female *Cx. tarsalis* submitted by Utah abatement districts (including those from Uintah and Duchesne Counties) for analysis by the University of Utah Virology Laboratory proved negative. Through that period during which active WEE transmission was occurring in the Uintah Basin, comparatively low larval and adult surveillance counts of the vector were recorded by mosquito abatement districts throughout the state, including areas in the immediate vicinities of several sites of equine infection in Uintah and Duchesne Counties. That observation, based upon comparisons of past and current regular larval collections and light trap data would strongly indicate that those Uintah Basin vector populations, though present in reduced numbers were optimally capable of successful WEE transmission, as determined by seasonal environmental conditions, the status of local reservoir bird populations and other ecological factors.

The two Uintah Basin MAD's maintained mosquito control procedures at full operational capacity through the month of September. At the beginning of the outbreak of disease, the public relations programs of those districts were modified to present via the local media, specific information related to the biology and cycle of infection of WEE, and the role of the districts in controlling vector populations as well as providing precautionary information to the public to reduce the chances of possible human infection. Throughout that period of regular, special communications with the concerned public, emphasis was placed upon the state-wide cooperative measures being taken in the overall response to the problem by the many government agencies, institutions and professionals so involved. The public response was excellent.

More than 60 cases of WEE were professionally diagnosed in Uintah Basin horses in August and September. Of those cases, 6 were terminal. The incidence of new clinical disease in horses ceased abruptly in the last week of September, corresponding with the onset of significantly cooler diurnal temperatures in the early part of that month.

Utah Mosquito Abatement Association Encephalitis Surveillance Program follow-up studies were planned for 1979, including the bleeding of selected samples of Uintah Basin bird populations for serological analysis, increased light trap collections and laboratory analysis of sample pools of local adult female vector populations as well as other pertinent comparative studies.

A GYNANDROMORPH IN *ANOPHELES GAMBIAE*

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At the present no *Anopheles* gynandromorph has been recorded in the literature despite considerable work on this group. The purpose of this note is to describe, and record the behavior of an anopheline gynandromorph and to discuss its possible origin.

DESCRIPTION OF THE GYNANDROMORPH

This particular gynandromorph was observed in the F_1 progeny of a pink eye (p) female from the *Anopheles gambiae* species A (Davidson & Jackson 1962) Lagos strain crossed with a wild type male from the same colony. Given the X-Y type of sex-linkage in *An. gambiae* (Giles) (Mason 1967) one would expect all the F_1 generation males to be pink-eyed and the females to have normal eyes. With these points in mind the gynander was examined and found to be an anterior-posterior type (Plate 1). The entire anterior portion from the posterior edge of the thorax forward was thought to be female in character. Consequently the eyes were wild type in color and the antennae were of the short-haired type; both of these are characteristics expected of the F_1 female. Similarly the palps and the proboscis were distinctly female in character (Plate 1). The classification of the thorax and its appendages was equally distinct for those characteristics which differ in the male and female. The prothoracic legs in the gynandromorph were typically female. Since the remaining legs do not differ in the male and female the tissue type could not be determined.

In contrast the abdomen was typically male in character. As can be seen in Plate 1 it had the long slim, more tapered shape of the adult male terminating in a pair of 2-segmented claspers between which the aedeagus was readily visible. The abdomen of this gynandromorph appears to have been functioning in the normal manner since, at the time it was discovered, the terminalia had rotated. Since the terminalia had assumed the mating position, and the proboscis appeared normal, an

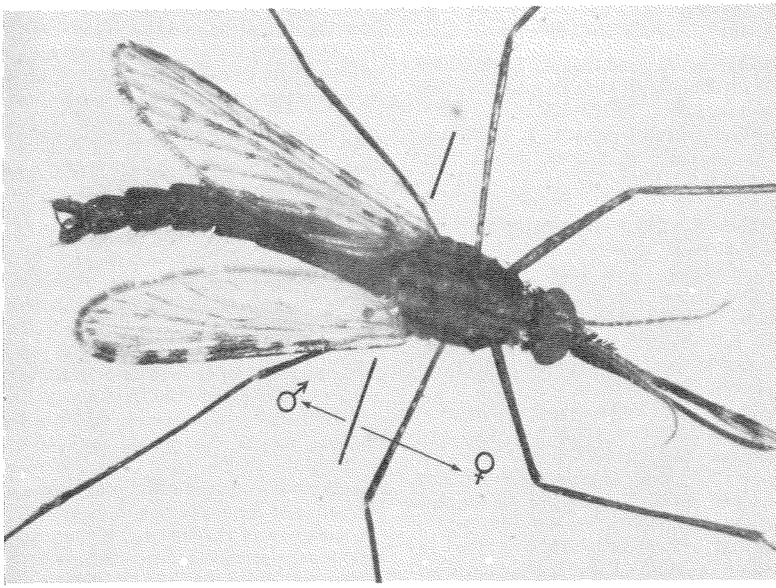

Plate 1. An *Anopheles gambiae* species A anterior-posterior gynandromorph.

attempt was made to feed and mate the corresponding female and male sections. The behavior of this gynandromorph in these different situations gave further evidence that the anterior half had a female genotype and the posterior a male genotype. When the animal was given an opportunity to feed it acted in a typical female manner. Normal probing and penetrance of the skin was carried out, but there was no evidence of blood being engorged. In fact the animal tried to feed several times without success. An attempt was then made to mate the animal with a normal female using induced copulation (McDaniel and Horsfall 1957). A number of females were presented to the male half and although on each occasion the abdomen flexed toward the female, and the male claspers encircled and gripped the female abdomen, the aedeagus did not enter the gonotreme.

Following the unsuccessful attempts to mate the gynandromorph the reproductive organs were dissected out and examined. These organs were revealed to be completely male. The testes were brown bulbous bodies with mature sperm spiralling along what appeared to be septa into the lumen of the vas deferens. Both of these ducts were normal in size and filled with sperm. The accessory glands located at the junction of the 2 vasa deferentia also appeared normal. When the testes were ruptured in saline a mass of spermatozoa burst forth and spread out from the break point. These sperm appeared to be mature and showed normal motility.

The seeming lack of gynandromorphs in *Anopheles* has been puzzling to many workers (Aslamkhan et al. 1969). Though most of the culicine gynandromorphs have been discovered in the laboratory a significant number have turned up in field traps. Since a comparable amount of research has been carried out on *Anopheles* it is strange that other gynandromorphs reported in 35 species belonging to 11 genera and only 1 of these is an anopheline. This may be due to monospermy in anopheline eggs, or the position of the egg nucleus, or a combination of these and other factors. In *Culex fatigans* [=*quinquefasciatus*] (Davis 1967), *Cs. pipiens* (Idris 1960), and *Aedes vexans* (Horsfall et al. 1973) the egg nucleus is located about the middle of the egg. In *Anopheles maculipennis* (Meigen), Kazas (1949) located the egg nucleus about 1/5 the length from the micropylar opening, but he did not report polyspermy. Perhaps it is in these areas that the reasons for the low frequency of gynandromorphs in *Anopheles* are to be found.

References Cited

Aslamkhan, M. and Baker, R. H. 1969. Gynandromorphs in *Culex tritaeniorhynchus*. Mosquito News 29:127–132.

Davidson, G. and Jackson, C. E. 1962. Incipient speciation in *Anopheles gambiae* Giles. WHO Bul. 27:303–305.

Davies, C. W. C. 1967. Embryology of *Culex fatigans*. Aust. Jour. of Zoology, 15:547–579.

Horsfall, W. R., Fowler, H. W. Jr., Moretti, L. J. and Larsen, J. R. 1973. Bionomics and embryology of the inland floodwater mosquito. Univ. Ill. Press, Urbana, 211 pp.

Idris, B. E. M. 1960. Die Entwicklung im normalen Ei von *Culex pipiens* L. (Diptera). Z. Morph. Okol. Tiere, 49:387–429.

Kazas, J. 1949. Embryonic development of *Anopheles maculipennis* Mg. Izv. Akad. Nauk sssr (ser. Biol.) 2:140–170.

Mason, G. F. 1967. Genetic studies on mutations in species A and B of the *Anopheles gambiae* complex. Genet. Res. 10:205–217.

McDaniel, J. M. and Horsfall, W. R. 1957. Induced copulation of aedine mosquitoes. Science 125:745.

AEDES ATROPALPUS BREEDING IN ARTIFICIAL CONTAINERS IN SUFFOLK COUNTY, NEW YORK

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The recent listing of the Suffolk County, New York mosquito species (Guirgis and Sanzone 1978) did not include *Aedes atropalpus* (Coquillett). This mosquito is primarily found breeding along rocky streams in water filled depressions in rocks (Hedeen 1953, Barnes et al. 1950). O'Meara and Craig (1970) provided the characteristics of four subspecies of *Ae. atropalpus*, only one of which, *Ae. atropalpus atropalpus*, has been reported from the east coast of the United States. This subspecies, unlike *Ae. a. epactius* found in the southwestern states, is not commonly found breeding in artificial containers. The recent report of Covell and Brownell (1979) mentioned location of *Aedes atropalpus* breeding in discarded tires.

While conducting an entomological survey of the Plum Island Animal Disease Center, a USDA research laboratory located 2.0 km from the eastern tip of Long Island's north fork, we located two sources of *Ae. atropalpus*, both artificial containers. Abandoned tires, used to secure a rubberized tarpaulin liner around a 0.6 ha sewage treatment settling pond, supported larval development. *Ae. atropalpus* larvae were also found breeding in many aluminum 16 x 20 x 28 cm rectangular animal cages found at a dumpsite located 0.4 km from the sewage settling pond.

Since *Ae. atropalpus* has been shown to be a vector of *Plasmodium gallinaceum* (Trembley 1946) and capable of transmitting eastern equine encephalitis (Carpenter et al. 1946), the Plum Island staff was notified of the mosquito's presence. Upon notification of the potential of the disposed material to support *Ae. atropalpus*, among other species, the Plum Island staff collected and buried all tires surrounding the settling pond. The aluminum cages were also temporarily turned over to prevent water from collecting in them.

Comparison of the collected specimens to the subspecies taxonomic differentiation as described by O'Meara and Craig (1970) led to the subspecies identification of larvae and reared adults as *Ae. a. atropalpus*.

While adult specimen characteristics were identical to those listed by O'Meara and Craig, larval pecten teeth were not as numerous as those listed for *Ae. a. atropalpus*. However, there were well in excess of 40 comb scales on collected larval specimens. This may indicate some integrated gene expression from *Ae. a. epactius*, which has been frequently reported breeding in artificial containers (O'Meara and Craig 1970). The fact that no *Ae. atropalpus* adults have been obtained from NJ light traps, portable CDC light traps, landing or biting samples or sweep net collections, may indicate that this population is characteristic of the autogenous *Ae. a. atropalpus* (O'Meara and Craig 1970). If, in fact, some gene expression of *Ae. a. epactius* does exist in the specimens, the female mosquito may require a blood meal for egg production. Should this occur, public health agencies should be aware of the vector potential of *Ae. atropalpus* populations along the east coast of the United States.

The same containers supported development of immature *Ae. triseriatus* (Say), *Culex restuans* Theobald, *Cx. salinarius* Coquillett and *Cx. pipiens* Linnaeus.

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