

POLYMORPHISM IN THE LOCAL POPULATIONS
OF Aedes aegypti (L.)

A Thesis

Presented to the
Faculty of the Graduate School
University of San Carlos

In Partial Fulfillment
of the Requirements for the Degree
Master of Science in Biology

by

Lourdes Cae. Alvez

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This Thesis attached hereto, entitled "POLYMORPHISM IN THE LOCAL POPULATIONS OF AEDES AEGYPTI (L.)," prepared and submitted by Lourdes Cae. Alvez, in partial fulfillment of the requirements for the degree of Master of Science in Biology, is hereby accepted.

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ABSTRACT

Coloration pattern and biological activities in Aedes aegypti are seen by authorities to be under genetic control. In the present study of the local populations of Ae. aegypti var. queenslandensis, two forms were observed as to morphology. These were classified as A- and B-forms.

A-form has profuse tergal-white scales which grade into six patterns. B-form has limited tergal-white scales which grade into three patterns. On the whole, nine intergrading tergal-white scale patterns were observed. Laboratory crossings showed a polygenic basis for the inheritance of these patterns.

With the morphological variations, between the two forms, significant differences in biological activities were observed. Differences were noted in habitat preference, reproductive potential, rate of developmental survival, sex ratio, life span, feeding behavior, manner of egg laying and choice of mate.

A-form was found more in the highlands far from the seashore, where few people live. B-form was more abundant in the plains near the shorelines, where a dense human population reside. However the A- and B-form populations overlapped in these areas.

A-form had a higher reproductive potential than the B-form. Yet the B-form had a higher rate of developmental survival than the A-form. But the A-form had a tendency for female preponderance while B-form had a fairly constant 1:1 sex ratio.

Bites of the A-form were painful. Those of the B-form were not painful or not as painful as the A-form. A-form laid eggs mostly on solid surfaces above the water line. B-form oviposited on either solid or liquid surfaces. The two forms also exhibited partial sexual incompatibility. A slight preference for mating with members of its own group was seen.

These differences indicate that these are two developing strains of Ae. aegypti in Cebu City and suburbs.

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INTRODUCTION

Any given group of organisms which inhabits different places is likely to exhibit continuous or discontinuous variation. These variations are collectively termed polymorphism. Polymorphism within a species results from changes within the genome of organisms brought about by either extrinsic and/or intrinsic factors. The study of polymorphism, by revealing the genetic variability of an insect pest, is of great economic importance, for genetic variation influences disease transmission, resistance to control measures, and breeding behavior.

Polymorphism is widely observed among insects. It guarantees their better adjustment to different environments. Because of their ability to adjust, insects often pose as man's most formidable enemies or competitors. The difficulty in reducing, if not destroying, this sinister relationship between man and insect pests lies partly in these highly adaptive variations which man has not yet fully resolved.

The true mosquitoes, a group of biting and flying insects under the family Culicidae, suborder Nematocera, order Diptera, shows extensive variation. In fact, morphological variants had been observed in the mosquito populations in Cebu City and neighboring areas, especially

Aedes aegypti (Schoenig)*. Aedes aegypti (L.) is the type species of the subgenus Stegomyia Theobald, 1901.

This mosquito is of economic importance for it is the carrier of yellow fever in Africa and in the Americas, of dengue fever in the tropics and hemorrhagic fever in Southeast Asia. This is doubly significant in the Southeast Asian countries where control of the vectors is not economically feasible.

A study of the varying strains of Ae. aegypti can give pure scientific information about genetics and morphology. Also it can result in improved and practical applications for vector control.

Since different strains may differ in their disease carrying and transmitting potentials and may react differently to control measures, the work described here was aimed to find out if the morphological variants present among local populations of Ae. aegypti indicate the presence of different strains. Cognizance of the presence of different strains will help man appropriate control measures and avoid unnecessary waste of money, time and effort.

In the beginning, researchers believed the species to be a homogeneous group showing uniform color pattern,

*Schoenig, E.H. 1968. Mosquito Survey in Cebu City, in unpublished report to the National Research Council of the Phil., c/o University of the Philippines, Quezon City.