

## ABSTRACT

The Architecture of the Compound Eyes of Two Jamaican Cave Insects,  
*Uvaroviella cavicola* (Insecta: Orthoptera) and *Neoditomyia farri* (Insecta: Diptera)  
A Light and Electron Microscopy Study

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This thesis elucidates the ultrastructural organization of the compound eyes of two cave insects *Uvaroviella cavicola* (Gryllidae : Orthoptera) Chopard and *Neoditomyia farri* (Mycetophilidae : Diptera) Coher, using light and electron microscopy, and to compare them with those of reported terrestrial Orthopteran and Dipteran species, respectively. The qualitative effects of long term dark adaptation and the functional significance of these effects on the compound eyes of both insects are stated and discussed.

The results are presented as scanned photographs and drawings from which observations and measurements are made.

The functionally divided eye of *Uvaroviella cavicola* comprises approximately 7500 and 500 ommatidial units in the main ventral area (MVA) and the dorsal rim area (DRA), respectively. In the MVA, the Dioptric Apparatus has lens facets 60-72  $\mu\text{m}$  long and eucone-type crystalline cones 140-160  $\mu\text{m}$  long; the rhabdom comprises 8 reticular cells 400-500  $\mu\text{m}$  long, is of the closed type and surrounded by pigment cells. In the DRA, the Dioptric Apparatus has lens facets 56-61  $\mu\text{m}$  long, eucone-type crystalline cones 38-45  $\mu\text{m}$  long; the closed rhabdom is 120-180  $\mu\text{m}$  long and surrounded by pigment cells.

The compound eye of *Neoditomyia farri* has 2000-2500 ommatidial units 150-190  $\mu\text{m}$  long. The Dioptric Apparatus has lens facets 6.5-7.2  $\mu\text{m}$  long, pseudocones 35-45  $\mu\text{m}$  long with cone cell processes extending into the rhabdom. The rhabdom is basically of the Dipteran type, that is, with 6 open peripheral rhabdomeres surround 2 central rhabdomeres arranged in a tandem position. The rhabdom is surrounded by pigment cells.

Long term light deprivation affects the ultrastructural integrity of the compound eyes of both cave insects in a qualitative manner; two such consequences are disorganization of rhabdomal microvilli and changes of number, position and structure of organelles.

**Keywords:** Michelle Antoinette Clarke; *Uvaroviella cavicola*; *Neoditomyia farri*; Compound Eye; Microvillar Disorganization; Dark Adaptation/ Light Deprivation; Orthoptera; Diptera.