ABSTRACT

The Architecture of the Compound Eyes of Two Jamaican Cave Insects, *Uvaroviella cavicolla* (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 cavicolla* (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 cavicolla* 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 μm long and eucone-type crystalline cones 140-160 μm long; the rhabdom comprises 8 retinular cells 400-500 μm long, is of the closed type and surrounded by pigment cells. In the DRA, the Dioptric Apparatus has lens facets 56-61 μm long, eucone-type crystalline cones 38-45 μm long; the closed rhabdom is 120-180 μm long and surrounded by pigment cells.

The compound eye of *Neoditomyia farri* has 2000-2500 ommatidial units 150-190 μm long. The Dioptric Apparatus has lens facets 6.5-7.2 μm long, pseudocones 35-45 μm 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 cavicolla*; *Neoditomyia farri*; Compound Eye; Microvillar Disorganization; Dark Adaptation/Light Deprivation; Orthoptera; Diptera.