LOW-LEVEL AUTOGENY IN A STRAIN OF *AEDES POLYNESIENSIS* MARKS FROM FIJI[1]

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Although once thought rare, autogeny has been shown to occur in many different species of mosquitoes. Spielman (1971) stated that autogeny at some level can be found in almost any species investigated. Among members of the *Aedes scutellaris* complex currently maintained in The Laboratories of Medical Entomology, The Johns Hopkins University School of Hygiene and Public Health in Baltimore, *Ae. tabu, Ae. kesseli,* and *Ae.* sp. (Niuafo'ou) are known to be fully autogenous. In crosses between anautogenous *Ae. polynesiensis* and autogenous *Ae. kesseli* (*Ae.* sp. (Tafahi)), Trpis (1978) reported that autogeny appeared to be controlled by a polygenic system. Until now, autogeny has not been known in *Ae. polynesiensis*. Because of its high levels of susceptibility to filarial parasites (Duhrkopf and Trpis, 1980) and its widespread distribution, autogeny in *Ae. polynesiensis* is of importance.

The NUKUI strain of *Ae. polynesiensis* Marks was sent to Mr. Barry Engber in the Laboratories of Medical Entomology, The Johns Hopkins University School of Hygiene and Public Health by Ms. Karen Toohey in November, 1979. The strain was collected as larvae, and adults were reared to produce eggs which were sent to Baltimore. The collections were made on Viti Levu Island, Nukui village, in Rewa Province, Fiji. During the course of an experiment, it was noticed that about 200 eggs were laid in a cage of about 1000 females before they were blood fed.

Those autogenously produced eggs were hatched and reared. Fourth instar larvae, pupal skins, and male terminalia were mounted for identification following Huang (1975). All characteristics were consistent with an identification of *Ae. polynesiensis* Marks.

During the course of the experiment, all mosquitoes were reared in a controlled environment insectary (27° ± 1°C, 70% ± 5% R.H., 16:8 light:dark regimen). Larvae were reared in enamel pans in 1 liter of water with less than 100 larvae per pan. Larvae were fed on liver powder suspended in water at a concentration of 25 g/L and fed 5 ml of the suspension daily. Pupae were isolated in individual vials and adults allowed to emerge. Adults were placed in individual oviposition cages with one male and one female per cage. The cages were constructed from cylindrical paper cartons (9 cm h. × 9 cm diam.) with bobbinette on top and a vial of water lined with paper towelling for oviposition. Adults were given a small piece of cellucotton soaked in honey for a source of carbohydrates. During the present study, no females were given a blood meal.

For the 1st and 2nd generations, 50 pairs of adults were isolated and kept for 14 days. At the end of that time, the number of females that laid eggs and the number of eggs that each female laid were recorded. All females were then individually dissected to determine the number of females that were autogenous but that did not lay their eggs.

Because of the small numbers of eggs laid and because of the relatively low rate of hatch of the eggs, there were very few adults in the 3rd and 4th generations. In an attempt to develop and maintain a fully autogenous strain, 3rd and 4th generation females were not dissected.

The results of the 4 generations of autogeny can be seen in Table 1. No attempt was made to determine the level of autogeny in the initial population. However, it is believed to be quite low. In the 4 subsequent generations, there was a great deal of variation in the level of autogeny. Because of the small numbers of females in the 3rd and 4th generations, it is felt that these data may not be very reliable. Even with that, the percentage of autogeny varied from a low of 8% in the 2nd generation to a high of 54% in the 1st generation.

An interesting point can be seen in looking at the average number of eggs produced by the autogenous females. The numbers of eggs produced appear to be always far less than one would expect for a full batch of eggs. The maximum number of eggs produced by an autogenous female during the course of the experiment was 24, and several females produced only 1 or 2 eggs. The population is well established in the laboratory. Because of that, it is believed that anautogenous females in this strain are no less fecund than females of other strains of *Ae. polynesiensis*. So, it appears that autogenous females produce far less than a full batch of eggs.

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Table 1. Rates of autogeny in four generations of *Aedes polynesiensis* Marks from Fiji.

Generation	Number of Females	Number of Females Laying Autogenous Eggs	Number of Females Autogenous upon Dissection	$\%_{Autogeny}$	$\bar{X}_{Eggs}$ (S.E.)
1	50	21	6	54.00	12.86 (1.43)
2	50	3	1	8.00	7.00 (3.40)
3	11	2	*	18.18	15.50 (3.18)
4	4	1	*	25.00	16.00 (N/A)

* No females were dissected in the third and fourth generations.

As mentioned above, it appeared that the viability of the autogenous eggs was less than should be expected. During the course of the experiment, about 40% of the eggs hatched. Again, because the strain is well established in the laboratory, it is unlikely that the anautogenous females produce eggs with a similarly low rate of hatch. So, it is believed that the autogenous eggs have a lower rate of hatch than eggs produced by anautogenous females.

In summary, autogeny has been found to be present in a strain of *Ae. polynesiensis* from Fiji. A great deal of variation was seen in the percentage of the females in the population which produced eggs autogenously. In addition, autogenous females appeared to produce far less than a full batch of eggs, and the eggs are believed to have a comparatively low rate of hatch.

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THE POTENTIAL USE OF LARVAE OF *CHAOBORUS COOKI* SAETHER (DIPTERA: CHAOBORIDAE) AS A BIOLOGICAL CONTROL OF MOSQUITO LARVAE

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The predaceous larvae of *Chaoborus* species are planktonic and capture organisms by hanging motionless in the water column and lashing out sideways at passing prey. Larvae in ponds feed on such invertebrates as chironomid and culicid larvae, cladocerans and copepods.

The potential use of *Chaoborus* larvae as biological control agents of mosquito larvae has been investigated both in the laboratory and in nature (James and Smith 1958, Montchadsky 1964, Nikolaeva 1979, Sailer and Lienk 1954, Skierska 1969, 1974, Twinn 1931). Because most species are restricted to permanent water where large numbers of pest mosquito species rarely occur, these are of limited use as a biological control.

During a revision of *Schadonophasma (Chaoborus)*, Borkent (1979) discovered that *Chaoborus cooki* overwintered in the egg stage in seasonally temporary woodland ponds in the Nearctic region. In Alberta, Canada, 1st instar larvae hatched in early spring while surface ice still formed overnight, generally about the 2nd