

MOSQUITO CAPTURES USING A MECHANICAL ASPIRATOR AND AN ENCEPHALITIS VIRUS SURVEILLANCE TRAP IN GUANGZHOU (CANTON) CITY, GUANGDONG PROVINCE, PEOPLE'S REPUBLIC OF CHINA¹

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Culex quinquefasciatus Say was the most common mosquito species observed by the authors in the city of Guangzhou during the period of their visit from May 16 to June 5, 1985. The southern house mosquito is an important species found throughout the tropical and subtropical regions of the world. It is also found in the southern area of the United States where Darsie and Ward (1981) list it from 28 states. In Asia, *Cx. quinquefasciatus* has been listed as a vector of Japanese encephalitis virus and *Wuchereria bancrofti*. According to officials of the Health and Anti-Epidemic Station for the city of Guangzhou, all children are vaccinated before the age of 7 against Japanese encephalitis. Filariasis is not currently an important disease in Guangzhou. Hawking (1976) discussed the endemicity of filariasis caused by *Wuchereria bancrofti* in Guangdong province based on accounts published earlier in 1959.

A mechanical aspirator (Hausherr's Machine Works, Toms River, NJ) was used to collect mosquitoes daily from May 20 to 25 in a ground level apartment in the city of Guangzhou. On May 22, an insecticidal treatment of pyrethrin was sprayed on baseboards to reduce mosquito numbers that were causing annoyance to the inhabitants.

An encephalitis virus surveillance trap (EVS) (Bioquip Products Co., Santa Monica, CA) baited with a chicken was also used to sample mosquitoes inside a farm building on the S.C. dairy farm 14 km SE of the city of Guangzhou. The chick-baited trap was operated each evening from 2000 to 0600 hr. A standard enamelled dipper with an extendable aluminum handle was used to search fish ponds and

irrigation ditches on the farm for mosquito larvae.

An equal ratio of male to female *Cx. quinquefasciatus* collected by mechanical aspirator from the ground floor apartment in Guangzhou (Table 1) suggests that houses may be one of the native resting sites for this species in the city of Guangzhou. Alternatively, the apartment may be close to potential breeding sites. The application of insecticide on May 22 temporarily reduced numbers of this mosquito species. The restoration of annoying numbers of *Cx. quinquefasciatus* within 2 days period of time may be due to the ability of this species to enter the apartment from the outside. During this period the authors observed adult mosquitoes entering the building through open storm drains in the ground floor apartment, and through gaps under doorways. Even though all of the windows in the flat were screened, not all residents have adequate screening on their premises. We later realized that *Cx. quinquefasciatus* was present in all domiciles (5) visited by the authors when conversing with friends and colleagues during their visit to the city of Guangzhou. Automobiles and other vehicles also served as resting places during the day, particularly when the vehicles are parked in dimly lighted garages or sheds which are not mosquito-proof. Mosquitoes were not observed in air-conditioned rooms as all openings to the outside are sealed in such facilities and automatically made mosquito-proof. The average daily maximum temperature for the city of Guangzhou in July is 32.7°C and the average daily minimum temperature is 25°C so residents often open windows or doorways in late afternoon or early evening to encourage greater movement of air. Freshly washed clothing was commonly observed hanging from bamboo rods outside windows

Table 1. Comparison of a mechanical aspirator and a chick-baited mosquito trap for the collection of *Culex quinquefasciatus* in Guangzhou, China.

Date	Mechanical aspirator applied to walls of flat in Guangschou		Encephalitis virus surveillance trap inside farm building	
	Male	Female	Male	Female
May 20	7	8	—	—
May 21	4	4	—	—
May 22	2	1	3	2
May 23	3	3	3	4
May 24	4	3	1	6
May 25	2	3	3	7
Totals	22	22	10	19

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since the lack of air movement indoors prevented the drying of laundry.

When the EVS mosquito trap was employed inside a farm building where the unscreened windows were always open (Table 1), the numbers of female *Cx. quinquefasciatus* were double that of males indicating the chicken was a food source.

On the farm premises this species was noted resting in dimly lit areas during the day. Larvae (1-2/dip) were found in irrigation canals on the farm that had previously been treated with petroleum oil. Larvae were not found in ponds built for the maintenance of fish.

Populations of *Cx. quinquefasciatus* in the city of Guangzhou reach their highest population level from January to March, then their population declines from May through July during the season of the rains before a second subpeak is reached between September and November. The recent and vigorous on-going construction activities in the Guangzhou area of China are believed to be a factor contributing to higher mosquito populations. Activities underway by the Health and Anti-Epidemic Station of Guangzhou to reduce mosquito numbers consist of the elimination of standing water and the leveling of ground depressions that can fill with water in the future and constitute larval breeding sources; the use of mosquito fish in areas where permanent water exists and spraying petroleum oils in areas that are unsuitable for fish production. The insecticide dichlorvos is sprayed indoors in domiciles as an adulticide.

One specimen of *Aedes albopictus* Skuse noted resting on a farm pillar near lactating dairy cattle on May 22 was the only other species of mosquito observed during this period. Numbers of this species can be considerably reduced when breeding occurs in artificial containers as was the case during the Fushan epidemic of dengue in 1978 (Luh and Zhu 1983). They noted however, that *Ae. albopictus* breeds in cut bamboo stems which are widespread wherever bamboo is growing in southern China. Cut bamboo poles were in great demand particularly for use in the expanding building industry. Ideally bamboo poles should be cut at the upper edge of nodes so a hollow is not formed that can fill with water during rainy periods and support populations of *Ae. albopictus*.

The house fly, *Musca domestica vicinae*, considered a major economic pest in many of the northern areas of China according to Pal (1982), is also increasing in importance as a pest in Guangdong Province. Both house flies and the Norway rat reach peak abundance from February to April in the city of Guangzhou. The authors also noted that house flies were pests on dairy and poultry farms outside of the

city. Numbers of house flies on a herd of lactating dairy cattle on the S.C. dairy farm averaged 19.3 flies/cow when counts were made on 15 animals within a period of 5 minutes on May 31.

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GENETIC SEXING IN *ANOPHELES STEPHENSI* USING DIELDRIN RESISTANCE

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The efficiency of insect control programs involving the release of sterilized insects can be greatly increased if a genetic sexing system is incorporated into the mass rearing (Robinson 1983). For malaria vectors in which females are responsible for disease transmission, elimination of females prior to release has a much higher priority. *Anopheles stephensi* Liston is an important malaria vector in the Indian subcontinent and has been the subject of many genetic studies with the aim of developing genetic control techniques (Sakai et al. 1983). However, attempts to produce an efficient genetic sexing system in this species have failed despite repeated attempts (C.F. Curtis, personal communication; Lines and Curtis 1984). This paper reports the production of such a strain using dieldrin resistance and a male-linked translocation. Similar systems have been constructed in other malaria vectors (Seawright et al. 1978, Baker et al. 1981, Curtis et al. 1976, Curtis 1978).

In *An. stephensi* dieldrin resistance is coded for by a gene located on linkage group 3 (Akhtar et al. 1982) probably on 3L (Sakai et al. 1983) and DDT resistance, (unrelated to pyre-