OCULAR LENS DIAMETER AND WEIGHT AS AN AGE INDICATOR IN *Leiognathus equulus* COLLECTED FROM THE SEA OF OMAN, SULTANATE OF OMAN

Jawad[1]*, L. A., Al-Mamry[1], J. M., Al-Bimani[2], S.M.H., Al-Ghafari[2], F.K.S., Al-Mamry[1], D. S., Al-Rasady[1], I.H., Al-Marzouqi[1], M. S. , Al-Habsi, S.H.

Summary

In the leiognathid fish, *Leiognathus equulus* the diameter of the eye lens can be used for identifying first-year animals, while the eye lens weight proved unreliable for age determination.

Key words*:* ocular lens diameter, ocular lens weight, *Leiognathus*, The Sea of Oman, Oman

INTRODUCTION

The common pony fish, *Leiognathus equulus*, is mostly marine species inhabiting several habitat i.e. freshwater; brackish; demersal; amphidromous at depth ranging between 10-110 m. Usually the adults inhabit coastal areas and live on soft bottom. The juveniles are commonly found in estuaries and tidal creeks (F r o e s e and P a u l y, 2011).

It distributed from South Africa to Red Sea and the Arabian Gulf. It is also recorded from Mauritius and Seychelles and the western Pacific from Queensland, New Caledonia, Ryukyu Islands, the Mariana Islands, Caroline Islands, and Samoa (R a n d a l l, 1995).

Adults of *L. equulus* move in shoals and feed on polychaetes, small crustaceans, small fishes (S o m m e r et al., 1996) and worms (R a i n b o t h, 1996). It is considered among the important food fish in the tropics (S m i t h, 1986). In Oman, this species is one of the important small pelagic fish species and sold either fresh or dried (A l - A b d e s s a l a a m, 1995).

Both eye lens diameter and eye lens weight have been used for the age determination

1 Marine Science and Fisheries Centre, Ministry of Fisheries Wealth, Sultanate of Oman, P.O. Box 427, Postal Code 100 Muscat; High Technical College, Muscat, Sultanate of Oman.
* Corresponding author: laith_jawad@hotmail.com

of a variety of animals. Eye lens weight was also used for studying the effect of nutrition on the process of age determination in vertebrates (T e s k a and P i n d e r, 1986). In teleost fishes, studies using these eye lens parameters as age indicators include C a r l t o n and J a c k s o n (1968), B u r k e t t and J a c k s o n (1971), C r i v i l l i (1980), S a l e e m et al. (1990), D o u g l a s (1987), A l - H a s s a n et al. (1991, 1992), A l - H a s s a n and A l – S a y a b (1994), C o n i d e s and A l – H a s s a n (2000), J a w a d (2001, 2003, 2004) and J a w a d et al. (2001). The aim of this study is to determine the validity of the eye lens diameter and weight as age indicators in the Oman Sea fish *L. equulus*.

MATERIALS AND METHODS

Specimens of *L. equulus* (n= 783) were obtained from the coasts of Muscat City on the Oman Sea. The eye lens diameter and weight were measured to the nearest millimeter and gram following J a w a d (2003). The large bone such as operculum and preoperculum were used to determine the age following A l – H a s s a n and A l – S a y a b (1994). The bones on both left and right sides were twice read independently, using an ordinary dissecting microscope for verification. One way analysis of variance followed by Duncan's multiple range test (H a r r a w a y, 1997) were applied to test the differences between the total length of the fish and its age.

RESULTS AND DISCUSSION

Based on the bone, the age of *L. equulus* ranged from less than one year to two years. There was a clear overlap in the body length of different age classes, with no significant difference ($p>0.05$) (Figure 1). There was a slight increase in the average lens diameter with age within different age groups. The showed that the eye lens diameter of the fish individuals that did not finished their first year of life did not overlap with the ranges of the eye lens diameter of subsequent year classes (Figure 2). The ages of fishes in year classes I & II could not be determined using the present technique (Figure 2).

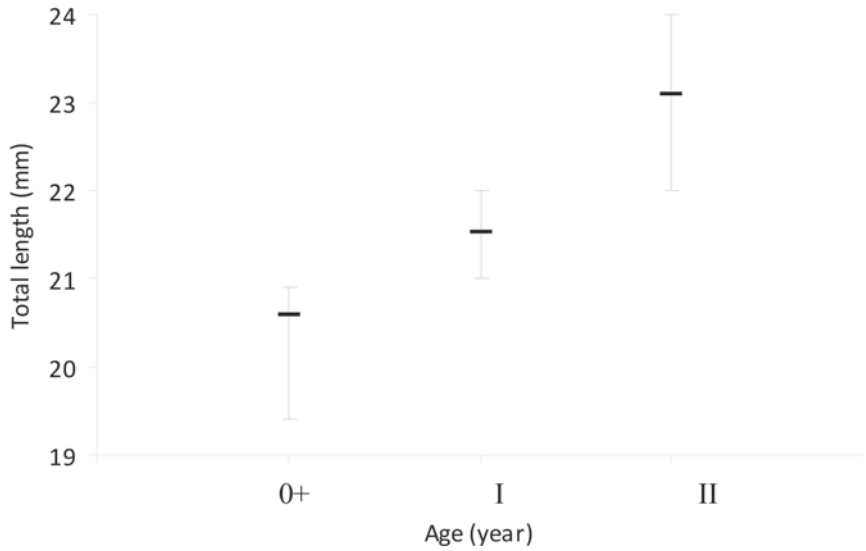

Figure 1. Total length vs age (determined from opercular bone) of L. equulus*. Vertical bars represent range of fish total length and horizontal lines represent mean fish length*

Slika 1. Prikaz odnosna ukupne dužine i starosti L. equulus*. Vertikalna linija označava raspon ukupne dužine riba, a horizontalna predstavlja srednju vrijednost dužine*

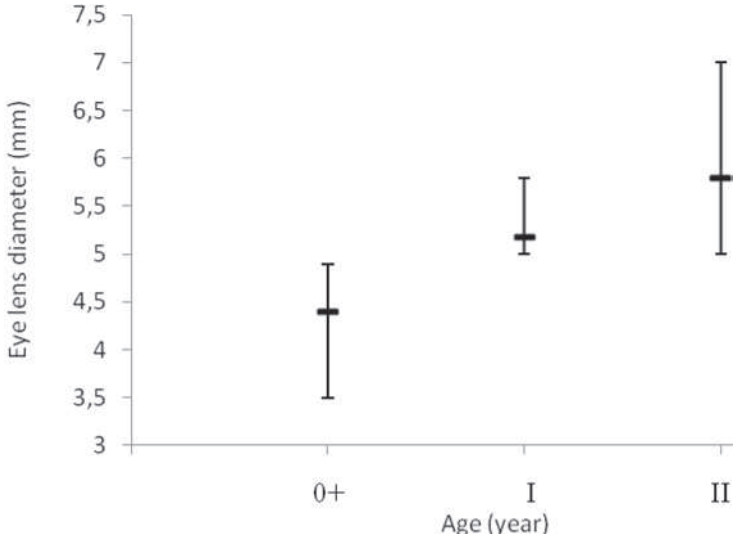

Figure 2. Lens diameter vs age (determined from opecular bone) of L. equulus*. Vertical bars represent total range of lens diameter and horizontal lines represent mean diameter*

Slika 2. Prikaz odnosa dijametra leće i starosti L. equulus*. Vertikalna linija označava ukupni raspon dijametra leće, a horizontalna predstavlja srednju vrijednost dijametra*

Similar results were obtained for the Brown Trout, *Salmo trutta* (D o u g l a s, 1987) and *Lithognathus mormyrus* and *Diplodus vulgaris* (C o n i d e s and A l – H a s s a n, 2000) and *Saurida undosequamis* and *Sillago sihama* (J a w a d, 2003). C a r l t o n and J a c k s o n (1968) and B u r k e t t and J a c k s o n (1971) also failed to find such a relationship during their study of different fish species.

Different environmental factors can alter the growth rate in different fish species living in different habitats (W o o t t o n, 1990). Temperature is probably the most important environmental parameter for tropical fish species as regards to their growth rate. Several authors reported on the relationship between temperature and the growth rate of fish that live in such tropical habitats (A h m e d, 1982; K h a l a f et al., 1986). In such habitats, almost uniform temperature regiems dominate. *L. equulus* experiences a narrow range of variation in water temperature all year round. There is thus a great possibility that changes in growth rate in this species from different year classes cannot be detected in its eye lens diameter, and that an accurate age determination using this parameter is ultimately invalidated. This situation is similar to fish ageing in tropical regions, where well-defined annual rings failed to appear on their scales (W o o t t o n, 1990).

The data on *L. equulus* show complete overlap in eye lens weight among the age groups (Figure 3), precluding accurate age determination. The presence of this overlap may correlate with the development of sexual maturity (C r i v i l l i, 1980). During the reproductive period, energy is transformed from somatic to gonadal growth. Since the increase in lens weight is closely correlated with somatic growth, the variation in individual reproduction development (hence variation in somatic growth) could result in an increased variation in lens weight within an annual group.

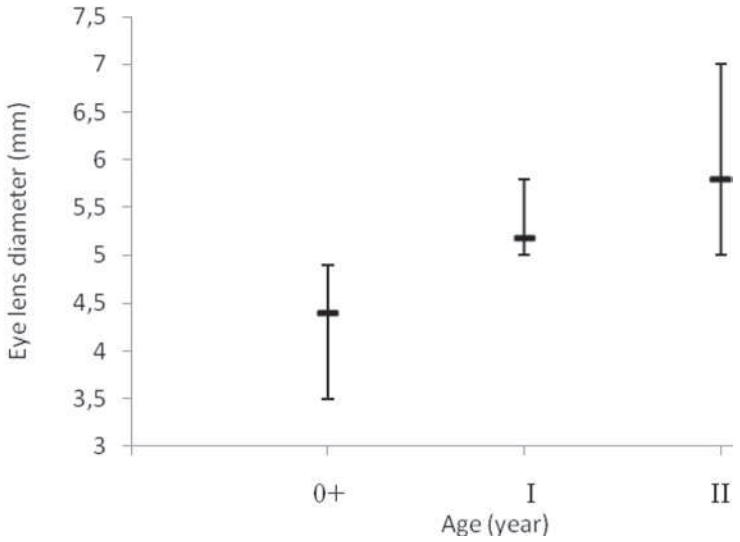

Figure 3. Lens weight vs age (determined from opercular bone) of L. equulus*. Vertical bars represent range of lens weight and horizontal lines represent mean lens weight*

Slika 3. Prikaz odnosa težine leća i starosti L. equulus*. Vertikalna linija označava raspon težine leće, a horizontalna predstavlja srednju vrijednost težine leće*

Sažetak

DIJAMETAR I MASA OČNE LEĆE KAO INDIKATOR STAROSTI *Leiognathus equulus* SAKUPLJENIH IZ MORA OMANA

Jawad[1]*, L. A., Al-Mamry[1], J. M., Al-Bimani[2], S.M.H., Al-Ghafari[2], F.K.S., Al-Mamry[1], D. S., Al-Rasady[1], I.H., Al-Marzouqi[1], M. S. , Al-Habsi, S.H.

U ribi, *Leiognathus equulus* korišten je dijametar očne leće za određivanje jednogodišnjih organizama, dok se masa očne leće nije mogla uzeti kao pouzdana za određivanje starosti.

Ključne riječi: dijametar očne leće, masa očne leće, *Leiognathus*, Omansko more, Oman

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1 Marine Science and Fisheries Centre, Ministry of Fisheries Wealth, Sultanate of Oman, P.O. Box 427, Postal Code 100 Muscat; High Technical College, Muscat, Sultanate of Oman.
* Corresponding author: laith_jawad@hotmail.com

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