

PAROUS/NULLIPAROUS CONDITION OF UNFED *ANOPHELES GAMBIAE* AND *ANOPHELES FUNESTUS* CAPTURED IN EXIT TRAPS

L. S. SELF¹ AND C. P. PANT²

WHO *Anopheles* Control Research Unit, Kaduna, Northern Nigeria

In the Guinea Savannah belt of Northern Nigeria, exit trap captures show that many unfed female anophelines leave native huts. In two villages near Kaduna, Service (1963) reports that unfed stages accounted for 52 percent and 47 percent respectively of the total female captures of *A. gambiae* and *A. funestus*. Unfeds are known to be common in other nearby villages, and to have higher mortality rates than fed and gravid stages after a 24-hour holding period in the laboratory (Self and Pant, 1966; Pant and Self, 1967). Although not referring specifically to unfeds, Foll *et al.* (1965) point out that *A. gambiae* and *A. funestus* tend to be exophilic during the rainy season when densities and malaria transmission are at a peak.

During periods of abundant larvae, it is reasonable to assume that many captured unfeds are recently emerged adults.

However, some unfed individuals might be older, capable of transmitting malaria. To obtain information on the age composition of the unfed population leaving native huts, the following study was carried out during a peak period of anopheline density near Kaduna.

METHODS. Exit traps were placed in 10 untreated huts in Zankoru village, located 25 miles west of Kaduna. Observations were carried out every two weeks from August through October, 1966, using previously described methods (Self and Pant, 1966). Captured anophelines were returned to the laboratory and separated according to species and abdominal stage of the female. Unengorged females showing no external evidence of a partial blood meal were classified as unfed. Unengorged females showing external evidence of a partial blood meal were classified as fed, and were discarded with the engorged fed and gravid stages.

The unfeds were dissected on a glass slide, and the ovaries removed to a drop

¹Present Address: WHO Filariasis Research Unit, Rangoon, Burma.

²Project Leader, *Anopheles* Control Research Unit, Kaduna, Nigeria.

of distilled water. After drying, both ovaries were viewed under a binocular microscope, using a magnification of X 45. Unfeds with terminal tracheoles showing tight skeins were classified as nulliparous (according to Detinova, 1962). Unfeds with terminal tracheoles showing a net-like formation were classified as parous.

At the same time the ovaries were removed, observations were made for traces of blood in the stomach. When present, the blood often appears red in colour, but sometimes as a dark clot.

RESULTS. Table 1 shows that, with both

TABLE 1.—Exit trap captures showing percentage nulliparous among anophelines classified macroscopically as unfed.

Total females captured (Aug.-Oct. 1966)	% unfed	% unfed as nulliparous
7,004	<i>A. gambiae</i> 40.9	56.1 (580)
10,369	<i>A. funestus</i> 41.1	35.9 (725)

In parenthesis, number of insects dissected.

A. gambiae and *A. funestus*, about 40 percent of the captured females were classified macroscopically as unfed. Of the unfeds dissected, nullipars accounted for 56.1 percent of the *A. gambiae* captures, but only 35.9 percent of the *A. funestus* captures.

Table 2 shows that a small number of

TABLE 2.—Percentage of anophelines macroscopically classified unfed showing presence of blood after dissection.

% nulliparous with blood	% parous with blood
5.9 (322)	<i>A. gambiae</i> 3.6 (250)
3.5 (255)	<i>A. funestus</i> 5.2 (460)

In parenthesis, number of insects dissected.

nulliparous and parous specimens of both species classified macroscopically as unfeds

took a partial blood meal. With *A. gambiae*, blood was detected in 5.9 percent of the nullipars and 3.6 percent of the parous unfeds. With *A. funestus*, 3.5 percent of the nullipars and 5.2 percent of the parous unfeds contained small quantities of blood. Some unfeds might have completely digested a partial blood meal before the time of dissection.

DISCUSSION. During a period of peak anopheline density near Kaduna, Northern Nigeria, the presence of many unfed *A. gambiae* and *A. funestus* was found not to be a primary result of recently emerged adults entering village huts for the first time. Parous unfeds of both species were common, and some individuals were old enough to transmit malaria. Although only 50 parous unfeds of each species were dissected for infection, 2 *A. gambiae* and 3 *A. funestus* harboured sporozoites in the salivary glands. It might also be considered that the partial blood meal taken by some of the nullipars could enhance those individuals chances for survival, while at the same time provide an opportunity for early stages of sporozoite development before the first oviposition.

Dissection of 127 freshly fed *A. gambiae* (ovaries in Christophers Stage III) in the Kankiya District of Northern Nigeria during the wet season (Foll *et al.* 1965) showed that nullipars accounted for only 28 percent of the inside morning resting population. In the present study many young *A. gambiae* which entered village huts left again without taking a full blood meal and apparently preferred to rest out of doors during the day.

SUMMARY. During August through October 1966, approximately 40.9 percent of the anophelines leaving village huts near Kaduna in Northern Nigeria were macroscopically classified as unfed. Simple age-grouping of unfed *A. gambiae* and *A. funestus* indicated that 56.1 percent and 35.9 percent respectively were nulliparous. A small percentage of the nulliparous and parous specimens of both species were found to have blood in the stomach when examined microscopically.

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