The specimen clearly showed an anterior-posterior organization in which the head is that of a typical female, with two normal short palps and female-like antennae, while the abdomen, with well formed terminalia, is that of a typical male. No other abnormalities in external features were noted.

Many attempts were made to force-feed the mosquito on different hosts but with no success. Although it was placed together with normal females, no attempt at copulation was observed over a 4-day period. Dissection of females did not reveal any spermatozoa in the spermathecae.

Longitudinal sections show no development of reproductive organs; gut and malpighian tubules are evident and there are a few associated cells that may be a rudimentary sex organ, but nothing more. These findings were confirmed by Dr. D. H. Colless, C.S.I.R.O. Canberra.

References

CHRISTOPHERS, S. R. 1960. *Aedes aegypti* (L.). The yellow fever mosquito. Cambridge, pp. 33–34.

COLLESS, D. H. 1958. Notes on the culicine mosquitoes of Singapore. Ph.D. Thesis, University of Singapore.

HAPPOLD, D. C. D. 1965. A gynandromorph of *Aedes punctor* (Kirby) (Diptera: Culicidae) from Alberta. Canadian Entomologist 97:204–206.

PRATT, H. D., and SUDIA, W. D. 1964. A gynandromorph of *Aedes taeniorhynchus* (Wiedemann). Mosquito News 24:459–460.

RIGBY, P. T., and BLAKESLEE, T. E. 1964. Gynandromorphism in *Culex tarsalis* (Coquillett). Mosquito News 24:460.

GYNANDROMORPHISM IN *Culicoides hollensis*.[1]

KAMEL T. KHALAF

Loyola University, New Orleans

Gynandromorphism in American *Culicoides* has been reported by Curtis 1962 for *C. variipennis* (Coq.) and by Hawkins 1962 for both *C. furens* (Poey) and *C. leopoldi* Ortiz. In mosquitoes, this abnormal morphological condition has been reported in many genera.

In the present work on the *Culicoides* of south Louisiana, *C. hollensis* (Melander & Brues) was found to be one of the most prevalent species. Males, however, were extremely rare in light-trap collections. For this reason, special attention was paid to each male secured, and this led to the recovery of two gynandromorphs from light-trap collections at Carlisle, La., one in the collection of Jan. 3/65 and the other in April 11/65. A permanent slide mount in polyvinyl alcohol was prepared from the former specimen.

The two gynandromorphs were similar to each other in appearance. They were both males, with slender abdomen and male genitalia. In the slide mount this did not differ morphologically from the genitalia of a normal male of this species. Furthermore, there was no spermatheca.

These two male specimens also possessed certain definite features of the female, namely, the wings and the head, with its appendages. Similarity to the female wing is manifested in the following characteristics:

1—The high value of $\frac{\text{width}}{\text{length}}$

2—The shape and nature of the two radial cells.

3—The maculation which is less extensive than that of the average male. In this regard, however, a considerable variation is encountered in (normal) females, but very little in the relatively limited number of males secured.

Similarity of the head to that of the female is summarized in the following:

1—The shape of the head sclerites in relation to the eyes, which are separated by a distance greater than the diameter of one facet.

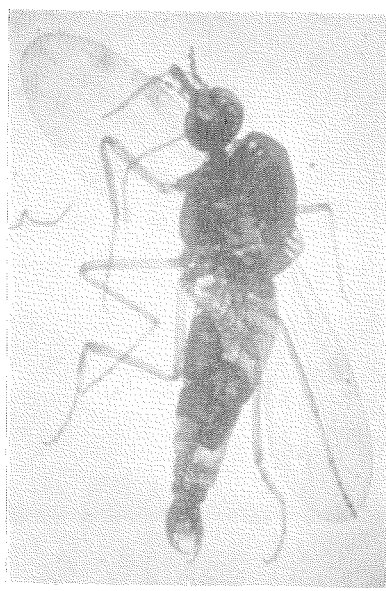

FIG. 1.—A gynandromorph of *C. hollensis*, with male abdomen and genitalia, and female head and wings.

[1] This investigation was supported by Public Health Service Research Grant GM 12896-01, from the National Institutes of Health.

2—The proboscis is formidable, the stylets stout, and both mandibles and maxillae are denticulate. In the normal male, the proboscis with its stylets is more delicate, and in this species no true teeth are recognizable.

3—The shape of the segments of both palpi, which in the male, is more slender. In the normal male of this species, the third segment is not enlarged.

4—Both antennae are not plumose. Furthermore, the shape of the segments is like that of the female; the pedicel is not as large as that of the male, and each one of the last five segments is distinctly elongated. In the (normal) male of this species, the pedicel is very large, the third through the twelfth segments bear verticils; the thirteenth through the fifteenth segments are the only segments which are excessively elongated and narrow.

These two gynandromorphs are deposited in the U. S. National Museum.

Literature Cited

CURTIS, L. C. 1962. A gynandromorph in *Culicoides*. Mosquito News 22(1):53.

HAWKINS, J. L. 1962. Sexual aberration in two species of *Culicoides*. Mosquito News 22(4): 361–362.

KHALAF, KAMEL T. 1962. A *Culex* gynandromorph. Bull. Iraq. Nat. Hist. Inst. 2(5):1–3.

ADDITIONAL NEW RECORDS OF TREEHOLE *CULICOIDES* (DIPTERA: CERATOPOGONIDAE) IN NORTHERN FLORIDA

WILLIAM W. SMITH

Department of Entomology, University of Florida

Three additional species of *Culicoides* not previously reported from Florida have been recovered from treeholes in Alachua County, Florida since *C. paraensis* (Goeldi) (1965) was reported. These species are *C. debilipalpis* Lutz, *C. hinmani* Khalaf, and *C. snowi* Wirth and Jones.

The four females of *C. debilipalpis* reported were recovered from debris samples taken from a laurel (*Quercus laurifolia* Michx.) oak stump hole, laurel oak treehole, a live oak (*Q. virginiana* Mill.) treehole, and a cavity in a magnolia (*M. grandiflora* L.) tree in the San Felasco Hammock about five miles northwest of Gainesville, Florida. They emerged as adults during February, March and April, 1965 from the samples taken in October and December, 1964. Many additional specimens apparently of this species have been taken in light traps and in treehole samples from several other locations in Alachua County during each month of this year to date (September, 1965). It is believed that adults are present most of the year in this region.

One male and three females of *C. hinmani* were recovered from debris taken from the base of a 4-foot vertical slit in a magnolia tree in San Felasco Hammock. The sample was collected on December 2, 1964 and adults were obtained during March, 1965.

Three males and six females of *C. snowi* were obtained from treehole debris samples collected during October, 1964 and February and March, 1965. The males emerged in early March while the females were recovered in late March and early April, 1965. The males came only from the later samples while the females were from the samples collected in October, 1964. As no specimens have been obtained since April in light traps or treehole samples, it appears that this species may be present only during the spring.

Treehole samples were held in the laboratory in pint glass jars with organdy-screened tops at 72° ±2° F. They were inspected at weekly intervals for the presence of adults and tap water was added to cover the debris shallowly at the time of inspection.

Identifications were made by Dr. Willis W. Wirth, U. S. National Museum, and Dr. F. S. Blanton, University of Florida.

These findings resulted from studies of the bionomics of inland species of *Culicoides* supported in part by NIH Grant GM 12322–01.

Reference Cited

SMITH, W. W. 1965. Occurrence of *Culicoides paraensis* (Goeldi) (Diptera:Ceratopogonidae) in northern Florida. Mosq. News 25(1):65.

A SIMPLE APPARATUS FOR OBTAINING EMERGENCE OF LARGE NUMBERS OF *SIMULIUM* ADULTS FROM NON-IMMERSED PUPAE

GEORGE J. BURTON

National Cancer Institute, National Institutes of Health, Bethesda, Maryland 20014

Rearing of adult *Simulium* from pupae on vegetation collected in the field has been carried out in several ways by different investigators, without using an aquarium. To match an emerged adult with its pupa, the latter is usually placed individually in a small vial or tube with one or two moistened absorbent cotton plugs, and with or without moist blotting paper (Dalmat, 1955; Hartley, 1955). For mass rearing, Meeser (1942) removed pupae in their cocoons with a scalpel, and placed them on damp blotting paper wrapped around the inside of a wide-mouthed or rectangular museum jar, which was then covered with mosquito netting of fine mesh. Lewis (1953, 1957) placed the vegetation to which the pupae were attached in a tube or jar covered with muslin.

In an airconditioned room or in a dry atmosphere, it was found that the pupae dried out