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Description of *Danio absconditus*, new species, and redescription of *Danio feegradei* (Teleostei: Cyprinidae), from the Rakhine Yoma hotspot in south-western Myanmar

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Abstract

Danio feegradei Hora is redescribed based on recently collected specimens from small coastal streams on the western slope of the Rakhine Yoma, ranging from the Thade River drainage southward to slightly north of Kyeintali. *Danio absconditus*, new species, is described from the Kyeintali Chaung and small coastal streams near Gwa, south of the range of *D. feegradei*. Both species are distinguished from other *Danio* by the presence of a dark, elongate or round spot at the base of the caudal fin and a cleithral marking composed of a small black spot margined by a much smaller orange spot. *Danio feegradei* is characterized by the colour pattern, with series of white spots along the otherwise dark side; *D. absconditus* by about 7–11 dark vertical bars on the abdominal side. Within *Danio,* the presence of a complete lateral line, cleithral spot, and 14 circumpeduncular scales is shared with *D. dangila* and similar species, but these character states may be plesiomorphic as suggested by the shared presence of cleithral spot and complete lateral line in *Devario* and *Betadevario*. In other *Danio* the cleithral spot is absent, the lateral line is short or absent, and the circumpeduncular scale count is lower (10–12). Twenty teleost species are reported from streams on the western slope of the Rakhine Yoma, all probably endemic. The parapatric distribution of *D. absconditus* and *D. feegradei* is unique within the genus, and may be partly explained by changes in eustatic sea levels.

Key words: colour pattern, freshwater fish, morphology, species discrimination, taxonomy

Introduction

Many recent papers have contributed to show that the short coastal streams of the western slope of the Rakhine Yoma mountain range in south-western Myanmar harbour a rich and highly endemic fish fauna (e.g., Britz, 2007, 2010; Conway & Kottelat, 2010; Kullander, 2015; Kullander & Fang, 2004, 2009a; Ng, 2004). Still, only a fraction of the region has been surveyed and many species await description. *Danio feegradei* is one component of this endemic fauna. It was described by Hora (1937) on the basis of a single specimen from road-side drains in Sandoway (now Thandwe). There are no later collections of *D. feegradei* reported, although it has become available in the ornamental fish trade (Cottle, 2010), and aquarium specimens have been used in phylogenetic analyses (e.g., Collins *et al.,* 2012; Tang *et al.*, 2010). Barman (1991) considered *D. feegradei* to be a synonym of *D. dangila* (Hamilton), but recent taxonomic papers consider it as valid (Fang Kullander, 2001; Kottelat, 2013). In this paper we provide a revised diagnosis of *D. feegradei,* demonstrating its distinctness on the basis of recent collections. We also present evidence that a similar, undescribed species, sharing unique colour-pattern characters, is present on the western slope of the Rakhine Yoma. The two species are almost overlapping in distribution, presenting a rare example of parapatry between putative sister species, further underlining the importance of the coast of western Myanmar as a hotspot for fish diversity.

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seismically active region with considerable volcanism, but became accessible to freshwater fishes in the Late Neogene. Aside from the Kaladan River there are no major drainages on the Rakhine coast, and the fish distribution was probably largely mediated since the Pliocene between smaller streams by stream capture following stream erosion. So far, there are no records of species found on both sides of the range, suggesting that displacement by stream capture may be rare, but on the other hand, only a small part of the Rakhine Yoma has been surveyed for fishes. The probable relationship with *D. meghalayensis* and the chain danios, which are most diverse in Indian highlands, suggest again that the Western Rakhine may be a component of the Naga Hills and Shillong Plateau hill-stream fish fauna more than that of central or northern Myanmar. A major component of the described endemism consists of species of *Garra* Hamilton, which are specialized hill stream fishes (Kullander & Fang, 2004) with considerable diversity of species from further north along the Indo-Myanmar Range.

Danio includes 23 valid species in South and South East Asia (Fang Kullander, 2001; Kullander, 2012, 2015). Fifteen valid species have already been reported from Myanmar, including *D. aesculapii, D. catenatus* and *D. concatenatus* also from the coast of Rakhine state*, D. albolineatus* (Blyth)*, D. choprae, D. erythromicron, D. feegradei , D. flagrans*, *D. kyathit*, *D. margaritatus, D. nigrofasciatus, D. quagga* Kullander, Liao & Fang, *D. roseus*, *D. sysphigmatus,* and *D. tinwini.* Only five species are known from west of Myanmar (*D. rerio, D. jaintianensis, D. assamila, D. dangila*, *D. meghalayensis*), and only four from east of Myanmar (*D. kerri* Smith, *D. pulcher* Smith*, D. tweediei* Brittan, *D. roseus*). Only one Myanmar species has a wide distribution, viz., *D. roseus*, which is found over most of northern Myanmar and adjacent China, Laos, and Thailand (pers. obs.). *Danio* species so far described have allopatric or overlapping distributions, and this extends also to sister species. In Myanmar the species pair *Danio flagrans* and *D. choprae* are mutually exclusive in the Ayeyarwaddy drainage (Kullander, 2012), and along the southern coasts the closely related *D. catenatus, D. concatenatus* and *D. sysphigmatus* have allopatric distributions (Kullander, 2015). The sister taxa *D. erythromicron* and *D. margaritatus* occupy different lakes in the Shan limestone karst region (Roberts, 2007; pers. obs.). Parapatry, i.e., abutting distributions as in *D. absconditus* and *D. feegradei*, have not been observed before in the genus. A main reason for that may be lack of collection coverage, and more cases likely exist in the region. Parapatric sister species are of interest because they have the potential for hybridisation and introgression and may mark very precise barriers for dispersal and/or speciation. In the case of *D. feegradei* and *D. absconditus* each species is present in several coastal streams and there is no obvious physical structure in the transitional region that may explain the complementary distribution. They have, however, been isolated for a long time, resulting in highly disparate colour patterns. It may be that the two taxa are headwater descendants of a species inhabiting a now submerged river or extension of the Kaladan River along the Rakhine coast, as outlined above, but there is no geological support for such an extension, and the taxonomic and geographical sampling density of the Rakhine Yoma is still too incomplete to point to a well substantiated pattern of fish distribution.

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References

Barman, R.P. (1991) A taxonomic revision of the Indo-Burmese species of *Danio* Hamilton Buchanan (Pisces: Cyprinidae). *Records of the Zoological Survey of India. Occasional Paper*, 137, 1–91.

Bender, F. (1983) *Geology of Burma.* Gebrüder Borntraeger, Berlin and Stuttgart, viii + 293 pp.

Britz, R. (2007) *Channa ornatipinnis* and *C. pulchra*, two new species of dwarf snakeheads from Myanmar (Teleostei: Channidae). *Ichthyological Exploration of Freshwaters*, 18, 335–344.

Britz, R. (2010) Species of the *Macrognathus aculeatus* group in Myanmar with remarks on *M. caudiocellatus* (Teleostei: Synbranchiformes: Mastacembelidae). *Ichthyological Exploration of Freshwaters*, 20, 295–308.

Clark, P.U. & Mix, A.C. (2002) Ice sheets and sea level of the Last Glacial Maximum. *Quaternary Science Reviews*, 21, 1–7. http://dx.doi.org/10.1016/S0277-3791(01)00118-4

Collins, R.A., Armstrong, K.F., Meier, R., Yi, Y., Brown, S.D.J., Cruickshank, R.H., Keeling, S. & Johnston, C. (2012) Barcoding and border biosecurity: identifying cyprinid fishes in the aquarium trade. *PLoS ONE*, 7 (1), e28381. http://dx.doi.org/10.1371/journal.pone.0028381

Conway, K.W. & Kottelat, M. (2010) Two new species of torrent minnow (Ostariophysi: Psilorhynchidae) from Western Myanmar. *The Raffles Bulletin of Zoology*, 58, 259–267.

Cottle, P.W. (2010) *Danios and devarios*. Peter W. Cottle, Rochester, 150 pp.

Fang, F. (1997) Redescription of *Danio kakhienensis*, a poorly known cyprinid fish from the Irrawaddy basin. *Ichthyological Exploration of Freshwaters*, 7, 289–298.

Fang, F. (1998) *Danio kyathit*, a new species of cyprinid fish from Myitkyina, northern Myanmar. *Ichthyological Exploration of Freshwaters*, 8, 273–280.

Fang, F. (2000) Barred *Danio* species from the Irrawaddy River drainage (Teleostei, Cyprinidae). *Ichthyological Research*, 47, 13–26. http://dx.doi.org/10.1007/BF02674309

Fang, F. & Kottelat, M. (2000) *Danio roseus*, a new species from the Mekong basin in northeastern Thailand and northwestern Laos (Teleostei: Cyprinidae). *Ichthyological Exploration of Freshwaters*, 11,149–154.

Fang, F. & Kullander, S.O. (2009) *Devario xyrops*, a new species of danionine fish from south-western Myanmar (Teleostei: Cyprinidae). *Zootaxa*, 2164, 33–40.

Fang Kullander, F. (2001) *Phylogeny and species diversity of the South and Southeast Asian cyprinid genus* Danio *Hamilton (Teleostei, Cyprinidae)*. PhD dissertation, Stockholm University, Stockholm, 26 pp.

Hora, S.L. (1937) Notes on Fishes in the Indian Museum XXXI. On a small collection of fish from Sandoway, Lower Burma. *Records of the Indian Museum*, 39, 323–331.

Humphries, J.M., Bookstein, F.L., Chernoff, B., Smith, G.R., Elder, R.L. & Poss, S.G. (1981) Multivariate discrimination by shape in relation to size. *Systematic Zoology*, 30, 291–308. http://dx.doi.org/10.2307/2413251

Kottelat, M. (2013) The fishes of the inland waters of Southeast Asia: a catalogue and core bibliography of the fishes known to occur in freshwaters, mangroves and estuaries. *The Raffles Bulletin of Southeast Asian Zoology,* 27 (Supplement), 1–663.

Kullander, S.O. (2012) Description of *Danio flagrans*, and redescription of *D. choprae*, two closely related species from the Ayeyarwaddy River drainage in northern Myanmar (Teleostei: Cyprinidae). *Ichthyological Exploration of Freshwaters*, 23, 245–262.

Kullander, S.O. (2015) Taxonomy of chain *Danio*, an Indo-Myanmar species assemblage, with descriptions of four new species (Teleostei: Cyprinidae: Danioninae). *Ichthyological Exploration of Freshwaters,* 25, 355–378.

Kullander, S.O. & Fang, F. (2004) Seven new species of *Garra* (Cyprinidae: Cyprininae) from the Rakhine Yoma, southern Myanmar. *Ichthyological Exploration of Freshwaters*, 15, 257–278.

Kullander, S.O. & Fang, F. (2009a) *Danio aesculapii*, a new species of danio from south-western Myanmar (Teleostei: Cyprinidae). *Zootaxa*, 2164, 41–48.

Kullander, S.O. & Fang, F. (2009b) *Danio tinwini*, a new species of spotted danio from northern Myanmar (Teleostei: Cyprinidae). *Ichthyological Exploration of Freshwaters*, 20, 193–199.

Ng, H.H. (2004) *Batasio elongatus*, a new species of bagrid catfish from southwest Myanmar (Siluriformes, Bagridae). *Ichthyological Exploration of Freshwaters*, 15, 67–70.

Roberts, T.R. (2007) The "celestial pearl danio", a new genus and species of colourful minute cyprinid fish from Myanmar (Pisces: Cypriniformes). *The Raffles Bulletin of Zoology,* 55, 131–140.

Systat Software (2009) Systat version 13. Systat Software, Inc., San Jose.

Tang, K.L., Agnew, M.K., Hirt, M.V., Sado, T., Schneider, L.M., Freyhof, J., Sulaiman, Z., Swartz, E., Vidthayanon, C., Miya, M., Saitoh, K., Simons, A.M., Wood, R.M., Mayden, R.L. (2010) Systematics of the subfamily Danioninae (Teleostei: Cypriniformes: Cyprinidae). *Molecular Phylogenetics and Evolution,* 57, 189–214. http://dx.doi.org/10.1016/j.ympev.2010.05.021

Voris, H.K. (2000) Maps of Pleistocene sea levels in Southeast Asia: shorelines, river systems and time durations. *Journal of Biogeography*, 27, 1153–1167. http://dx.doi.org/10.1046/j.1365-2699.2000.00489.x