**UNCLASSIFIED**

**AD NUMBER**

| AD042493 |

**LIMITATION CHANGES**

**TO:**
Approved for public release; distribution is unlimited.

**FROM:**
Distribution authorized to U.S. Gov't. agencies and their contractors; Administrative/Operational Use; 31 MAY 1954. Other requests shall be referred to Office of Naval Research, Arlington, VA 22203–1995.

**AUTHORITY**

ONR ltr, 26 Oct 1977
THIS REPORT HAS BEEN DELIMITED AND CLEARED FOR PUBLIC RELEASE UNDER DOD DIRECTIVE 5200.20 AND NO RESTRICTIONS ARE IMPOSED UPON ITS USE AND DISCLOSURE.

DISTRIBUTION STATEMENT A

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED.
Because of our limited supply, you are requested to return this copy WHEN IT HAS SERVED YOUR PURPOSE so that it may be made available to other requesters. Your cooperation will be appreciated.

NOTICE: WHEN GOVERNMENT OR OTHER DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE U. S. GOVERNMENT THEREBY INCURS NO RESPONSIBILITY, NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

Reproduced by
DOCUMENT SERVICE CENTER
KNOTT BUILDING, DAYTON, OHIO

UNCLASSIFIED
Reproduced FROM LOW CONTRAST COPY.
Outline for
OFFICE OF NAVAL RESEARCH

FINAL REPORT

Report Prepared By: G. W. Wharton

Date: 31 May 1954
For period 1 July 1950
through 31 May 1954

NR: 132-022

CONTRACT: N7-00R-45506 (With Duke University)

ANNUAL RATE: $9,123.00 for four year period

PRINCIPAL INVESTIGATOR: G. W. Wharton, Prof. and Head, Department of Zoology,
University of Maryland

Research Assistant: Flora Coriono, Junior Instructor, University of Maryland. Engaged on work for the project during the entire period.

Artist: Aline Hansens. $250.00 (125 hours at $2.00 per hour)
Collector: A. S. Pearse. $3.00 (5 hours at $1.00 per hour)
Collector: Clyde Robertson. $62.00 (62 hours at $1.00 per hour)
Collector: H. S. Chapa. $30.05 (2 weeks at 130 pesos = $30.05)
Technician: Jane Atkinson. $51.75 (39 hours at $1.35 per hour)
Typist: Ellen P. Drummond. $57.00 (57 hours at $1.00 per hour)

TITLE OF PROJECT: The Comparative Anatomy of the Mouth Parts of Mesostigmatic Mites.

OBJECTIVES: The numerous species of mites that comprise the suborder Mesostigmata were so imperfectly known that their classification, evolutionary trends, and structural adaptations for feeding were largely undetermined. Species included in the group are pests of man and his domestic animals, vectors of disease, parasites, predators, and important components of the fauna of the soil. Knowledge of the comparative anatomy of the mouth parts of these mites has made it possible to explain their adaptations for feeding as well as the evolutionary trends by which these adaptations were attained.

SUMMARY OF RESULTS

In the suborder Mesostigmata twenty-four gnathosomal structures have been named, defined and their homologies established. They are: the gnathosomal base, deuto sternum, gnathosomal setae, epistoma, tentorium, subcheliceral plate, internal cheliceral sheaths, external cheliceral sheaths, pharynx, teetum, labrum, epipharynx, epipharyngeal styli, hypopharynx, hypopharyngeal processes, hypopharyngeal styli, hypostome, hypostomal setae, hypostomal processes, salivary styli, protosternum, corniculi, chelicerae and pedipalps. All these structures except for the styli are present in each group of the Mesostigmata.
On the basis of the presence of either or both of the hypopharyngeal and/or the salivary styli, nine of the eleven cohorts considered under the Mesostigmata can be reduced to three groups.

**Group I:** Liroaspina-Zorconina-Gamasides  
   a) only with salivary styli

**Group II:** Trachytina-Diarthrophallina-Uropodina  
   a) with both salivary and hypopharyngeal styli

**Group III:** Megisthanina-Celaenopsina-Fedrissiina  
   a) only with hypopharyngeal styli

Other characteristics of these groups serve to reflect the affinities of the different groups within these three divisions; among these are the structures of the tectum, chelicerae, labrum, and the subcheliceral plate.

Certain adaptive trends which lack phylogenetic significance have also been studied and reported:

1. Scavengers may be modified by having extremely long chelicerae:  
   a. *Uropoda agitans* (Group II)

2. Predacious forms are usually equipped with heavily sclerotized, strong chelicerae which enable them to crush a chitinous integument:  
   a. *Pergamasus* sp. (Group I)  
   b. *Megisthanus floridanus* (Group III)  
   c. *Euscrocon latus* (Group III)  
   d. *Polyaspis* sp. (Group II)

3. Parasitic forms frequently have slender, stylet-like chelicerae which permit piercing the skin of their hosts:  
   a. *Bdellonyssus bacoti* (Group I)  
   b. *Diarthrophallina quercus* (Group II)

A study of certain of the Laelaptidae (belonging to Group II) demonstrated that the epipharynx is greatly enlarged and equipped with a sclerotized groove on its ventral surface. It is freely observable from the ventral surface of the mite. While it has not been observed to function in penetrating the host, it is possible from its structure that it is in a position to penetrate during the process of feeding and inject solutions into the host. It is interesting that *Laelaps jettmari* Vitzthum, 1930, one of the mites suspected of being involved in the epidemiology of hemorrhagic fever possesses such an epipharynx.

As a result of detailed notes and drawings of the type material found in the Berlese Collection in Florence, Italy, much information received in conferences held with the leading acarologists in Switzerland, Belgium, England, France and Italy, much information has been disseminated among American acarologists interested in specific mesostigmatid groups.
A revision of the Mesostigmata has been undertaken in collaboration with Dr. Joseph Camin of the Chicago Academy of Sciences as an outgrowth of the present project, the Berlese study and specimens from the islands of the Pacific, the Indo-Australian Region, South and Central America and other parts of the world. This revision will reflect the fact that only two major phyletic lines are included in the Mesostigmata rather than eleven as was previously thought. Groups I and II of this study are in the same phyletic line. Group III appears to be distinct.

Index of publications as a result of the present study:

Camin, J. and Flora E. Gorriossi.

Gorirossi, Flora E.

The anatomy of the feeding apparatus of Uropoda agitans Banks, 1908, a mesostigmatid mite. Amer. Midl. Nat. in press.


Gorirossi, Flora E. and G. W. Wherton.
Because of our limited supply, you are requested to return this copy WHEN IT HAS SERVED YOUR PURPOSE so that it may be made available to other requesters. Your cooperation will be appreciated.

NOTICE: WHEN GOVERNMENT OR OTHER DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE U. S. GOVERNMENT THEREBY INCURS NO RESPONSIBILITY, NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.