

ULTRASTRUCTURE OF THE COMPOUND EYE OF THE MANTODEA

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The compound eyes of the mantodean insects are well-developed and characterized as a higher animal. The fine structure of compound eye of a mantodean, Tenodera aridifolia was observed by transmission electron microscopy.

The eye is of the apposition type and contains cones of the "eucone organization. Dioptric apparatus is comparatively large, composed of cornea and crystalline cones. The cone cell extension splits into four and enters the intercellular space of the retinula cells and they reach the level below the basement membrane. Just above the basement membrane, the cone extensions suddenly thicken and converge at the centre of an ommatidium to

become a bundle of 4 axons. However, under the basement membrane, the cone extensions disperse and each encloses an axon.

In each ommatidium, one finds a total of 8 retinula cells as in many insects. However, two retinula cells (R1 and R8 in Fig. 1) possess no rhabdomere. The other 6 cells (R2 to R7 in Fig. 1) contribute to the formation of the rhabdom. The nuclei of R1 and R8 are present more distally and proximally to other 6 retinula

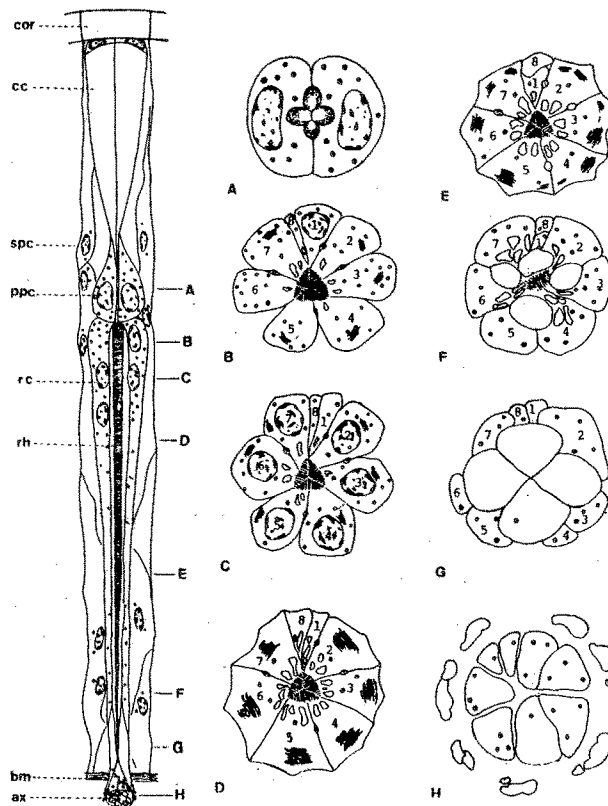


Fig. 1. An ommatidium of *Tenodera aridifolia* in longitudinal section and transverse section at representative levels (A-H) (the scale is not same). Numbers on the right side of the longitudinal section indicate the figure numbers of region illustrated by electron micrographs. ax, axon bm, basement membrane cc, crystalline cone cor, cornea ppc, primary pigment cell rc, retinula cell rh, rhabdom spc, secondary pigment cell.

cells. Pigment granules were present in the cytoplasm of all retinula cells. Those granules were especially abundant in the distal region of the retina.

Numerous organelles such as mitochondria, Golgi bodies, multivesicular bodies, smooth and rough ER are seen in cytoplasm of the retinula cells. The retinula cells have numerous vacuoles in the endoplasmic reticulum called 'palisade' as in other orthopteroid insects. It is interesting that the pigment grains in retinula cells show various degrees in spite of adult.

The rhabdom is triangular, and of "fused type". As mentioned above, each ommatidium is composed of 8 retinula cells, of which 6, or 3 pairs, contribute to a rhabdom with its cross-section divided into three regions, with microvilli pointing at angles of approximately 120° to each other.

In pigment cells, there are 2 primary pigment cells and a number of secondary pigment cells per ommatidium. The secondary pigment cells contain few pigment grains and a number of microtubules ordered parallel to each other and to the long axis of ommatidia.

As a conclusion, the fine structures of the ommatidium of Tenodera (Mantodea) resemble those of the other orthopteroid insects except that of the Dermaptera (McLean and Horridge, 1977).

References

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