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LENGTH-WEIGHT RELATIONSHIPS OF FIVE CULTRINAE FISH SPECIES AND TWO OF THEIR HYBRIDS FROM CHINA

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ABSTRACT

TThe length-weight relationships (LWRs) were determined for five freshwater fish species collected from Liangzi Lake, the Xi River and Longxi River in China, including *Megalobrama amblycephala*, *Megalobrama skolkovii*, *Megalobrama pellegrini* and *Megalobrama terminalis* belonging to the genus *Megalobrama*, as well as white Amur bream (*Parabramis pekinensis*) of the genus *Parabramis*. Three of these five species had no previous LWR estimates in the FishBase. The LWRs of hybrids from *Megalobrama amblycephala* ♀ × *Parabramis pekinensis* ♂ and *Megalobrama amblycephala* ♀ × *Megalobrama terminalis* ♂ were also reported for the first time.

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INTRODUCTION

There are five bream fish species distributed in Chinese natural lakes or rivers, including *Megalobrama amblycephala*, *Megalobrama skolkovii*, *Megalobrama pellegrini* and *Megalobrama terminalis* belonging to the genus *Megalobrama* (Cultrinae), as well as white Amur bream (*Parabramis pekinensis*) of the genus *Parabramis*, the sister genus of *Megalobrama*. The morphological characteristics of these five species are very similar to each other (Song et al., 2013). Because of their economically valuable traits, bream fishes have been considered as the main aquaculture fish species in China since 1960s (Ke, 1965). The hybridization of these five species had been conducted to produce more superior varieties (Gao et al., 2014). Length-weight relationships (LWRs) of fish species can be applied to depict morphological comparisons among species and populations (Froese, 2006; Froese et al., 2011). In this study, the LWRs for these five bream species from their natural distributed lakes or rivers in China were determined. Two hybrids artificially produced from *Megalobrama amblycephala* ♀ × *Parabramis pekinensis* ♂ and *Megalobrama amblycephala* ♀ × *Megalobrama terminalis* ♂ were also included in the present study.

MATERIALS AND METHODS

Specimens of five bream species were collected from their natural distributed lakes or rivers in China between 2008 and 2012, with *Megalobrama amblycephala*, *Megalobrama skolkovii* and *Parabramis pekinensis* from Liangzi Lake in Hubei province, *Megalobrama terminalis* from the Xi River in Guangdong province, *Megalobrama pellegrini* from the Longxi River in Sichuan province. Specimens were identified to species according to the literature ispraviti (Xie, 2009; Song et al., 2013). Two hybrids of *Megalobrama amblycephala* ♀

× *Parabramis pekinensis* ♂ and *Megalobrama amblycephala* ♀ × *Megalobrama terminalis* ♂ were artificially produced in Fish Breeding Base of College of Fisheries, Huazhong Agricultural University, Hubei province of China. Fish samples were measured to the nearest 0.1 cm (standard length, L) and weighed to the nearest 0.1 g (weight, W). For each species, the relationships between standard length and weight were determined by log transformed equation: Log(W) = log(*a*) + *b*log(L), where L is the standard length (cm), W is the total body weight (g), and *a* and *b* are the parameters of the linear regression (Froese, 2006). Log-log plots within species were done to remove outliers using SPSS 22.0 (SPSS Inc. Ltd., California). The records can be used if the correlation coefficient given was > 0.8 (Froese, 2006).

RESULTS

A total of 960 species were studied for length-weight relationships in the present study. Statistics and estimated parameters of LWRs for the seven species are shown in Table 1. Coefficients of determination (r^2) for all species ranged from 0.815 to 0.972. Parameters *a* and *b* ranged from 0.0104 to 0.0550 and 2.708 to 3.188, respectively.

DISCUSSION

According to Table 1, the r^2 values of all species were >0.8, so LWRs for all species in this study were not marked as questionable for other reasons such as potential misidentifications (Froese, 2006). According to the FishBase (Froese and Pauly, 2014), no LWR information was available for *M. hoffinanni*, *M. terminalis*, *M. pellegrini* and also two hybrids. Although there is LWR information for *M. amblycephala* and *P. pekinensis* in the FishBase, the sampled populations in this study were different from FishBase records. In conclusion, the result of this paper provides new information on LWRs for five bream species, which could be useful for fishery biologists and managers.

DUŽINSKO-MASENI ODNOS PET CIPRINIDNIH VRSTA RIBA I DVA NJIHOVA HIBRIDA IZ KINE

Sažetak

Dužinsko-maseni odnosi (LWRs) određeni su za pet slatkovodnih vrsta riba prikupljenih iz Liangzi jezera i rijeka Xi i Longxi u Kini, uključujući *Megalobrama amblycephala, Megalobrama skolkovii, Megalobrama*

Table 1. Descriptive statistics and estimated parameters of LWRs for five bream fish species and two of their hybrids, China

Species	n	Standard length (cm)		Total body weight (g)		Parameters		95% CL of a		95% CL of b		r^2
		Min	Max	Min	Max	a	b	Min	Max	Min	Max	
Megalobrama amblycephala	78	19.5	36.3	173.3	1252.7	0.0541	2.708	0.0204	0.1435	2.413	3.003	0.815
Parabramis pekinensis	64	16.4	33.3	70.8	812.8	0.0104	3.188	0.0054	0.0197	2.977	3.399	0.936
Megalobrama skolkovii	31	31.5	45.1	606.5	2036	0.0303	2.932	0.0187	0.0493	2.500	3.364	0.869
Megalobrama pellegrini	42	15.2	33.1	77.1	849.1	0.0314	2.890	0.0067	0.1479	2.734	3.045	0.972
Megalobrama terminalis	145	19.5	41.2	144.2	1494.0	0.0550	2.727	0.0398	0.0757	2.629	2.825	0.955
Hybrid of *Megalobrama amblycephala* ♀× *Parabramis pekinensis* ♂	300	12.1	20.7	39.4	193	0.0262	2.920	0.0207	0.0332	2.836	3.004	0.939
Hybrid of *Megalobrama amblycephala* ♀× *Megalobrama terminalis* ♂	300	12.7	23.5	42	274.7	0.0428	2.782	0.0314	0.0582	2.674	2.889	0.897

pellegrini i *Megalobrama terminalis* roda Megalobrama, kao i bijelu amur deveriku (*Parabramis pekinensis*) roda Parabramis. Tri od tih pet vrsta nije imalo prethodnih dužinsko-masenih procjena u u svjetskoj bazi podataka ribljih vrsta - FishBase. Dužinsko-maseni odnosi hibrida *Megalobrama amblycephala* ♀ × *Parabramis pekinensis* ♂ i ♀ *Megalobrama amblycephala* × *Megalobrama terminalis* ♂ također su određeni prvi put.

Ključne riječi: *Megalobrama sp., Parabramis sp*., dužinsko-maseni odnos

REFERENCES

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

Froese, R., Tsikliras, A. C., Stergiou, K. I. (2011): Editorial note onweight-length relations of fishes. Acta Ichthyologica Et Piscatoria, 41, 261–263.

Froese, R., Pauly, D. (2014): FishBase. World Wide Web electronic publication, version (02/2014). Available at: http://www.-fishbase.org (accessed on 08 May 2014).

Gao, Z., Wang, W., Jiang, E., Chen, B. (2014): Research advances on germplasm resources and genetic improvement of blunt snout bream (*Megalobrama amblycephala*). Journal of Huazhong Agricultural University, 33, 138–144.

Ke, H. (1965): The artificial reproduction and culture experiment of *Megalobrama amblycephala*. Acta Hydrobiologica Sinica, 5, 282–283.

Song, W., Wang, Y., Zhu, D., Ren, L., Wang, W. (2013): Morphological variations among the genus *Megalobrama*. Freshwater Fisheries, 43, 3, 21–27.

Xie, C. (2009): Ichthyology. Beijing: China Agricultural Press, pp, 56-57.