ZOOLOGICAL RESEARCH

Range extension of *Lepidocephalichthys alkaia* (Teleostei: Cobitidae) and notes on its sexual dimorphism

Marco ENDRUWEIT[1,2,*]

[1] *Kunming College of Life Sciences*, *University of Chinese Academy of Sciences*, *Kunming*, *Yunnan* 650204, *China*

[2] *State Key Laboratory of Genetic Resources and Evolution*, *Kunming Institute of Zoology*, *Chinese Academy of Sciences*, *Kunming*, *Yunnan* 650223, *China*

ABSTRACT

The natural distributional range of the cobitid loach *Lepidocephalichthys alkaia* is extended into Yunnan Province, China. The modified sexually dimorphic pectoral fin in males of *L. alkaia* is described.

Keywords: *Lepidocephalichthys alkaia*; Sexual dimorphism; Modified pectoral fin; Yunnan; China

INTRODUCTION

Spined loaches of the genus *Lepidocephalichthys* are a common component of lowland river fish assemblages in Indochina. They thrive abundantly in water bodies offering dense submerge vegetation and plenty woody debris. Species of the genus *Lepidocephalichthys* often represent the predominant benthic fish species in this type of habitat. Their abundance and neutral, non-muddy flavor of the flesh make them a part of subsistence fisheries in rural areas. Species of *Lepidocephalichthys* are diagnosed by having fused and hardened innermost pectoral-fin rays with a dorsal projection in males (Havird & Page, 2010; Šlechtová et al., 2008). So far, two species are known to occur in Yunnan, China; viz. *L. berdmorei* and *L. hasselti* (Chen, 2013; Havird & Page, 2010; Kuang, 1990). An ichthyologic survey in Dehong, Yunnan yielded a single specimen of *L. alkaia* from an agricultural market in Yingjiang town. Further specimens could be identified in the ichthyologic collection of the Kunming Institute of Zoology (KIZ), Kunming, China. In this contribution the sexually dimorphic, modified pectoral fin in males of *L. alkaia* is described.

MATERIALS AND METHODS

Meristics, morphometrics and related terminology follow explanations given in Kottelat (1990). Morphological abbreviations used: SL, standard length. Measurements are taken point to point with a caliper and recorded to the nearest 0.1 mm. Regional squamation pattern and morphological features were examined using a binocular Zeiss Stemi 2000-C at 20-50 times magnification.

Radiographs of the specimen were taken by a Kubtec Xpert 80 and used to count vertebrae and fin rays. Vertebral counts and associated terminology follow Roberts (1989); the terminal compound centrum supporting the hypural series is counted as one vertebra; the Weberian apparatus is counted as four vertebrae.

Specimen KIZ 2015000184 was preserved in the field using a 10% formalin solution and after five days transferred into 75% industrial ethanol for permanent storage. Institutional abbreviation used: KIZ, Kunming Institute of Zoology, Chinese Academy of Sciences, Kunming, China; ZRC, Zoological Reference Collection, Raffles Museum of Biodiversity Research, National University of Singapore, Singapore. Comparative data on *L. alkaia* are taken from Havird & Page (2010).

Lepidocephalichthys alkaia **Havird & Page, 2010**

Material: KIZ 2003004465-4475, 4477, 4478, 13 ex., 27.9-37.6 mm SL, Liangjiaoshui River, Irrawaddy basin, Longling County, Baoshan Prefecture, Yunnan, China; collected by X. Y. Chen, 16 September 2003. KIZ 2006010982-984, 986, 4 ex., 38.2-40.4 mm SL, same location; collected by X. Y. Chen & D. Neely, 27 April 2006. KIZ 2006010998-11004, 16 ex., 30.3-38.9 mm SL, Longchuanjiang River, Irrawaddy basin, Tengchong County, Baoshan Prefecture, Yunnan, China; collected by X. Y. Chen & D. Neely, 18 April 2006. KIZ 2015000184, 1 ex., 28.3 mm SL, Yingjiang town, Dayingjiang River, Irrawaddy basin, Yingjiang County, Dehong Prefecture, Yunnan, China; collected by M. Endruweit & T. Qin, 18 August 2014.

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[*]Corresponding author, E-mail: marco.endruweit@yahoo.de

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Figure 1 ***Lepidocephalichthys alkaia*****, KIZ 2015000184, 28.3 mm SL, male, lateral view**

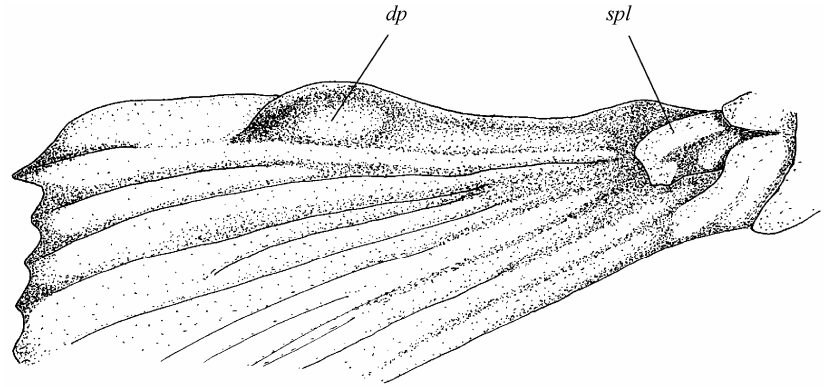

Figure 2 ***Lepidocephalichthys alkaia*****, KIZ 2003004465, 36.3 mm SL, schematized depiction of modified pectoral-fin rays, right side, dorsolateral view**

dp: dorsal projection; spl: suprapectoral lobe.

RESULTS

Material listed above was identified as *L. alkaia* based on the diagnosis given in its original description (Havird & Page, 2010): a midlateral dark stripe extends over the base of the caudal fin; caudal-fin shape truncate to round; top of the head scaleless; dorsal-fin origin posterior to pelvic-fin origin; and a moderate SL of up to 38 mm. Its chief morphometrics lie well within the ranges of *L. alkaia* with some slight deviations: predorsal length ranges from 51%-60% of SL in the type specimens *v.s.* 58-62 in the Chinese material, pre-pelvic length from 43%-54% of SL *v.s.* 50-55; and length of the pectoral fin from 13%-18% of SL *v.s.* 14-22. The number of unbranched rays in the dorsal and anal fins is given as two in the original description while it was counted to 2-3 on the radiographs. In addition, the radiographs showed a total vertebra number of 36 with 24-25 abdominal and 11-12 caudal vertebrae [*n*=10]. The largest type specimen is one of the three paratypes of lot ZRC 51544 measuring 38.2 mm SL. Specimen KIZ 2006010984 (40.4 mm SL; male) is slightly larger.

DISCUSSION

The herein reported occurrence of *L. alkaia* in Dehong and Baoshan prefectures raises the number of *Lepidocephalichthys* species in Yunnan to three. The occurrence of *L. alkaia* in Yunnan is expected since its type locality at Myitkyina in the Burmese Kachin State is adjacent and *Lepidocephalichthys* typically possesses a high dispersal rate with a wide distributional range provided that their habitat preferences are met. While the type series is exclusively described from the Irrawaddy basin Havird & Page (2010) list additional non-typic material from the Burmese Salween basin indicating a wide dispersal of *L. alkaia*.

A lamina circularis sensu Rendahl (1930, 1933) is a thin, osseous, saucer-like, horizontal projection of the second enlarged pectoral-fin ray. It is located proximal on the ray and is sexually dimorphic present exclusively in males of numerous cobitid species. The term ‘lamina circularis’ has been misused in recent ichthyologic literature (Das et al., 2012; Havird & Page, 2010) for the modified innermost pectoral-fin rays featuring a dorsal projection in males of *Lepidocephalichthys*. Yet a lamina circularis is absent in species of this genus.

The structure of the modified pectoral-fin rays in males of *L. alkaia* was not described nor depicted by Havird & Page (2010) since the original description based on an all female batch of 28 specimens. The two innermost pectoral-fin rays are fused and build a conspicuous, dorsally projected, hardened flange over approximately 2/3 of the rays’ length. The flange’s shape as depicted in Figure 2 is peculiar and diagnostic on species level. Adjacent to the flange there is a conspicuous, ovoid, fleshy

suprapectoral lobe adnate to the rays that is located proximally and may not be confused with a lamina circularis.

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