

A Proposal for a Systematic Study of the Culicine Mosquitoes
of India

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INTRODUCTION:

The present proposal for a systematic study of the culicine mosquitoes of the Indian subcontinent has arisen largely because of (1) the reorganization of the former British India into several independent countries after 1947, (2) the increase in the number of mosquito-borne diseases, (3) the incompleteness in our knowledge of the life cycle of several mosquito species, (4) the role of man in changing the ecology, and (5) the advances in the methodology of systematic studies.

HISTORY:

Though a large amount of literature on Indian mosquitoes is available, our knowledge on the systematics and biology is far from complete. This is aptly illustrated by Edwards (1934) in his editorial preface in the Fauna of British India volume on Culicidae. "In spite of the vast increase in our knowledge of Indian mosquitoes within the past twenty years - an increase through which the Culicidae have become one of the best-known groups of insects in the Indian fauna - a great deal of work remains to be done before our knowledge even approaches completeness. As will be noted from Capt. Barraud's account, the larvae of 96 of the 239 described Indian Culicini are still unknown, and regarding the distribution of these and others within the area our information is very meagre". This statement more or less summarizes our present state of knowledge of Indian Culicidae. No major revisionary work has been undertaken after the publication of the basic original work on the mosquitoes of British India in the early part of the twentieth century by Christophers (1933) on anophelines and Barraud (1934) on culicine mosquitoes. Other earlier notable contributions were those of James and Liston (1911) and Puri (1930, 1931) on Anopheles. While much emphasis was placed on anophelines, culicine mosquitoes were comparatively neglected. At present one has to depend solely on the work of Barraud (1934). In spite of the vast amount of published material on these mosquitoes, no attempt has been made either to understand their ecology and distribution or adequately describe all of the life cycle stages. It also appears that very little attempt has been made to obtain authentically reared material of the sexes and stages and to analyze critically the correlated characters of the adults and the immatures. In addition, very little attention has been paid to the so-called pest mosquitoes whose role is becoming increasingly important in recent years due to changes in the ecology by human intervention.

AREA OF RESEARCH:

Geographically this tropical area embraces a variety of ecological habitats such as moderately high to very high mountain ranges, plateaus, semiarid and arid zones, highly fertile deltas, tropical rain forests and monsoon-dependent coastal areas. This subcontinent, therefore, appears to be an ideal setting for study of the systematics, ecology, behaviour, distribution and medical importance of mosquitoes.

TAXONOMY:

Belkin (1962) considers the true mosquitoes (Culicinae) as a subfamily of the family Culicidae. While Edwards (1932) recognized only 3 tribes in the subfamily Culicinae, Belkin divided it into 12 tribes and all these have representatives in India. In the present study, Belkin's classification will be followed and only Anophelini will not be taken up. The other 11 tribes, including Toxorhynchitini, will be studied and revised. The following are the tribes represented in the subcontinent and the genera belonging to the particular tribe are placed in brackets:

- Toxorhynchitini (Toxorhynchites)
- Uranotaenini (Uranotaenia)
- Culicini (Culex)
- Aedeomyiini (Aedeomyia)
- Hodgesiini (Hodgesia)
- Culisetini (Culiseta)
- Ficalbiini (Ficalbia)
- Mansoniini (Mansonia, Coquillettidia)
- Orthopodomyiini (Orthopodomyia)
- Aedini (Armigeres, Heizmannia, Aedes)
- Sabethini (Malaya, Topomyia, Tripteroides)

TAXONOMIC PROCEDURE:

The terminology, the method of presentation and the general taxonomic procedures will be those developed by Belkin (1962) and Belkin et al (1965). The primary objectives of the project will be to describe and illustrate in detail all the known stages of the culicine mosquitoes in the Indian subcontinent (preferably from topotypic material), to summarize all the readily available information on ecology, distribution, evolution and medical importance of each species, to describe new forms and previously undescribed stages, and to publish monographs on each genus or tribe. In addition, charts and maps will be incorporated to show the composition and detailed distribution of the elements of the mosquito fauna in this subcontinent.

Since the problem undertaken is tremendous and voluminous in terms of area and number of species, it is hoped that many local and foreign scientists will cooperate to make this venture a success.

ORGANIZATION AND FINANCIAL ASSISTANCE:

The headquarters of this project will be located in the Zoology Department, American College, Madurai, South India. Madurai, which is the second largest city in the State of Tamilnadu (formerly Madras State), is a cultural and industrial center and is easily accessible by rail, motor or air.

Because of the magnitude of the project, the cooperation of foreign scientists is absolutely essential for its success. Therefore plans are being made to submit a proposal to the National Science Foundation under the NSF Special Foreign Currency Program. This program welcomes proposals from institutions in the United States or participating countries for the support of joint ventures and cooperative endeavours between the U. S. and non U. S. scientists. As far as this proposal is concerned, this program allows scientists of USA and India to work together, exchange information on the systematics, biology, behavior, distribution and the medical importance of the culicine mosquitoes of this subcontinent. Therefore interested culicidologists should write to the National Science Foundation, Washington, D. C. for further information.

SIGNIFICANCE OF THIS RESEARCH:

Results of this proposed work should contribute significantly to a better understanding of the mosquito fauna of India. From the practical standpoint this study may be of considerable importance in the control of many mosquito-borne diseases. This is true to a large extent because of the resurgence of malaria, the spread of filariasis and the constant threat of many arboviral diseases. Equally significant may be the contributions of this study to a better understanding of the relict forms occurring in this area. Finally, this work when completed will yield a wealth of information to zoologists, epidemiologists and medical men.

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