

SOUTH EAST ASIA MOSQUITO PROJECT
DEPARTMENT OF ENTOMOLOGY
SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM
WASHINGTON, D. C. 20560

THE SYNONYMY OF
ANOPHELES CHRISTOPHERSI, THEO.,
AND A. INDEFINITA, LUDL.

BY

C. S. LUDLOW,

Army Medical Museum, Washington, D.C.

[*Reprint from the BULLETIN OF ENTOMOLOGICAL RESEARCH, Vol. VI, Pt. II.,
September, 1915.*]

LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
By BARCLAY & FRY, LTD., THE GROVE, SOUTHWARK STREET, S.E.

1915.

Report Documentation Page			Form Approved OMB No. 0704-0188		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 1915		2. REPORT TYPE		3. DATES COVERED 00-00-1915 to 00-00-1915	
4. TITLE AND SUBTITLE The Synonymy of Anopheles Christophersi, Theo., and A. Indefinita, Ludl.				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Army Medical Museum, Washington, DC				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 4	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

THE SYNONYMY OF ANOPHELES CHRISTOPHERSI, THEO.,
AND A. INDEFINITA, LUDL.

By C. S. LUDLOW,
Army Medical Museum, Washington, D.C.

For some time an Anopheline found in the eastern tropics has been accumulating names in a most unfortunate way, and as the mosquito has proven to be a very active carrier of malaria, and I myself am partly to blame for this multiplication of names, it seems fit that I should try to untangle the synonymy.

When the study of Philippine mosquitos was in its infancy, there was sent in to me an Anopheline which, according to the only authority available at the time,* seemed to be *Anopheles funestus*, Giles. This Anopheline is common in the Islands and was early seen to be so usually collected in connection with the report of malaria that in 1908† I recorded that it "is taken always when malaria is present or prevalent," and this was so conspicuous that I stated "one specimen in a collection is enough to lead to a suspicion that malaria is present, and even a small number of them is usually accompanied or immediately followed by new cases, the number (of cases) depending largely on the prophylactic control of the station."

Nothing occurred to suggest to me that an error had been made in referring this species to *A. funestus* until the spring of 1912, when in discussing some Philippine mosquitos with Dr. Malcolm Watson, Chief Medical Officer, Estate Hospital Association, Klang, F.M.S., who was in Washington at that time, he called my attention to the fact that the dark species under consideration had a light ventral apical portion on the proboscis, and it seemed possible that it was an undescribed species. I gave Dr. Watson specimens of various Philippine mosquitos which he took to Mr. F. W. Edwards (British Museum) for confirmation of my naming, and at once wrote me that what I had called *funestus*, Giles, was really *christophersi*, Theo. In the meantime I had published a description of the dark specimens as *Myzomyia flavirostris*.

Mr. Edwards also kindly wrote me in regard to the matter, saying there could be no doubt as to the naming of the species, especially as Mr. Theobald's types in the British Museum were "fortunately in good condition. The type of *christophersi* has two broad apical palpal bands like your *funesta*. On the other hand both *funesta*, Giles, and *listoni*, Liston, have female palpi with three narrow bands," and in a later letter with reference to specimens I had sent him, Mr. Edwards writes: "Your *M. funesta*, Giles," and "*M. flavirostris*, Ludl., both, as you suggest, = *christophersi*."

In preparing the MS. of "Bulletin No. 4, Surgeon-General's Office," in 1913, as this species had heretofore been reported to the Medical Corps, U.S. Army, as "*M. funesta*," it seemed wise to retain the name and Giles' description and add a foot-

* Giles, G. M.—Gnats or Mosquitos. 1st Edition.

† Ludlow, C. S.—Mosquitos of the Philippine Islands, the distribution of certain species, and their occurrence in relation to certain diseases, 1908.

note explaining the error which had occurred, giving the correct name and synonymy, which, with the description of *flavirostris* immediately following, it was believed would make the matter quite clear.

It was therefore a surprise to find Mr. Banks had redescribed this species as *A. febrifer** and that Messrs. Walker and Barber in their article "Malaria in the Philippines" had referred to its connection with malaria as if that were quite unknown.† The foot-note at the end of this article is also definitely misleading, as I did not suggest that *christophersi* = *listoni*, but showed that, whatever else the synonymy might be, it did not include *listoni*.

Dr. Marshal A. Barber sent me specimens of this mosquito for determination which reached me in beautiful condition, and there can be no doubt that it is the one I had wrongly referred to "*funesta*," that is, it is unquestionably *christophersi*.

The synonymy of this species as given by Mr. Edwards‡ and added to by myself and Mr. Banks is therefore :—

- Anopheles (Myzomyia) christophersi*, Theobald.
- = *alboapicalis*, Theobald.
- = *mangyana*, Banks.
- = *funesta*, Ludlow (non Giles).
- = *flavirostris*, Ludlow.
- = *febrifer*, Banks.

The re-naming of this species by Banks is the more interesting because of the extreme amount of malaria among the Mangyans and that *Myzomyia mangyana*, Banks, was described in connection with a recognition of that condition.

In regard to *Anopheles rossi*, Giles, as used by Banks, it includes at least three forms :—

- Myzomyia ludlowi*, Theo.
- Myzomyia indefinita*, Ludl.
- Myzomyia parangensis*, Ludl.

and is therefore nearly as confusing in the reduction of names as is the multiplication of names in the species previously considered. It is easy to collect data concerning the relationship of these species, which have probably been more or less mis-comprehended. Mr. Edwards writes me, in regard to specimens I had sent him marked "*M. rossi* or *indefinita*?" : "I think I mentioned to you my conclusions

* Banks, C. S.—"A new Philippine Malaria Mosquito," Phil. Journ. Sc., ix, Sec. D, no. 4, Aug. 1914.

† Walker, E. I., and Barber, M. A.—"Malaria in the Philippines" Phil. Journ. Sc., ix, Sec. B, no. 5, Sept. 1914.

‡ [Mr. F. W. Edwards has kindly supplied the following note on this species :—"Since publishing my views on the synonymy of this species (Bull. Ent. Res., iv, p. 222) I have come to the conclusion that the oldest name for it is *A. minimus*, Theob. It is very common at Hong-Kong, and there is no other Hong-Kong species which answers at all to Theobald's description. The name *christophersi* must therefore be dropped; this is fortunate as it will avoid any confusion with *listoni*. The Malayan *A. aconitus*, Dön. (= *albirostris*, Theo.) is probably a geographical form of *A. minimus*, differing only in having the apical half of the proboscis pale on the upper as well as on the under side. This difference however appears to be constant."—Ed.]

on this subject, but am not sure. They are that *indefinita* is a variety of *rossi* representing it in the Philippines and Malaya, the true *rossi* not occurring further east than India and Ceylon.* These specimens, like all I have seen from the Philippines, are *indefinita*."

Christophers† says that though *Nsm. ludlowi* rather closely resembles *Nsm. rossi* the "eggs of the two species are quite distinct," and Strickland‡, while not agreeing with Christophers on this point, after having given the differences in the two larvae, says, "The larva of *ludlowi* is therefore quite distinct from that of *rossi*§" and in a foot-note adds: "As a certain amount of confirmation, we may note that if either *ludlowi* or *rossi* had hatched out of one of our breeding bottles, on examining the larvae remaining in the bottles we found in *every* case, although we need not have expected such favourable evidence, that they were of the type which we now ascribe to the respective species."

The description of *Myzomyia parangensis* has been comparatively lately published, but specimens were sent to Edwards for comparison before its publication and his verdict was "This is quite unlike any Anopheline I have seen before. I suppose it comes nearest to *ludlowi*."

The *status* of these species seems to be that the Anophelines taken in the Philippines which closely resemble *rossi* are *indefinita*, and that *ludlowi* and *parangensis* are established species.

When insects are connected with the transmission of disease it is doubly important that the nomenclature should be as unclouded as possible, and it is hoped that the above points may clear some of the confusion which has existed concerning these species.

* [Concerning this point Mr. Edwards now says :—"This view cannot be strictly maintained. I have recently examined specimens of the true *A. rossi* from the Philippines, and of the var. *indefinitus* from Pusa, Bengal. The latter is chiefly distinguished by the much broader white band at the tip of the female palpi."—ED.]

† Christophers, S. R.—"Malaria in the Andamans," Sci. Mem. by Off. of Med. and San. Depts. Govt. of India (New Series), No. 56.

‡ Strickland, C.—"The comparative Morphology of the Anophelines *Nyssomyzomyia ludlowi*, Theob., and *Nyssomyzomyia rossi*, Giles," Bull. Ent. Research, v, pt. 4, March 1915.

§ [Mr. Strickland has recently written to say that the insect called by him *Nyssomyzomyia rossi*, Giles, in the paper referred to, is undoubtedly *N. rossi* var. *indefinita*, Ludl.—ED.]