LABORATORY COLONIZATION OF *ANOPHELES SACHAROVI*, THE PRINCIPAL VECTOR OF HUMAN MALARIA IN TURKEY

MÜLKİYE KASAP AND HALİL KASAP

Çukurova Üniversity, Faculty of Medicine, Department of Medical Biology, Adana, Turkey

Anopheles sacharovi Favre is the principal vector of human malaria in Turkey and other eastern Mediterranean countries. Although many species of *Anopheles* mosquitoes have been colonized (Gerberg 1970, Klein et al. 1982), few details have been published on the colonization of *An. sacharovi*. Coluzzi (1964) only mentions that he maintained a colony in Italy by the induced copulation technique. It is not readily adapted to living in an insectary due, in part, to the behavior of the males which swarm before mating. Erel (1967, 1973) reported that in the field the males swarm above water or above any object which is 1.5–2 m high above the ground. In addition, the nutritional requirements of the immature stages are not known, but in the field the larvae and pupae of *An. sacharovi* are found in brackish and fresh water swamps, excavations, open reservoirs, irrigation, drainage, roadside ditches and rice fields where horizontal or emergent vegetation is invariably present (Erel 1967, Postiglione et al. 1973, Kasap et al. 1983).

Detailed studies of the biology of *An. sacharovi* have not been possible due to the lack of laboratory colonies. This paper presents our procedure for the establishment and maintenance of a laboratory colony of *An. sacharovi*. To the best of our knowledge this is the first successful colonization of a strain of this species from Turkey.

The colonization room (18 m^3) was maintained at 25 ± 1C° and 80 ± 10% RH. There was 12 hrs artificial light per day provided by eight 40-watt fluorescent tubes. To simulate dawn and dusk conditions, four of the tubes were turned on or off 2 hrs earlier at the beginning and 2 hrs later at the end of the 12 hrs.

The colony was started with 148 freshly blood-engorged females collected from cattle sheds and sheep stables in the village of Hadirli, Adana on September 3, 1979. These females were at first kept in a wire-mesh cage (50 × 100 × 150 cm) and supplied with a piece of gauze soaked in 10% sugar solution, which was changed daily. Plastic pans (26 cm diam.), one-third filled with water taken from natural breeding habitats, were placed in the cage to provide sites for egg deposition. After the pans were removed from the cages and the eggs hatched, the 1st instar larvae were transferred to new pans (200 larvae/pan) in which some vegetation was added. Every 2 days, the water in the pans was changed and larval food (a mixture of aerated shrimp, water plant leaves, yeast and wheat germ) was added. Excess food which accumulated in the pans was removed to avoid bacterial infection.

When pupation began the larval pans were covered with net. Newly emerged adults were collected and transferred into the cage to allow the adults to mate and copulate. A pot of flowers was also placed into the cage to provide nectar and a swarming site for the males. To provide a blood meal, the females were transferred from the cage (with a glass tube aspirator) into small paper cups (25/cup) covered with net. The mosquitoes were fed on the shaved side of the abdomen of a rabbit. This

was done by tying the cup on the side of a wire restraining cage containing the rabbit so that the mosquitoes could feed on the immobile rabbit through the net cover of the cup. The mosquitoes were offered a blood meal for 15 min twice a week.

Beginning with the 5th generation, the adults were kept in a smaller cage (50 × 50 × 50 cm) but the procedure for maintenance of immature and adult stages was the same as before except no vegetation was added to the larval pans. Beginning with the 11th generation, a smaller cage (30 × 30 × 30 cm) was used and no pot of flowers was provided in the cage.

Usually more difficulties arise in the breeding of the first generation of a laboratory population of an insect than for succeeding generations. For *An. sacharovi,* rearing of only a first generation from field-collected females was previously accomplished by Erel (1967) and Kasap et al. (1983). In the insectary, the field-collected females laid eggs in 2–5 days, had a high percentage of mortality (83.8%) and produced eggs with a very low hatch rate. Since the adult males of *An. sacharovi* swarm over the top of tall objects or over a body of water before mating, our preliminary experiments to get them to copulate in conventional size cages without vegetation were failures. As the first step we tried to make natural larval and adult habitats available in the insectary by using water intermingled with vegetation taken from the field breeding sites of *An. sacharovi* and by using a large cage (50 × 100 × 150 cm) to meet the swarming requirements of the males during the first 5 generations. During those 5 generations a degree of laboratory adaptation was achieved and the egg hatching rate was considerably increased. However, the mean number of eggs produced per female was variable. As the second step, the large size was reduced during the 6th to 10th generations but the pot of flowers was kept in the cage. The final step, beginning with the 11th generation, was to keep the adults in the smallest cage (30 × 30 × 30 cm) in which a pot of flowers was no longer necessary.

As a result of the stepwise change from natural to laboratory conditions, the colonization was successful. The colony of *An. sacharovi* has been maintained in our laboratory for over 30 generations. After 30 generations, the data on the biology of the laboratory colony are as follows: preoviposition time 7.14 ± 3.06 days; percentage of the eggs hatched 73.5 ± 21.6, emergence 14.9 ± 10.7% (adults/eggs) and 20.9 ± 9.4% (adults/1st instar larvae); mean developmental period for immature stages 11.46 ± 1.99 days. The mean number of eggs per female per oviposition (128) was still variable, ranging between 55 and 217.

The availability of this colony will greatly facilitate needed research on this important vector of malaria.

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