Since *C. astictopus* is related to *C. flavicans*, the reported susceptibility of *C. astictopus* to the fungus is surprising. In their field tests, Brown and Washino (1977) added zoospore suspensions to large volumes of pond water containing chaoborid larvae and measured adult emergence rates from treated and untreated water. No larval infections were observed, but gnat emergence from ponds with medium and high doses of zoospores was lower than from the untreated ponds. The zoospore doses used were much lower than the estimated output of a *Lagenidium* culture on hemp-seed agar (ca. 10^7 zoospores, Jaronski et al. 1983). In subsequent work, Brown and Washino (1979) reported reduced emergence from an agricultural pond treated with the fungus, but were unable to re-isolate the fungus from collected chaoborids. At the same time sentinel mosquito larvae in the pond became infected with *L. giganteum.* A very brief description of the laboratory tests that they conducted indicated that the chaoborids may have been infected by the fungus, but apparently emergence rates were used rather than observed infection rates. The differences between treated and untreated chaoborid populations may have been the result of factors other than infection by *L. giganteum.* Direct evidence of *Lagenidium* infection in *C. astictopus* has not been reported. Our assay showed that the closely related *C. flavicans* is not infected under laboratory conditions by the NC isolate of the fungus. Therefore, there is some uncertainty about including *C. astictopus* among the species susceptible to *L. giganteum.* It is possible that *C. astictopus* was infected and the difference in susceptibility between the two chaoborids is due to differences among isolates of the fungus. However, Koethe[2], found no major differences between the infectivities of the NC and Louisiana isolates for several species of mosquito. Further investigations are needed to determine whether or not Chaoboridae are susceptible to infection by *Lagenidium giganteum.*

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MALATHION RESISTANCE IN *CULEX PIPIENS* IN SOUTHERN ITALY

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During the summer and fall months, the beach housing areas just north of Naples, Italy experience very large numbers of *Culex pipiens* Linn. Mosquito control is limited to rare adulticiding with various aerosol fogs on only one or two holidays per season. The primary breeding source for *Cx. pipiens* is a network of slow-moving irrigation and drainage canals. These concrete-lined canals crisscross the heavily-farmed coastal vegetable-growing areas adjacent to the beach housing developments. These

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canals not only provide water for irrigation but also receive all the runoff from these farmlands. The effluent from these canals is discharged into successively larger canals and eventually discharged into the sea. Tremendous numbers of *Cx. pipiens* were found breeding in these larger and slower-moving discharge canals which often paralleled or dissected beach housing areas.

The possibility that these canal-breeding *Cx. pipiens* might be resistant to organophosphate or carbamate insecticides was tested during the early fall of 1982. Even though mosquito control was limited, adequate insecticide pressure could have resulted from insecticides present in the farmland effluent. Organophosphate resistance in *Cx. pipiens* is well documented (Sinegre et al. 1976, 1977; Pasteur and Sinegre 1978) in nearby France, but has not been documented in Italy.

Late instar *Cx. pipiens* larvae and pupae were collected from the main canal carrying irrigation effluent to the sea. Collection sites were adjacent to major beach housing areas from 200 to 500 m inland. These larvae and pupae were returned to the laboratory for eclosion and testing. A susceptible laboratory strain of *Cx. pipiens* from the Superior Health Institute in Rome was used as the comparison standard. Standard rearing procedures were used. All testing and rearing were conducted under laboratory conditions of 25–27°C and 70–85% RH. Only unfed adult females less than 2 days old were tested. The World Health Organization procedures (1981a, 1981b), insecticide impregnated papers and equipment were used for all tests. However, 10 instead of 4 replicates of 25 females were used for each exposure time on the field-collected strain and subsequent F_1 progeny. The insecticide impregnated papers utilized were 5.0% malathion, 1.0% fenitrothion and 0.1% propoxur. Survivors of the 1-hr "diagnostic" exposure to the 5.0% malathion papers were used to establish a colony of F_1 progeny for additional testing. Data were submitted for computer analysis and determination of the LT_{50} and LT_{90} utilizing a program similar to the one described by Brown and Pal (1971).

No indications of tolerance or resistance to fenitrothion or propoxur were found from the diagnostic tests with the field-collected strain. However, tests with the malathion impregnated papers yielded a LT_{50} and a LT_{90} of 72 and 275 min, respectively, for the field-collected strain as compared to 13 and 23 min, respectively, for the susceptible strain. The percentages of mortality after the 1-hr diagnostic exposures were 44 and 100% for the field-collected and susceptible strains, respectively. The highest mortality obtained for the field-collected strain was only 93% even after a 24-hr exposure.

Tests of the F_1 progeny of the survivors of the 1-hr diagnostic exposures yielded further evidence of resistance to malathion. A LT_{50} of 144 min for the F_1 population gave an 11-fold resistance instead of the 5.5-fold resistance for the parental population. In addition, the percentage of mortality after the 1-hr diagnostic exposures were reduced to 28%, and no mortality greater than 83% could be obtained even after a 24-hr exposure.

This resistance to malathion is not surprising considering the large amount of vegetable farming in the area serviced by these canals. Malathion is a preferred insecticide for vegetables, and in official statistics (Istituto Centrale di Statistica 1982), malathion is listed as one of the main insecticides used in this region.

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