Iran. J. Ichthyol. (December 2017), 4(4): 384-387
P-ISSN: 2383-1561; E-ISSN: 2383-0964
http://www.ijichthyol.org

Received: October 18, 2017
Accepted: November 29, 2017
doi: 10.22034/iji.v4i3.211

Short Communication

Length weight relationships estimated for eight ponyfishes (Teleostei: Leiognathidae) from the northern Arabian Sea coast

Nazia QAMAR[1], Noureen FAROOQ[1], Sher Khan PANHWAR[1*], Baradi WARYANI[2]

[1]*Fishery Biology Laboratory, Center of Excellence in Marine Biology, University of Karachi, Sindh, Pakistan.*
[2]*Department of Freshwater Biology and Fisheries, University of Sindh, Jamshoro, Pakistan*.
[*]*Email:* sk.panhwar@uok.edu.pk

Abstract: This study documents length-weight relationships (LWRs) for a total of 411 specimens belonging to 8 ponyfish species (Leiognathidae) mainly caught as bycatch using gill nets, pelagic and demersal trawls, by medium sized commercial vessels operated in the northern Arabian Sea. Significant length-weight relationships with high correlation coefficients were found for all species. The coefficient of determination r^2 value ranged from 0.90-0.99. The LWRs for *Nuchequula blochii* and *Secutor interruptus* are recorded for the first time and new maximum total length (26.5cm) for *Karala daura* is reported for the first time.

Keywords: Leiognaths, Slip-mouth fishes, LWRs, Northern Arabian Sea.

Citation: Qamar, N.; Farooq, N.; Panhwar, S.H. & Waryani, B. 2017. Length weight relationships estimated for eight ponyfishes (Teleostei: Leiognathidae) from the northern Arabian Sea coast. Iranian Journal of Ichthyology 4(4): 384-387.

Introduction

Ponyfishes are commonly known as slipmouths, belong to the family Leiognathidae and are widely distributed in inshore and estuarine waters of tropical and sub-tropical regions (McFall-Ngai & Dunlap 1983; Bianchi 1985). Most of their relatives are small, mainly caught as bycatch and often used for fish meal production. Almost all members of the family possess a small bacterial organ having a gram-negative bacteria, *Photobacterium leiognathi* located in the throat region that produces luminance (Paxton & Esch 1998) which may be used for communication (Sasaki et al. 2003) and provides assistance in predation (McFall-Ngai & Dunlap 1983). On the LWR (Farooq et al. 2017; Qamar & Panhwar 2017; Panhwar et al. 2017) reported LWR of some important fish species from northern Arabian Sea coast of Pakistan. Present study documents LWRs for eight species of family Leignathidae and records new maximum length for the first time for *Karala daura.*

Materials and Methods

Specimens were caught as bycatch with different fishing gears such as gill net, pelagic and demersal trawls by medium sized commercial vessels operated in the northern Arabian Sea coast during 2014-2015. Fresh specimens were placed in the iceboxes and transported to the fishery Biology Laboratory of the CEMB, University of Karachi. Each species was identified (see Fischer & Bianchi 1985), body measurements include total length (TL), standard length (SL), body circumference and weight at 0.01g. Appling parabolic equation $W=aL^b$ (LeCren 1951), length weight relationship of each species was estimated after transformation of raw data on natural logarithms (W is individual weight, L is length and parameters a and b as estimated from the equation).

Results

The parameters of length-weight, coefficient of determination (r^2), slope (b), intercept (a) and

Table 1. Summary of regression parameters after transforming on natural log (ln) estimated for eight species of the family Leiognithadae collected in this study.

Species	N	TL range (cm)		*a*	CL_{95} *a*	*b*	CL_{95} *b*	SE*b*	r^2
Equulites lineolatus (Valenciennes, 1835)	5	5.5	9.5.0	0.004	-6.994–-3.882	3.593	2.766–4.421	0.2600	0.984
Gazza minuta (Bloch, 1795)	27	5.8	8.50	0.027	-5.022–-2.146	2.683	1.852–3.514	0.403	0.900
Karala duara (Cuvier, 1829)	63	11.9	26.5	0.016	-4.612–-3.550	3.102	2.892–3.311	0.105	0.935
Leiognathus equulus (Forsskål, 1775)	9	7.9	27.5	0.022	-2.012–-2.387	3.178	2.893–3.463	0.102	0.996
Leiognathus brevirostris (Valenciennes,1835)	5	8.5	10.1	0.031	-4.656–2.281	2.751	2.190–3.312	0.176	0.987
Nuchequula blochii (Valenciennes, 1835)	66	7.1	9.00	0.096	-3.251–-1.416	2.171	1.703–2.638	0.234	0.963
Photopectoralis bindus (Valenciennes, 1835)	78	5.5	10.4	0.025	-4.033–3.284	2.836	2.650–3.022	0.093	0.923
Secutor interruptus (Valenciennes, 1835)	35	3.1	7.3	0.009	-2.230–-1.823	3.259	2.969–3.549	0.140	0.955

confidence limits (CL_{95}) for intercept and slope are summarized in (Table 1). Estimates of (*a*) were within the range of 0.001 and 0.05 as described by Froese (2006). The *b* value ranged between 2.171 and 3.593 (Table 1) which remain within the expected range of 2-4 reported by Tesch (1971). The LWRs of *Nuchequula blochii* and *Secutor interruptus* is recorded for the first time along with new maximum length for *Karala daura* were also recorded for the first time.

Discussion

The range of *b* values estimated for eight ponyfishes was within the expected range of 2-4 reported by Tesch (1971) and near the range of 2.5-3.5 reported by Froese (2006). The LWRs showed a high coefficient determination, indicating the reliability of our results for the estimation of the length–weight. The information on the LWR of the ponyfishes available in the FishBase database (Froese & Pauly 2015) was compared and found new record of maximum total length (26.5. cm) for *Leiognathus daura*. The parameters estimated for *Photopectoralis bindus* were close to those reported earlier (Letourneur et al. 1998; Deyresani et al. 2015). The *b* value for *Secutor interruptus* was similar to that of reported (Letourneur et al. 1998). Interestingly, the parameter *b* estimated for *Gazza minuta*, *L. equulus*, *Nuchequula blochii*, *L. daura* and *Secutor interruptus* showed variation in growth pattern in different waters. This change in *b* value could be a reason of their small sample size, seasonal changes, gut fullness, gonads development (Jenning et al. 2001). It is interpretable from the coefficient of determination that *L. duara*, *N. blochii*, *Gazza minuta*, *L. equulus* and *S. interruptus*, LWR showed weaker correlation in *a*, *b* parameters, whereas, strong correlation estimated for *S. interruptus, Photopectoralis bindus*, *Equulites lineolatus* and *L. brevirostris.* In general, regression coefficient may be affected by habitat preference, ontogenetic changes, availability of food, degree of gut fullness, and fish susceptibility for disease (Weatherley & Gill 1987). The lowest minimum length found 3.1cm TL for *Secutor interruptus* and highest maximum length found to be 27.5 cm TL for *Leiognathus equulus*. The LWRs for eight species contributes to the knowledge of fish species (*Gazza minuta, Photopectoralis bindus*, *L. brevirostris*, *K. duara*, *Equulites lineolatus* and *S. interruptus*) in the northern Arabian Sea coast of Pakistan which had seldom and no previous LWR record. Estimates of the regression generated from this study will help scientists and fishery managers more confidently estimate growth parameters of

ponyfishes from the range of their distribution. Besides, this study provides basic information on the LWRs of eight pony fishes which could serve as baseline data for further biological research.

Acknowledgments

The research is supported by the Higher Education Commission (HEC), Pakistan under NPRU programme grant No. 3690.

References

Bianchi, G. 1985. Field guide to the commercial marine and brackish-water species of Pakistan. FAO identification sheets for fishery purpose, PAK/77/033 and FAO (FIRM) regular program; pp. 1-200.

Deyrestani, A.; Alavi-Yeganeh, S.A. & Sadeghizadeh, M. 2015. Length– weight and length–length relationships of six ponyfish species from the Persian Gulf. Croatian Journal of Fish 73: 67-69.

Farooq, N.; Qamar, N.; Rashid, S. & Panhwar S.K. 2017. Length-weight relationship of eleven marine catfishes from the northern Arabian Sea coast of Pakistan. Chinese Journal of Oceanology and Limnology 35(5): 1218-1220

Froese, R. 2006. Cube law, condition factor and weight-length relationships: history, meta-analysis and recommendations, Journal of Applied Ichthyology 22: (4): 241–253.

Jenning, S.; Kaier, M. & Reynolds, J. 2001. Marine Fisheries Ecology, ISBN: 978-0-632-05098-7, Willey Black. 432 p.

LeCren, E. 1951. The length-weight relationship and seasonal cycle in gonad weight and condition in the Perch (*Perca fluviatilis*), Journal of Animal Ecology 20: 201-219.

Letourneur, Y.; Kulbicki, M. & Labrosse, P. 1998. Length-weight Relationship of Fishes from Coral Reefs and Lagoons of New Caledonia - An Update. Naga, the ICLARM Quarterly 46-56.

Mcfall-Ngai, M.J. & Dunlap, P.V. 1983. Three new modes of luminescence in the leiognathid fish *Gazza minuta*: discrete projected luminescence, ventral body flash, and buccal luminescence. Marine Biology 73: 227-237.

Qamar N. & Panhwar S.K. 2017. Length-weight relationships of nine rarely occurring species of the family Carangidae (Pisces) from the northern Arabian Sea. Journal of Applied Ichthyology –DOI:10.1111/jai.13540

Moutopoulos, D.K. & Stergiou, K.I. 2002. Length–weight and length– length relationship of fish species from the Aegean Sea (Greece), Journal of Applied Ichthyology 18: 200-203.

Panhwar, S.K.; Qamar, N.; Mairaj, M.; Shaikh, W.; Farooq, N.; Habib, N.; Han, Z. & Gao, T. 2017. Length weight relationship, sex ratio and growth estimates for five sympatric sillaginids (Pisces), from the northern Arabian Sea coast. Journal of Applied Ichthyology 33(3): 336-339.

Paxton, J.R. & Esch, W.N. 1998. Encyclopedia of fishes, Academic Press Inc. (London, Ltd).

Sasaki, A.; Ikejima, K.; Aoki, S.; Azuma, N.; Kashimura, N. & Wada, M. 2003. Field evidence for bioluminescent signaling in the pony fish, *Leiognathus elongates*. Environmental Biology of Fishes 66(4): 307-311.

Tesch F.W. 1971. Age and growth. In: W.E. Ricker (Ed.), Methods for Assessment of Fish production in Fresh Waters. Blackwell Scientific Publications, Oxford, 99-130.

Weatherley A.H. & Gill, H.S. 1987. The Biology of Fish Growth. Academic Press, London, UK. 443 p.

Iran. J. Ichthyol. (December 2017), 4(4): 384–387
© 2016 Iranian Society of Ichthyology
P-ISSN: 2383-1561; E-ISSN: 2383-0964
http://www.ijichthyol.org
Received: October 18, 2017
Accepted: November 29, 2017
doi: 10.22034/iji.v4i3.247

یافته علمی کوتاه

رابطه طول و وزن هشت گونه پنجزاری ماهی (ماهیان استخوان حقیقی: پنجزاری ماهیان) از سواحل شمال دریای عرب

نازیا قمری[۱]، نورین فاروق[۱]، سحرخان پانوار*[۱]، بارادی واریانی[۲]

[۱]آزمایشگاه زیست‌شناسی، مرکز زیست‌شناسی دریا، دانشگاه کراچی، سند، پاکستان.
[۲]گروه زیست‌شناسی آب‌شیرین و شیلات، دانشگاه سند، جامشور، پاکستان.

چکیده: این مطالعه به بررسی رابطه طول-وزن ۴۱۱ نمونه ماهی متعلق به ۸ گونه از پنجزاری ماهیان (Leiognathidae) که عمدتاً به‌عنوان صید ضمنی تورهای گوشگیر و ترال‌های پلاژیک و کف کشتی‌های تجاری با اندازه متوسط فعال در شمال دریای عرب صید می‌شوند، می‌پردازد. روابط معنی‌دار طول-وزن با ضریب همبستگی بالا در همه گونه‌های مورد مطالعه یافت شد و مقدار ضریب r^2 نیز بین ۰/۹۹-۰/۹ بود. LWRs گونه‌های *Nuchequula blochii* و *Secutor interuptus* برای نخستین بار ثبت شده و یک حداکثر طول کل ۲۶/۵ سانتی‌متر برای *Karala daura* نیز برای اولین بار گزارش می‌شود.

کلمات‌کلیدی: Leiognathes، پنجزاری ماهیان، رابطه طول و وزن، شمال دریای عرب.