TABLE 1.—Mosquitoes recovered from NCDC "black-jar" oviposition traps in the Western Pacific.

Location	No. traps set	Species recovered	No. pos. traps	% pos. traps	Ave. no. eggs per pos. trap	No. larvae
Tainan	96	*Aedes aegypti*	37	38.5%	17.8	2
		Aedes albopictus	9	9.4%	13.1	28
		Aedes sp.	3	3.1%	1.7	0
Naha	120	*Aedes aegypti*	1	0.8%	1.0	0
		Aedes albopictus	14	11.7%	15.1	1
		Aedes okinawanus	1	0.8%	7.0	0
Kadena	106	*Aedes aegypti*	4	3.8%	3.8	0
		Aedes albopictus	49	46.2%	14.8	0
		Aedes okinawanus	3	2.8%	8.7	0
		Aedes riversi	1	0.9%	3.0	0
Andersen	105	*Aedes albopictus*	15	7.0%	8.1	0
		Aedes pandani	1	1.0%	1.0	0
		Aedes vexans nocturnus	5	2.1%	1.8	0

species of *Aedes* from Taiwan; however, these specimens unfortunately died during the rearing procedure, precluding their final identification.

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HEAVY MORTALITY OF *GAMBUSIA AFFINIS* REARED ON DIET RESTRICTED TO MOSQUITO LARVAE

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For a lasting biological control of mosquitoes by larvivorous fish such as *Gambusia affinis,* the mosquito larvae, when they are the only food or a major proportion of it, must supply all the necessary amino acids, vitamins etc. in quantities sufficient to promote the normal growth and reproduction of the fish. While estimating food

intake, conversion efficiency, growth and reproduction of *G. affinis* fed on mosquito larvae, observations were made on the heavy mortality of the freshly born juveniles of *G. affinis* receiving mosquito larvae as food. This note reports on the juvenile mortality of *G. affinis* fed on mosquito larvae as a function of time.

Depending upon the mother's size, *G. affinis* gives birth to 40 to 80 individuals. With a view to minimizing genetic variations, juveniles born to one mother were equally divided into 3 batches, each consisting of 10 to 25 individuals. Each group was kept in a glass aquarium (capacity 5l) containing filtered aerated tap water. The aquaria were regularly aerated (2 to 4 hours a day; O_2 content ranged between 3.8 to 4.5 ml/l) and illuminated with a cool fluorescent lamp, 10 hours a day (see Tabibzadeh *et al.* 1970). The ambient temperature around the aquaria averaged 24° C. The mosquito larvae of *Culex fatigans* and *Aedes aegypti* were reared in our laboratory in water sprinkled with yeast.

RESULTS. The average numbers of *G. affinis* surviving during the successive days of the experiment were calculated as percentages of the initial number of juveniles, and the average values obtained for each group are plotted as a function of time in Figure 1. The trends obtained suggest a higher percentage of mortality of the juvenile (test groups) fed on mosquito larvae in comparison to the control group feeding on *Tubifex tubifex* worms. On the 6th day, more than 50 percent of the *Culex*-fed juveniles were dead. On the 15th day, only 10 percent of these individuals were alive and on the 20th day none survived. *Aedes* larvae promoted a relatively better survival. On the 6th day, nearly 83 percent of the *Aedes*-fed juveniles were alive; on the 15th day, about 40 percent juveniles were alive and on the 66th day none survived. On the average, 70 or 63 percent of the *Tubifex tubifex*-fed juveniles were surviving and healthy on the 20th or 60th day.

The maximum mortality of *Culex*-fed juveniles occurred between 4th and 6th day of the feeding experiment; the corresponding maximum mortality period for the *Aedes*-fed juveniles was not only shifted to the 5th day but also prolonged until the 15th day.

The control group fed on *Tubifex tubifex* attained an average wet body weight of 6.7 mg on the 15th day, and 95.3 mg on the 60th day. Very few *Culex*-fed individuals survived until the 60th day and the surviving individuals attained a maximum wet body weight of 5.0 mg. A few surviving *Aedes*-fed individuals exhibited an aver-

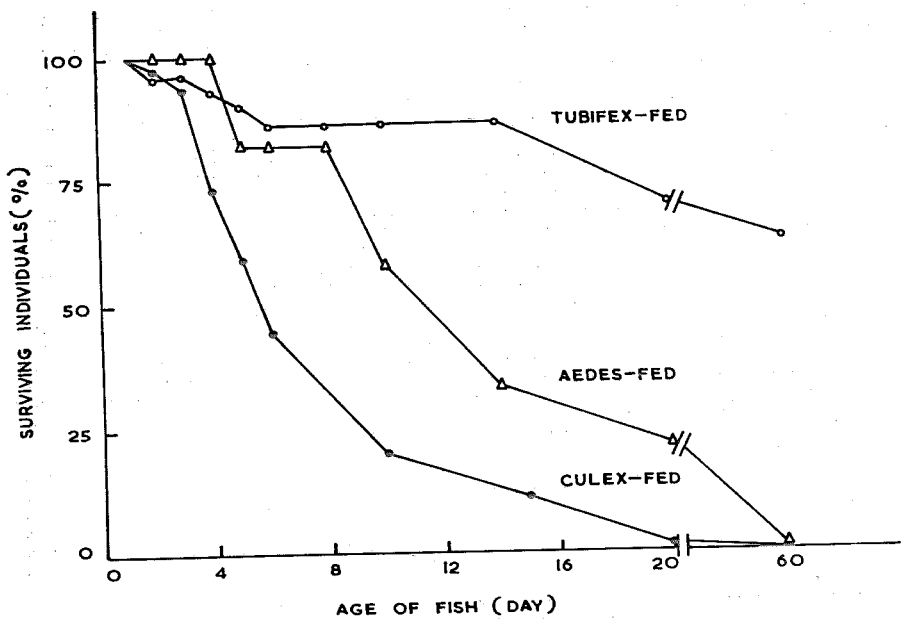

FIG. 1.—Percentage of survival of *Gambusia affinis* fed on different food organisms as function of time.

age wet body weight of 6.2 mg. on the 60th day. The wet body weight of freshly born juveniles (150 individuals) averaged 3.8 mg and ranged between 3.0 and 4.5 mg. It may be seen that though very few individuals fed on mosquito larvae managed to survive until the 15th day (*Culex*-fed) and the 60th day (*Aedes*-fed), they did not grow at all. It is very likely that a restricted diet of mosquito larvae involved a dietary deficiency for the development and survival of *Gambusia*, this deficiency being more pronounced in *Culex* than in *Aedes* larvae.

Individuals fed *Tubifex* worms exhibited the normal growth characteristics of *G. affinis*. However, these individuals too tended to postpone their sex differentiation and parturition of the first batch of juveniles. While these occur on 25th and 82nd day, respectively in juveniles fed on the nauplii of *Artemia salina*, according to S. Katre (unpublished), sexual differentiation took place on the 45th day in juveniles fed *Tubifex* worms. In fact, we have observed that the juveniles receiving different combinations of *Tubifex*:*Culex* larvae exhibited better survival and growth, than those feeding purely on *Tubifex* worms. It is very likely that a mixed diet promotes best survival, growth and reproduction in *G. affinis*, and this aspect is being at present studied by us.

It is known that many insects are not capable of synthesizing the required vitamins and hence depend upon the food sources for these vitamins too (Prosser and Brown, 1962). At present, we are rearing the mosquito larvae in water containing specific protozoans and algae with a view to test whether such mosquito larvae will promote the survival, growth and reproduction of *Gambusia*.

Menon and Chacko (1955) analysed the stomach contents of *G. affinis* collected from different freshwater habitats of South India and reported that only 51 percent of its food consisted of insects including mosquito larvae and the rest was formed by crustacea, worms and algae. From our studies on the stomach contents of *G. affinis* collected from the Bangalore aquatic units, it was also evident that the food of *G. affinis* included, in addition to mosquito larvae, a considerable amount of copepods, cladocerans and worms. These ecological observations indicate that *G. affinis* is a mixed feeder and a mixed diet may therefore be expected to promote its normal survival, growth and reproduction.

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MOSQUITO COLLECTIONS IN SUBURBAN CHICAGO FROM 1928 TO 1971

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The Desplaines Valley Mosquito Abatement District encompasses a 76 square mile area of the Des Plaines River and Salt Creek valley in the western suburbs of Chicago. The district was established in 1928 when the area was primarily lowland plains and marshes which annually produced large numbers of floodwater mosquitoes, principally *Aedes vexans* (Meigen). Since its inception, the Desplaines Valley MAD has attempted to control these mosquitoes and was undoubtedly influential in the growth of the area to its present 85 percent residential and business status. As a monitor of the district's control procedures and to ascertain the species of mosquitoes present, an annual mosquito survey was initiated in 1928. From 1928 to 1941 this survey consisted of samples taken in biting catches. Ten men visited 33 sites once each week and for a 15-minute period captured all biting mosquitoes with an ether killing vial. The collection sites were located in and around the district.

In 1941 ten New Jersey light traps were set up throughout the district. The following year the light trap collections became the standard and biting collections were eliminated. The number of light traps employed varied from 10 to 17 with 12 being the average and the standard number used since 1966. The averages of the annual catches of the light traps and biting tests are presented in Table 1.

During 1971 two men visited 10 different sites in the district for a period of 3 hours each, where they collected all biting mosquitoes. These are included for comparison in Table 1.

The results show that *A. vexans* is the principal pest of this area comprising 90 percent of the annual biting surveys from 1928 to 1941 and 90.1 percent in the 1971 biting survey. The light trap collection of *A. vexans* averaged 63.5 percent from 1941 to 1971 and yearly variations were not significant during this period. *Culex pipiens* Linnaeus comprised 27.2 percent of the annual light trap collections, but less than one percent of the biting survey from 1928–1941 and 1.1 percent during the 1971 biting test.

[1] Desplaines Valley Mosquito Abatement District, Lyons, Illinois.