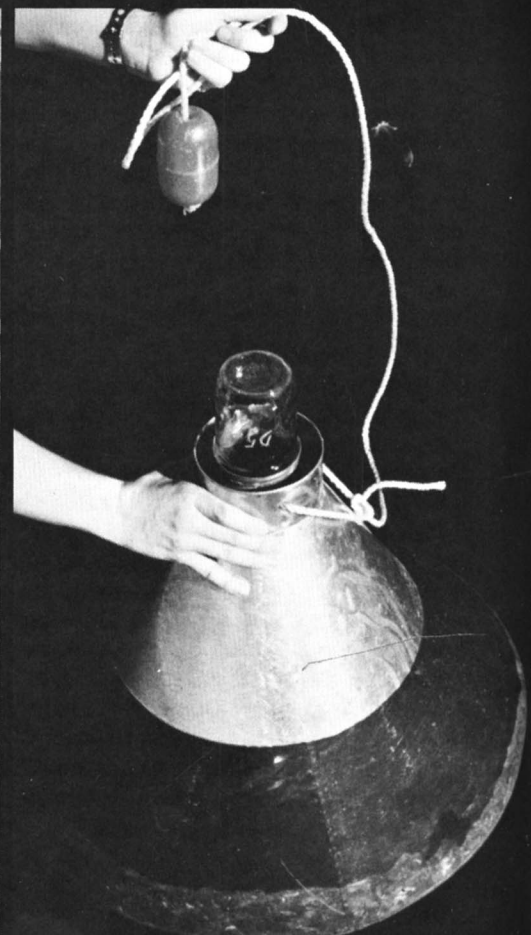




Midges plague lakeside dwellers

Robert M. Boardman

Above: Midge emergence traps are retrieved for assessment of adult population trapped in jar. Below left, upper photo: Man-made recreational lake in southern California desert; shallow, warm lakes like this are an ideal habitat for chironomid midges. Bottom left: Midges rest in shadow of a beam to keep cool. Because of their sheer numbers, they are a nuisance indoors and outdoors; spiders build webs on walls and under eaves, adding to the defacement problem. Lower right: Emergence trap is lowered into lake, where it will settle on the bottom and collect emerging adult midges.



A new phenomenon in California home ownership has led to an emerging problem of pestiferous insects: City dwellers moving into new housing developments built around man-made recreational lakes have been met with swarms of chironomid midges.

Researchers at University of California, Riverside, have been seeking effective, safe, and environmentally acceptable control measures to deal with this problem in Los Angeles, San Diego, Riverside, and San Bernardino counties. Mir S. Mulla, professor, and Arshad Ali, post-graduate research entomologist, Department of Entomology, believe that aquatic midges breeding in lakes and in golf course ponds can be reduced to a low level during the heavy midge breeding and annoyance periods. They do not expect, however, to find a "magic wand" that will wave the midges away.

Midges of many types breed in and swarm out of the artificial lakes that provide recreational facilities for the hundreds of homes built around these lakes. From March through October, the tiny-to-large insects (some so large they are mistaken for mosquitoes) multiply rapidly in lake waters. They don't bite or spread disease; as adults they rest in or swarm through homes, gardens, shops, and eating places—anywhere that provides shelter.

The new homeowners, never having experienced such swarms of adult midges in metropolitan areas, find the presence of the insects extremely annoying. At night, the midges are attracted to lights. They buzz in people's faces, eyes, and ears, deface windows, screens, lights, walls, ceilings, and draperies, and sometimes clog car radiators.

Spiders follow the midges and build webs on walls and under eaves of roofs. Midges become entangled in the webs, appearing as gray patches and smudging new structures. Thousands of dead midges accumulate around windows and doors. They have even invaded surgical wards and patient rooms of a modern hospital; for three weeks attendants swept dead midges from beds and equipment.

Eradicating the midges from artificial bodies of water in southern California would mean killing the lakes themselves, Mulla says. Substantial control of the midges for limited periods during the worst outbreaks can be achieved, however. The midge problem can best be solved if chemical and biological control measures are combined and if residents

will tolerate some midges during the March-October period. To develop this kind of control, a great deal of information is needed.

Chironomid midges are part of the living landscape, and thousands of species exist. Most of them play a beneficial role in the aquatic system.

Mulla and Ali have tested a variety of chemical control methods. Using some larvicidal chemicals, they achieved 95 to 98 percent control and a noticeable reduction in midge swarms during tests last year in man-made lakes in the Mojave Desert and elsewhere in southern California.

They found they needed different chemicals for different midge species. They also noted that some chemicals had a drastic effect on "nontarget" (suspended and bottom-dwelling) organisms—water fleas, cyclops, seed shrimps, and others.

The researchers want to avoid harming organisms that help keep the lake alive and useful for fishing. Midges themselves, while developing in water in their larval form, clean up detritus and recycle waste products, thus helping keep the lakes clean.

Entomologists hope to come up with practical and safe controls using chemicals where necessary but also practicing biological control—for example, stocking midge-eating fish in ponds. These fish will be tried first in small ponds on golf courses. If successful there, they will be studied in larger lakes.

Although considerable work has been done on the nuisance midges at several southern California lakes, no two lakes are the same. Each is an entity supporting different midge populations and species. This is even true of lakes only a block or two apart. It is therefore necessary to manage each lake independently of others.

Chironomid midges prevailing in high densities in artificial lakes are a relatively new problem. Man-made lakes surrounded by housing have a heavier inflow of organic material (from fertilizers, lawn clippings, tree leaves, etc.) than lakes in the wild. All this nutrient material and the warm, shallow water make such lakes ideal for midge reproduction.

Midges are carried several miles by winds. It takes only a few females laying eggs to produce a massive midge population within a few weeks. Each female lays 500 to 1,000 eggs in her three-to-five-day life span as an adult. The egg masses sink to the bottom and hatch into larvae in

two or three days. The larvae stay on the bottom feeding on organic detritus, algae, and other organic material. Some dwell in tubes they build in the mud; others swim in the ooze.

During the warm season, the larvae become pupae in six to ten days and, in another two or three days, adult midges. They soon mate, and the females return to the water to lay eggs.

While in the adult stage, they feed very little except on the juices and nectar of flowers. They seek cool places during the day, then fly out at sunset.

Mulla and Ali feel optimistic about the midge problem. Starting from virtually no knowledge about these particular midge-producing habitats, they have established many facts previously unknown, such as midge species in the lakes, life cycle, seasonal changes, and susceptibility to larvicides.

Among Mulla's treatment methods have been organophosphorus larvicides at 0.1 to 0.5 pound per acre. These were effective in some lakes but not in others; they suppressed larval populations for only two to three weeks.

Mulla and Ali also experimented with analogs and mimics of insect growth regulators, including juvenile hormones—that is, hormone-like chemicals that prevent or retard development from the juvenile to the adult stage. These chemicals are advantageous in that they permit the larvae to play their normal part in the food-chain process in the lake. They inhibit adult midge emergence for two to four weeks and do not harm fish or birds. Although excellent control of midges in some lakes was achieved, in one instance after treatment with an insect growth regulator, a different species of midge suddenly appeared for the first time. Treatments with the growth regulator Dimilin had some effect on the invader species, but at higher rates than are needed to control susceptible species.

Even with the best results, however, residents will have to tolerate small midge populations as part of the water-plus-outdoor environment. Chemical and biological control methods that will abate heavy plagues of these midges will be continually studied, developed, and improved. It is likely that, with judicious use of appropriate control measures, the aquatic nuisance midges can be maintained at a tolerable level in California's artificial lakes.

Robert M. Boardman is Communications Specialist, Pest and Disease Management, University of California, Riverside.