Available online at http://www.ijims.com
ISSN: 2348 – 0343

Diurnal Rhythms in Retinal Pigment Movements in Freshwater crab, *Barytelphusa jaquimontii*

Sudha Bansode* and Meena Patil
Shankarrao Mohite Mahavidyalya, Akluj, Dr. Babasaheb Ambedkar Marathawada University, Aurangabad,India
*Corresponding author: Sudha Bansode

Abstract

Daily Rhythms in Retinal pigment movements were observed in crab eyestalk. The crab B. *jaquimontii* acclimatized to laboratory conditions were considered. The three groups: natural photoperiod (6:18), a group kept in constant darkness (12:12) and a group kept at constant light (24L: OD) was studied for three days. After begin of experiment, the eyestalk were excised for every 4 hr interval, to determine the position of retinal pigments. The method adapted by Lazzari (1992) and Reisenman et al (1998) were used. By this experiment we could study the daily rhythms shown by rentinal pigments in crab, *Barytelphusa jaquimontii*.

Key words: Diurnal rhythms, Retinal pigment movements, freshwater crabs

Introduction

Experiments were carried out to study retinal migration in crab, B *jaquimontii* the general procedure followed are cited under material methods.

Materials and Methods

B. jaquimontii used for present investigation were collected and they were maintained in the laboratory in a large aquarium supplied with freshwater and the animal were randomly selected without sex discrimination. The experiments were performed in the daytime between the hours of 7.30 a. m. and 6.00 p.m. during the 2002 - 2003.

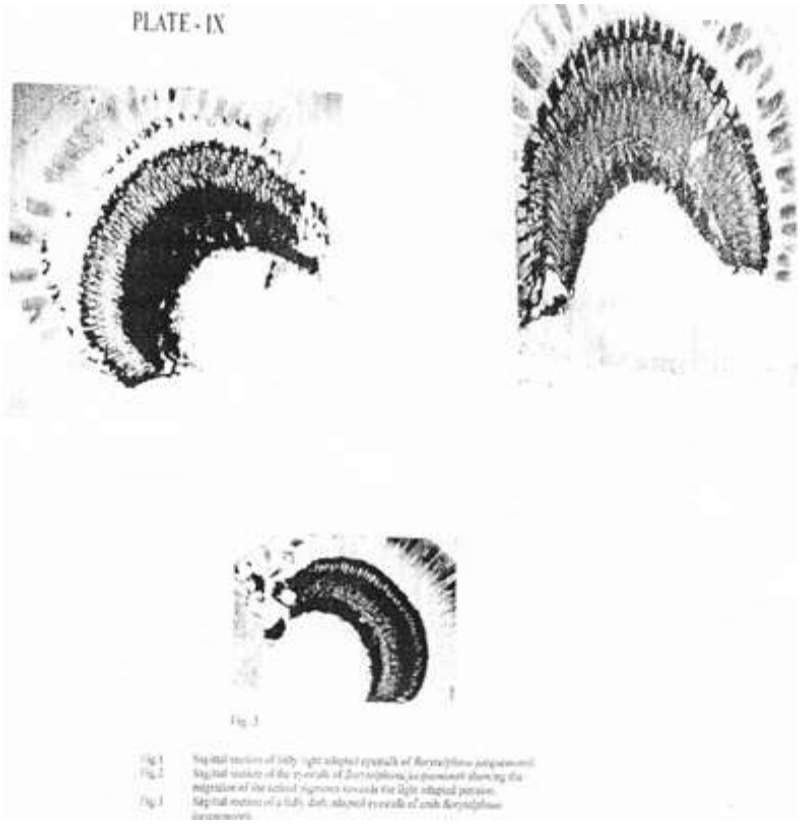
The positions of retinal pigments were determined by observation of sectioned eyestalk. The observations were done by using the method of Fingerman and Nagbhushanam (1963). The crabs were killed rapidly by immersion in boiling water for at least 15 second so that, the additional migration of the retinal pigment was stopped. Then, both eyestalk were removed and fixed in Bouin's fluid. After being dehydrated and embedded, the eyestalks were sectioned at 7 to 8 um, since the reflecting pigment of B. *jaquimontii* remained stationary in light and darkness; the present observation were confined to the distal and proximal retinal pigments to express position of retinal pigments.

The experiments were carried out to study retinal migration in crab, B. *jaquimontii* the general procedure followed are cited under material methods however the special experiments setup here.

B. *jaquimontii* used for present investigation were collected and they were maintained in the laboratory in a large aquarium supplied with freshwater and the animals were randomly selected without sex discrimination. The experiments were performed in the daytime between the hours of 7.30 a.m. and 6.00 p.m. during the 2002, 2003.

Results

The positions of retinal pigments were determined by observation of selected eyestalk. The observations were done by using the method of Fingerman and Nagbhushanam (1963). The crabs were killed rapidly by immersion in boiling water for at least 15 second so that, the additional migration of the retinal pigment was stopped. Then, both eyestalk were removed and fixed in Bouin's fluid. After being dehydrated and embedded, the eyestalks were sectioned at 7 to 8 um, since the reflecting pigment of B. *jaquimontii* remained stationary in light and darkness; the present observation were confined to the distal and proximal retinal pigments to express position of retinal pigments quantitative terms. (Plate IX, Fig. 1.2.3) The positions of pigments were measured with the aid of an ocular micrometer under the compound microscope. The technique for measurement was – i) Cornea to distal edge of the distal pigment, ii) Cornea to distal edge of the proximal pigment, iii) Cornea to basement membrane, whose position was fixed.



Summary

The compound eye of crustaceans contains many ommatedia. Each ommatedium is with rhabdom surrounded by three pigments, distal, proximal and reflecting. The experiments were carried out to show the hourly rhythmicity in the movements of these there migratory pigments. In crab, *B jaquimontii* from 8.00 to 4.00 pm, the compound eye of this crustacean showed light adaptation where as 8.00 to 4.00 a. m. in the early morning the compound eye showed dark-adapted condition. During the rest hours of the day and night, pigment showed transitory position of migration from dark to light adoption and vice versa.

References

Arechiga H and Wiresma CA (1969) Circadian rhythm of responsiveness in crayfish visual units. J. Neurobiol II (11) 71-85.

Arechiga H and Mena F (1975) : Circadian variation of hormonal content in the nervous system of the crayfish. Comp. Biochem Physiol 52 A: 581-584

Arechiga H (1977) : Circadian rhythmicity in nervous system of crustaceans. Proc. Am. Soc. Expt. Biol. 36: 2036-2041.

Arechiga H and Rodrigues-Sosa (1997) : Coupling of environmental and endogenous factors in control of rhythmic behavior in decapods crustaceans. J. Mar. Bio. Ass. U.K. 98: 75-80.

Arechiga H. and Rodriguez-Sosa (1998) : Circadian clock function in isolated eyestalk tissue of crab. Proc. R. Soc. Lous 256: 1819-1823.

Alexandrowiez J.S. (1932) : Innervation of the heart of crustacean (Decapoda). Q.J. Micros. Sci 75: 182-249.

Aoto T. (1966) : Diurnal variation in chromatophorotropic potency of the neurosecretory system of the freshwater prawn, *Palaemon paucidens*. Fac. Sci. Hokkaid Univ. Ser. VIZool. 16: 113-120.

Arechiga H. and Rodrigues-Sosa (1993): The circadian system in crustaceans Chronobiology. 1-19.

Arechiga H. and Rodrigues-Sosa (1993): The circadian system in crustaceans Chronobiology. Int. 10: 1-19.

Arechiga H., Fernandez – Quiroz F, Fernander de, Miguel F, Rodriguez – Sosa L. (1998): The circadian systems of crustaceans. Chronobiology. Int. 11: 1-19.

Autrum H. (1981) : Light and dark adaptation in invertebrates and evolution of vision in invertebrates. Invertebrate visual centers and behavior chapter I and II : 1-91.

Babu B. T., Shyamasundari K. and Rao K. H. (1989). Observations on the nature of neurosecretion in the marine crab, *Portunus sanguinolentus* Folia Morpholl. 37 (3): 274-384.

Brown FA. Bennett M.P. and Webb H.M. (1954): Daily and tidal rhythms of oxygen consumption of Fiddler crab J. cell. Comp. Physio. 41: 477-506.

Bosch H. F. and Taylor W.R. (1973): Diurnal variation migration of an esturine *Cladeceran podan polyphemoides* in Chesapeake Bay. Mar. Bio. (Berlio) 19: 172-181.

Bunning E. (2003): The physiological clock: circadian rhythmicity and biochronometry. J. Exp. Bio. 86: 91-98.

Brown F. A. (1970) : The biological clock: Academic Press, New York.

Bunning E. (1973): The physiological clock: Efforts of external factors on circadian rhythms, physiological bases and significance of rhythms for orientation and photoperiodism.