

baiting and trapping) by influencing rodent movements to improve efficacy in an "integrated" approach. Almost all applications recommended for ultrasonic rodent control devices are in structures (e.g., homes, businesses, warehouses). Since the devices are practically inaudible to humans with their output frequencies above the 20-KHz range, they have been marketed as a "Usilent sentry" to guard against rodent problems with no annoying noises in the home or workplace. Most devices generate ultrasonic output in the 70-140 dB range of intensity as measured 12 inches (30.5 cm) from the transducer. Similar to sound, ultrasound loses intensity rapidly as one moves farther from the source. The "inverse square law" defines this intensity drop as inversely proportional to the square of the relative distance. For example, a sound or ultrasound stimulus measured at a distance of 12 feet from the device is going to be only one-fourth as strong compared to the strength at a distance of 6 feet from the same device. Ultrasound also has the disadvantage of being rapidly absorbed in its energy level by soft-textured materials (e.g., cloth, insulation), minor obstacles in its path (e.g., paper, cardboard), and corners or angles out of the direct path of the device's output energy. Typical electrical power requirements for the devices are a few watts of 110 VAC, and they come packaged with mounting bracket hardware, modern integrated circuitry, and instruction manuals describing their use and proper installation procedures.

Electromagnetic

These units for controlling pest species including insects and rodents were offered for sale during the 1970's. These devices were advertized as capable of generating their own magnetic fields or distorting the earth's magnetic fields in such a manner that animal pest species (but not "beneficial species") stopped eating, drinking, and reproducing. As preposterous as this premise sounds, many units were sold to unsuspecting, trusting customers. Despite the fact that **no efficacy data existed to support the electromagnetic pest control concept or theory**, there were 30 manufacturer-distributors of these devices in 1977 with an annual sales volume of several million dollars. Laboratory efficacy tests on the control of Norway rats by Rex Marsh and Walter Howard at the University of California, Davis (Environmental Protection Agency 1980) and field efficacy tests on the control of pocket gophers in Nevada by John O'Brien (Environmental Protection Agency 1980) indicated definitively that such devices have no effect on feeding, drinking, mating, or infestation patterns. **Legal actions by EPA resulted in fines to manufacturers for misbranding such products. In addition, court orders have been issued against manufacturers.** Few, if any, electromagnetic pest control devices are marketed currently.

Vibration and Shock

Other electrically operated devices that have been marketed for rodent control include vibrational devices designed to frighten pests from buildings or agricultural crops. Efficacy for such devices has yet to be demonstrated for any application. Electrical barriers and electrical shocking devices have been used to control rodent problems where baiting and trapping have