



FIG. 2.—Sketch of restrainer carton showing organdy mesh stretched across one end. (D) organdy.

FIG. 3.—Sketch of mosquito inside restrainer with only the mouth parts showing. (A) proboscis; (B) maxillary palpi; (C) container; (D) organdy.

FIG. 4.—Cut-away container showing mosquito in position for mouth part surgery. (C) container; (D) organdy.

sharpened minuten nadeln inserted into wooden applicator sticks (Patton and Evans, 1929). Excision of the maxillary palpi and/or the proboscis, partially or completely, was done with micro-scissors (Jones, 1967). Before and after excision, the mouthparts were cleansed with saline (Ephrussi and Beadle, 1936), buffered with M/150 potassium phosphate to pH 6.8 (Bradford and Ramsey, 1949). The mosquitoes were then held at 85 percent relative humidity, 25° C. for postoperative recovery of one day, (Wellington, 1946).

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FIELD TESTS WITH BED NETS TREATED WITH REPELLENTS TO PREVENT MOSQUITO BITES¹

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Bed nets are used as protection against the attack of mosquitoes particularly in areas where mosquito-borne diseases are prevalent or populations of mosquitoes are extremely high. Recent research (Gouck *et al.*, 1967) showed that 4-mesh-per-inch cotton netting treated with repellents to exclude mosquitoes, could be very useful and more satisfactory than the standard bed net. Therefore, from August to December, 1966, we tested similar repellent-treated bed nets in Bangkok, Thailand against natural populations of *Culex pipiens quinquefasciatus* Say (= *fatigans* Wiedemann) and *Aedes aegypti* (L.).

The bed nets were made of 4-mesh-per-inch pressed cotton netting treated at a rate of 0.5 g deet or M-1960 (a mixture of 30 percent benzyl benzoate, 30 percent *N*-butylacetanilide, 30 percent 2-butyl-1,3-propanediol, and 10 percent emulsifier) per 1 g of netting. All tests were made in 2 houses in the Klong Toey section of Bangkok. One set of nets A (treated with M-1960) and one set G (treated with deet) were used between 7 and 9 a.m. for tests against *C. p. quinquefasciatus*; another set E (treated with M-1960) and a fourth set F (treated with deet) were used between 1 and 3 p.m. for tests against

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TABLE I.—Mosquitoes collected within treated and untreated bed nets inside a house in the Klong Toey section of Bangkok, Thailand.

Month or date	No. tests	Av. number of indicated species of mosquitoes entering nets treated with ^a					
		<i>C. p. quinquefasciatus</i>			<i>A. aegypti</i>		
		M-1960 (A)	Deet (G)	Untreated	M-1960 (E)	Deet (F)	Untreated
Aug.	2	0	0	25	..	..	..
Sept. ^b	4	..	..	22	0	0	10
Oct.	4	0	0	24	0	0	17
Nov.	5	0	0	26	0	0	15
Dec. 6	1	5	0	29	1	0	8
Dec. 13	1	..	0	29	..	6	16
Dec. 20	1	..	3	30	..	..	..

^a Nets A and G treated Aug. 16; nets E, Aug. 17; and nets F, Aug. 19, 1966.

^b Tests made with E and F nets only.

A. aegypti. These periods were chosen because the two species were known to be actively seeking human hosts for blood meals at these hours.

The tests were made by placing the 2 sets of treated bed nets and 2 sets of untreated bed nets in position shortly before the test period. Then two subjects sat within each set of nets for the 2 hours of the test and collected all mosquitoes that entered. These mosquitoes were then counted and identified. When the nets were not in use (between tests), they were hung in the house. Each set of nets was tested once a week until mosquitoes entered the treated nets.

The data are summarized in Table I. The numbers caught in the untreated sets showed that both species of mosquitoes were actively seeking human hosts during the test period. The average

number of adult female, *C. p. quinquefasciatus*, collected in 2 hours within the untreated bed nets ranged from 22 to 30; the average number of female *A. aegypti* ranged from 8 to 16. The bed net treated with deet provided complete protection for 17 weeks against *C. p. quinquefasciatus* and for 16 weeks against *A. aegypti*. The bed net treated with M-1960 provided complete protection against both species for 15 weeks.

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A GYNANDROMORPH OF *Culicoides lailae* KHALAF (CERATOPOGONIDAE: DIPTERA)¹

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In *Culicoides*, intersexes have been recorded from nine species (Callot, 1959; Callot and Kremer, 1963; Dzhabarov, 1960; Navai and Mesghali, 1969; Smith, 1966 and Smith and Perry, 1967) but so far gynandromorphs have been recorded from only three species (Curtis,

1962 and Hawkins, 1962). Herein is a record of a gynandromorph of *Culicoides lailae* Khalaf which has not been described previously.

Four specimens of the gynandromorph were collected in the Caspian littoral. Two were collected on July 11, 1964 in Sari, Iran, together with 10 normal females and 9 normal males in a light trap. The other two were collected on August 25, 1967 in Shirud, Iran, together with 17 normal females and 5 normal males.

The gynandromorphs exhibited female characteristics in the wings and abdomen (Fig. 1). Spermathecae were definitely present and were of the same size as those of the normal female. No eggs were present in the ovaries. The head of the

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