serious gum disease may also occur.

As part of a large dental study being conducted at the Veterans Administration (VA) Outpatient Clinic in Boston, researchers from that clinic and the VA Medical Center in Philadelphia are looking at how the progression of dental disease among otherwise healthy men differs between smokers and nonsmokers. (For this study, a nonsmoker had never smoked or had quit by the time the study began.)

Data from two follow-up examinations over six years showed that smokers develop more calculus (rock-hard calcified accretions on tooth surfaces) but less dental plaque, the bacteria-laden mucous film that tooth brushing can remove. Contrary to conventional wisdom, smokers exhibited no increased risk of developing gingivitis (inflamed and bleeding gums). However, what most surprised the researchers, says Roy Feldman of the VA Medical Center, is that gingivitis proved so poor a clue to serious periodontal, or gum, disease among cigarette smokers. Periodontal disease is the leading cause of tooth loss in adults. One of its most serious signs is alveolar bone loss, the rate at which bone is lost from that area in the jaw in which the teeth are set. The VA data show that this bone loss was greater and progressing significantly faster in smokers than in either nonsmokers or cigar/pipe smokers.