



## Why is *Pseudosphromenus cupanus* (Teleostei: Osphronemidae) reported from Bangladesh, Indonesia, Malaysia, Myanmar, and Pakistan?

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### Abstract

The native distribution of the small labyrinth fish species *Pseudosphromenus cupanus* includes southern India and Sri Lanka. According to literature it has a range including also Pakistan, Bangladesh, Myanmar, Malaysia, and Indonesia (Sumatra) but there are no voucher specimens or reliable observations from those areas. The distribution record of *P. cupanus* was inflated partly by including *P. dayi* as a synonym. *Pseudosphronemus dayi* is native to the Western Ghats in India, but the origin of the aquarium importation in 1907 was reported as both Cochin (=Kochi) and Malacca (=Malaysia), the latter locality obviously in error. The basis for the Sumatra record is an obviously mislabeled sample of *P. dayi* from Pulau Weh close to Sumatra. The basis for reporting the species from Pakistan, Myanmar or Bangladesh could not be located. Misidentified museum specimens from Myanmar and Pakistan identified as *P. cupanus* were never published on. *Pseudosphromenus cupanus* has been considered recently to be extinct in Bangladesh, but in fact it never occurred there.

**Key words:** Asia, Freshwater, Geographical distribution, Threat status

### Introduction

*Pseudosphromenus cupanus* (Cuvier, 1831) is a small species, about 60 mm long in total length, of the labyrinth-fish family Osphronemidae (Fig. 1a). It is characterised by its elongate body, relatively long but low dorsal and anal fins, and the caudal fin ending in a point. It is nearly uniform in colour or with a faint dark band along the side, and with a black spot at the base of the caudal fin. The only other species in the genus *Pseudosphromenus* Bleeker, 1879, is *P. dayi* (Engmann, 1909) which has the same shape and similar dorsal and anal fins, but the caudal fin is longer (Figs 1b–c). Especially in the male, the caudal fin is markedly lanceolate, and the middle rays may be prolonged beyond the fin membrane (Fig. 1c). *Pseudosphromenus dayi* is also slightly more colourful than *P. cupanus*, and presents two dark stripes along the side.

Both species are easy to keep and rear in aquaria, and have been in the aquarium hobby since the early 20<sup>th</sup> Century. *Pseudosphromenus cupanus* was imported as an aquarium fish to Germany in 1903 (Rachow, 1936b), followed by *P. dayi* in 1907 (Scholze & Pötzschke, 1930) or 1908 (Rachow, 1936a). The latter was then recognized as being the same as a form of *P. cupanus*, distinguished but not named by Day (1865:135, 1877:371) (Poenicke, 1908a; Köhler, 1908), and was long treated as a variety or subspecies of *P. cupanus* (Köhler, 1908; Engmann, 1909; Rachow, 1936a), only occasionally considered a separate species (e.g., Stansch, 1911; Vierke, 1988). Kottelat (1994) reviewed the nomenclature of *P. dayi*, and established its species rank. Although authorship of *P. dayi* is usually attributed to Köhler (1908), the name was made available by Engmann (1909) as explained by Kottelat (1994).

Both species were first described in the genus *Polyacanthus* Cuvier, a synonym of *Trichogaster* Schneider, but contained in *Macropodus* La Cepède from Regan's (1909) revision of the Asian anabantoid fishes until Vierke (1975) resurrected *Pseudosphromenus*. *Pseudosphromenus dayi* occurs in Kerala, India (Cherian *et al.*, 2001; Dahanukar & Rema, Devi 2013; Kottelat, 1994), whereas *P. cupanus* is found both in Sri Lanka (Pethiyagoda,

1991), and in southern India (Cherian *et al.*, 2001; Day, 1877:371). The taxonomy of *P. cupanus* and *P. dayi* was addressed most recently by Cherian *et al.* (2001), comparing a sample of each species. In the phylogenetic analysis of the Osphronemidae by Rüber *et al.* (2006), *P. cupanus* and *P. dayi* are sister species with an estimated divergence at 5.3 MYA.

In an assessment of the genetic diversity of the Bangladeshi freshwater-fish fauna we noted that Rahman (1989, 2005) and Rahman & Ruma (2007) report *Pseudosphromenus cupanus* from Bangladesh and give also some fin counts to support the identification. The figure provided in Rahman (1989) is redrawn from the illustration in Day (1877, pl. 78, fig. 4). The associated images in Rahman (2005) and Rahman & Ruma (2007), however, show different specimens of *Badis* Bleeker, probably *Badis badis* (Hamilton). The latter is reproduced here as Figure 1d.

Further research into the literature on south Asian fishes shows that *P. cupanus* has been reported with the distribution Eastern India, Sri Lanka, western Burma, Malay Peninsula and Sumatra by Talwar & Jhingran (1991: 1002–1003), and they are copied by Rahman & Ruma (2007). *Pseudosphromenus cupanus* is listed in Jayaram (1981: 382) with the locality information Kerala, Coromandel coasts, Bangladesh, Pakistan, Sri Lanka, Malaya, and Malay Archipelago. In Jayaram (1999:438–439) the locality information for the genus is copied from that of *Macropodus* in Jayaram (1981), i.e., including species of *Macropodus* in Viet Nam and China and the incorrect locality in Java for the Chinese species *M. opercularis* (Linnaeus) in Weber & de Beaufort (1922:347); the distribution for *P. cupanus* is expanded with a Maharashtra locality and dropping Malaysia and the Malay Archipelago. Similar information is repeated in FishBase (Froese & Pauly, 2015) and the IUCN Red List (Abraham, 2013). Considering that *P. cupanus* is a species endemic to Sri Lanka and southern India (Cherian *et al.*, 2001; Day, 1877; Pethiyagoda, 1991) there seems to be a mistake ‘going viral’ here; the objective of this paper is rectify distribution information for species of *Pseudosphromenus* and investigate the sources of the confusion.

## Material and methods

Distribution data were assembled from the literature and the sources of statements were checked against literature records and museum collections online in FishNet II and GBIF. Coverage of aquarium literature is selective, focusing on widely available books and early periodicals. Distribution records in German-language sources were translated to English. References may use the generic names *Polyacanthus* or *Macropodus* for species of *Pseudosphromenus*, but we use *Pseudosphromenus* consistently. Museum codes are: ANSP (Academy of Natural Sciences of Philadelphia), BMNH (The Natural History Museum, London), MCZ (Museum of Comparative Zoology, Cambridge), MNHN (Muséum national d’Histoire naturelle, Paris), NRM (Swedish Museum of Natural History, Stockholm), RMNH (Naturalis Biodiversity Center, Leiden), ZMA (Zoölogisch Museum Amsterdam; now in RMNH).

The following specimens (\*) or database records (\*\*) were assessed:

*Badis* sp.: ANSP 93953\*\*, 1. Burma: Shinbwiyang. J.W.H. Rehn, 29 May 1945.—ANSP 93954\*\*, 3. Burma: Shingbwiyang. J.W.H. Rehn, 17 Apr 1945.—ANSP 93959\*\*, 1. Burma: Cahill Creek, J.W.H. Rehn 10 May 1945. *Pseudosphromenus cupanus*. NRM 12251\*, 1. India, Kerala, Kottayam District, Meenachil River basin, tributary 10 km NW of Kottayam, Olassa village. E. Åhlander, 15 Dec 1987.—NRM 26169\*, 22. Sri Lanka, Southern Province, Point de Galle. O. Nordqvist & A. Stuxberg, 16–21 Dec 1879.—NRM 40344, 7\*. Calcutta, Deepak Nopany's Fish Farm 'Asian Exporter'. F. Fang & A. Roos, 17 Jan 1998.

*Pseudosphromenus dayi*: BMNH 1909.7.16.35-37\*\*, 3. Malacca. J. P. Arnold.—BMNH 1908.10.26.2-3\*\*, 2. Malacca. W. Wolterstorff (Syntypes).—BMNH 1933.9.2.8, 1. Sumatra. F. Mayer.—NRM 12069\*, 2. India, Kerala, Kottayam Municipality, Kottayam, Meenachil River 1 km from railway station, riverside. E. Åhlander, 22 Mar 1990. RMNH (ZMA 124.107\*\*), 12. Indonesia, Anak Laut, bergrievte op Pulo Weh. P. Buitendijk. (Photograph examined.)

*Trichogaster lalius* (Hamilton): MCZ 60876\*\*, Pakistan, Sind, Thetta; SE of Karachi. H. Field, 19 Jul 1955. (Photograph examined.)

Registered as *P. dayi*: MNHN 1911-0242\*\*, 1. Indo-Malaisie. Lefebvre. (Not further investigated, apparently aquarium specimen.)

Registered as *P. cupanus*: MCZ 154985\*\*. 1, West Java. K. Liem, 1955. (The specimen could not be located; K. Hartel, pers. comm.)

## Results

In the scientific secondary literature the earliest mention of *Pseudosphromenus cupanus* as occurring in Bangladesh, Pakistan, Malaysia and Indonesia indeed seems to be that of Jayaram (1981), and the earliest mention of *P. cupanus* from Burma seems to be in Talwar & Jhingran (1991), although Burma had been listed in aquarium literature already by Arnold (1949) and Sterba (1959). The species has not been reported in faunal works on the fishes of Pakistan (Mirza 1990), Malaysia (Mohsin & Ambak, 1983), or Indonesia (Kottelat *et al.*, 1993), which are three ichthyologically relatively well-investigated countries. The species is also not listed in the country monographs for Thailand (Smith, 1945) and Cambodia (Rainboth, 1996). With the exception of the doubtful record in Weber & de Beaufort (1922), there are no reliable museum records of species of *Pseudosphromenus* from outside the native range in southern India and Sri Lanka, and also no literature records of occurrence outside the native range in India and Sri Lanka except for the unverified records cited here, and which may be phrased in different ways in secondary references.

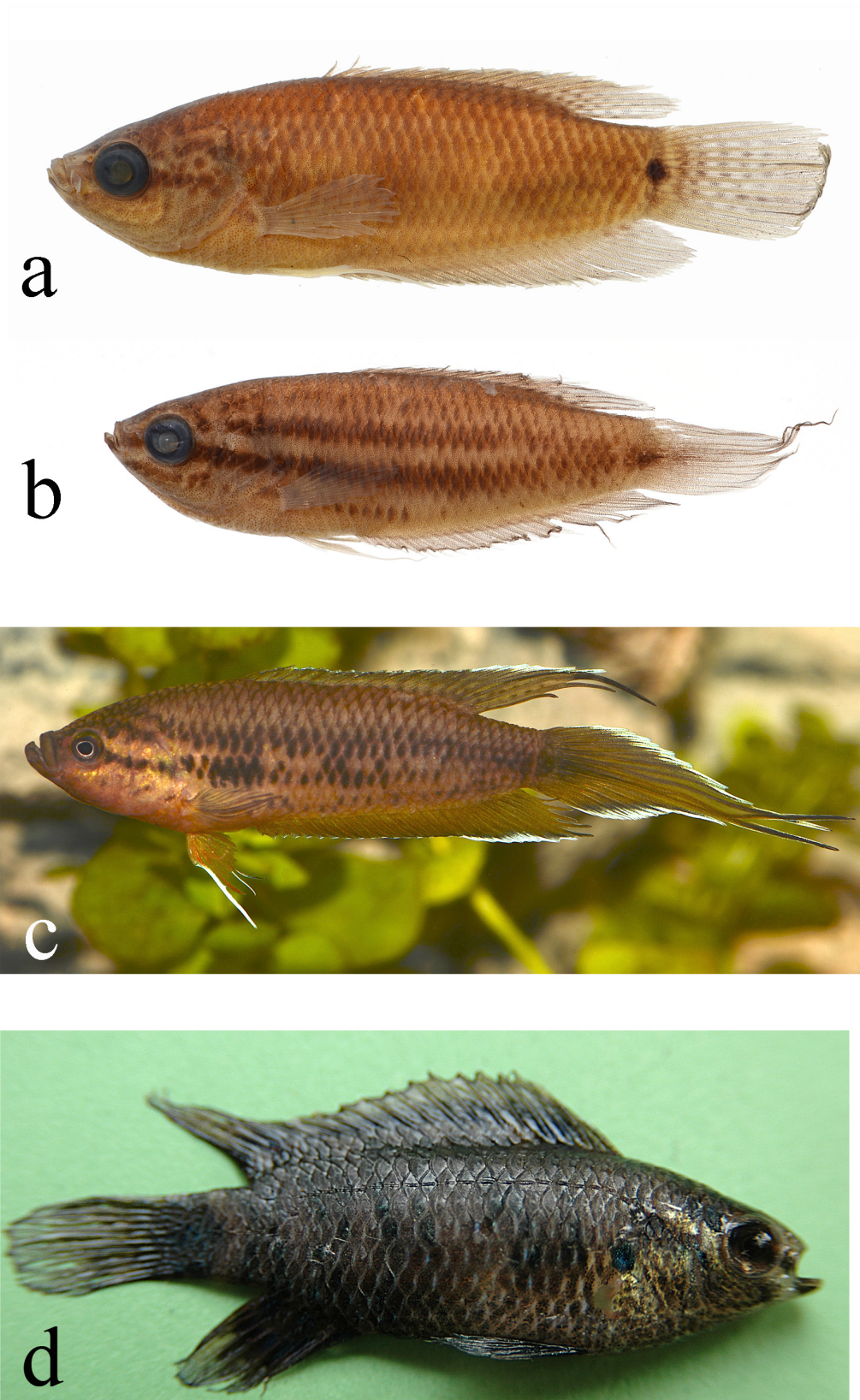
The record from Sumatra probably derives from Weber & de Beaufort (1922: 346), who reported material from Lake Anak laut, on Pulu Weh (= Aneuk Laot, Pulau Weh) near Sumatra. The sample of 12 specimens was originally deposited in the Zoölogisch Museum Amsterdam (ZMA 124.107), and are now in the Naturalis Biodiversity Center in Leiden. A photograph of the sample shows it to consist of *P. dayi* rather than *P. cupanus*. The handwritten label states that they were from “Anak Laut, bergrievte op Pulo Weh”, i.e., from a mountain stream rather than the lake, and collected by Peter Buitendijk. Buitendijk (1870–1932) was a ship’s surgeon on the route Amsterdam–Jakarta 1900–1931. He collected fishes and other aquatic animals for the Rijksmuseum van Natuurlijke Historie in Leiden (now Naturalis Biodiversity Center). Apparently Buitendijk also kept live fishes for the Amsterdam Zoo (now Natura Artis Magistra) (Fransen *et al.*, 1997), which suggests one source of confusion. It may be that aquarium stock of *P. dayi* was confused with some fish collected by Buitendijk on Pulau Weh. Except for Hoedeman (1954: 477), and derived editions of that book and tertiary references to “Way island” in German aquarium literature, no subsequent work on anabantoids or Indonesian fishes has cited this record. Hoedeman was curator at the ZMA. The fin counts provided by Weber & de Beaufort agree with *Pseudosphromenus* and with no other Indonesian osphronemid species. It seems highly unlikely that there was or is a natural population of *P. dayi* on a small island in the Indonesian archipelago. More likely, the locality information for ZMA 124.107 is in error.

The original reference to occurrence in Myanmar, reported by Talwar & Jhingran (1991), could not be traced, but there are three samples in the ANSP collection, from Shingbwiayang (= Shin Bway Yang) on the upper Chindwin River in Myanmar, collected in 1945 by John W.H. Rehn and identified but never published on by Henry W. Fowler. These specimens were examined for us by Mark Sabaj Pérez at ANSP and identified as a species of *Badis*.

The Natural History Museum, London, has samples of *Pseudosphromenus dayi* labelled Malacca donated by Walter Wolterstorff in 1908 and Johann Paul Arnold in 1909, and also one specimen with locality Sumatra donated by Fritz Mayer in 1933. Those specimens were donated by aquarists, and the first two are obviously descended from the first importation of *P. dayi*. Regan (1909) included those specimens in *P. cupanus* in his revision of the Asian anabantoids, where the distribution of *P. cupanus* is given as “India; Ceylon; Malay Peninsula; in lowland streams and estuaries”. The Malaysian distribution is certainly attributable to Arnold’s and Wolterstorff’s specimens. Mayer’s specimen was accessioned along with numerous other aquarium specimens from different continents (R. Britz, pers. comm.), rendering the locality information open to doubt given that no further records from Sumatra exist.

The original reference to occurrence in Pakistan in Jayaram (1981) could not be identified but one specimen in the MCZ collection, collected in Thetta, Pakistan, in 1955, was identified as *P. cupanus*. An image of the specimen shows it to be a bleached specimen of *Trichogaster lalius*. This record seems not to have been observed in the rich literature on fish biogeography in Pakistan (e.g., Mirza, 2006), and is unlikely to have been the basis for Jayaram’s record.

An original report on *P. cupanus* in Bangladesh cannot be found. The species is not mentioned in Bhuiyan’s (1964) monograph of fishes from Dhaka, one of the earliest accounts of freshwater fishes from Bangladesh. The earliest local record (Rahman, 1989) is apparently based on the mention in Jayaram (1981).



**FIGURE 1** (a) *Pseudosphromenus cupanus*, NRM 40344, 27.1 mm SL, India, Kolkata, ornamental fish farm; (b) *P. dayi*, NRM 12069, 22.7 mm SL, India, Kerala, Kottayam; (c) *P. dayi*, living specimen in aquarium, ca 40 mm SL; (d) *Badis badis*, image used as illustration of *Pseudosphromenus cupanus* in Rahman & Ruma (2007), slightly adjusted. Photo by Gawsia W. Chowdhury.

The confusion seems to stem to some extent also from aquarium literature. Both *P. cupanus* and *P. dayi* have a long history as aquarium fishes. The three major influential sources of aquarium information were Holly *et al.* (1927–1966), Arnold & Ahl (1936), and Sterba (1959). These books had a wide distribution (Sterba was also translated to English), captured all available information, and were sources for derivative works by others. In the anglophone domain Axelrod & Schultz (1955) had a similar position.

The origin of the first importation of *P. dayi* to Germany in 1907 or 1908 was reported initially to be either Cochin or Malacca (Rachow, 1936b). Although the importer Scholze & Pötzschke had stated that it came from Cochin (=Kochi, eastern India) (Poenicke, 1908b), Engmann (1909) gave the origin as “Malakka”. Rachow (1936b) summarized the distribution as “Nearer India: Canara-District (?), Cochinchina, Malay Peninsula and Way Island (at Sumatra)”. “Way Island” is probably Pulau Weh, and “Nearer India” equals the Indian subcontinent (including India, Sri Lanka, Pakistan, Nepal, Bhutan, and Bangladesh). Cochinchina equals today’s southern Viet Nam, and apparently Rachow confuses Cochin on the western coast of India with Cochinchina.

*Pseudosphronemus cupanus* were imported as aquarium fish to Germany in 1903. Rachow (1936a) gives the following distribution for *P. cupanus*: “India, Malabar and Coromandel Coast, Ceylon, allegedly from Siam, Cochinchina and the Malay Peninsula; mostly in coastal areas and particularly common in small and tiny waters, also such that are influenced by flood and tide, in irrigation canals of fields and such.”

Arnold & Ahl (1936) describe the distribution of *P. cupanus* as “Nearer India including Ceylon and Farther India”, where “Farther India” equals Indochina plus Myanmar. They put *P. dayi* correctly on the Malabar Coast (Kochi). Axelrod & Schultz (1955) list Malabar and Coromandel coasts as the native area for *P. cupanus*, and Ceylon, Sumatra and Malaya [=Malaysia] as the distribution of *P. dayi*.

Sterba (1959:616) describes the distribution of *P. cupanus cupanus* as “Nearer India, Ceylon close to the coast”; and that of *P. cupanus dayi* as the “Malabar Coast, Burma, South Viet Nam and Way Island”. The record from Burma may be from Arnold (1949), the earliest aquarium literature record of *P. dayi* from Burma that we could find. Arnold lists “Malabar coast, Burma and Cochinchina” as distribution of *P. dayi*. In two other editions of Sterba’s book *P. dayi* is reported from “Malabar coast, Burma and Cochinchina” (Sterba, 1955:276), and “South Viet Nam, Way Island” (Sterba, 1987:867).

All in all, aquarium sources report the distribution of *P. cupanus* as southern India (Western and Eastern Ghats), Sri Lanka and Indochina; and that of *P. dayi* as Malabar Coast, Western Ghats, Malaysia, Myanmar and South Vietnam. We have not found an aquarium literature source for Pakistan or Bangladesh.

Not all secondary and tertiary sources present an erroneous distribution for species of *Pseudosphronemus*. Cherian *et al.* (2001), Kottelat (1994) and Menon (1999) report reliable distributions for both species, except the latter insisting on Burma for *P. dayi*. Vierke (1988:114), in a popular work, already rejected the wide distribution of *P. dayi*, considering it correctly to occur only in southern India.

## Discussion

*Pseudosphronemus cupanus* is a very distinctive species, and unlikely to be confused with any other osphronemid species in Bangladesh or Myanmar. Day (1877:371) reports *P. cupanus* from the Malabar (Kerala) and Coromandel (Tamil Nadu) coasts. He gives the dorsal and anal fin counts as D. XIV–XVII. 5–7, A. XVI–XIX.9–11 in the description (XIV–XVI.5–7 and XVI–XIX.10–11, respectively, in the synopsis). With the long dorsal and anal fin it cannot be confused with *Trichopsis vittata*, which has a much shorter dorsal fin; or *Badis*, with only three anal-fin spines. Since the species data reported by Rahman (1989, 2005), Rahman & Ruma (2007), and Talwar & Jhingran (1981) are probably taken from literature they are of limited value as evidence of the records from outside Sri Lanka and southern India. The common osphronemid species in Bangladesh, *Trichogaster fasciata* (Schneider), *T. chuna* (Hamilton), and *T. lalius*, also with long dorsal and anal fins, are much more deep-bodied than both *P. cupanus* and *P. dayi*. Because there is no species in Bangladesh or Myanmar with which *P. cupanus* or *P. dayi* can be confused, there is no reason to consider that records from those countries are based on misidentified specimens. The misidentified museum records from Pakistan (MCZ) and Myanmar (ANSP) are an exception, but they were never published on and consequently did not enter into the literature. The photographs of specimens of *Badis* in Rahman (2005) and Rahman & Ruma (2007) are not necessarily to be considered as vouchers. Several of the species accounts in Siddiqui *et al.* (2007) are illustrated with photos of some other species. It is unlikely that an

experienced ichthyologist such as Ataur Rahman would have identified a specimen with three anal-fin spines as a species with 16–19 anal-fin spines.

It may be possible to find additional aquarium references and track the confusion in detail, but, it seems sufficient here to conclude first that the information in Jayaram's, Rahman's, and Talwar & Jhingran's accounts are probably derived partly from confused aquarium sources. Both Jayaram (1999) and Talwar & Jhingran (1991) refer to aquarium literature in comments on the synonymy and generic placement of *P. cupanus*. One potential mistake concerns the origin of the first import of *P. dayi*, Cochin, which should be understood as Kochi on the western (Malabar) coast of India and which is within the natural range of *P. dayi*. As evident from Rachow (1936b) it has been confused with Cochinchina (Viet Nam) where there are no *Pseudosphromenus*. We have not found authentic literature sources for Pakistan, Bangladesh or Myanmar. Those records may have been deduced from area descriptions such as Nearer India and Farther India used in the 19<sup>th</sup> and early 20<sup>th</sup> Century, although we then miss references to Bhutan and Nepal. Alternatively, perhaps Myanmar and Bangladesh were added to the list of countries of occurrence simply to fill the gap between Malaysia and India. Bangladesh was part of Pakistan from 1947 till 1971, but since the species does not occur in either present-day Pakistan or Bangladesh, this name change cannot have been a source of confusion.

Adding to the problem, all Indian and Bangladeshi sources fail to recognize *P. dayi* as a distinct species, so the false distribution data for *P. dayi* in Sterba (1959) is added to the false distribution data for *P. cupanus*. To some extent there may also be some confusion with species of *Parosphromenus* Bleeker, which look somewhat similar, but which only occur in Southeast Asia, including Sumatra.

From the case of the garbled distribution data of *P. cupanus* we learn three things: First, that aquarium literature is not always reliable, but usually represents compilation from many sources without critical scrutiny. Aquarium literature is not scientific: it is by default somewhat less reliable in terms of precise facts, and often based on oral communication where published information is not an alternative. This is not to say it is useless, because for the most part it is sound and reliable. Nevertheless, as a foundation for national checklists aquarium literature may be a bad choice. Second, the same applies to popular handbooks and field guides. Third, we cannot assume anything about distribution without voucher specimens of reliable provenance identified by specialists. In the case of the Bangladeshi (and Myanmar) *Pseudosphromenus*, no specimens are on record. We have also not been able to find evidence of correctly-identified published vouchers for Malaysia, Indochina, Indonesia, or Pakistan.

A significant aspect of the confusion is also the application of subspecific epithets. *Pseudosphromenus cupanus* and *P. dayi* are distinct taxa with different distribution whether they are considered as subspecies or species. When the two are synonymized (as done by, e.g., Regan, 1909; Jayaram, 1981; Talwar & Jhingran, 1991; Rahman, 1989, 2005) they have the combined distribution. This becomes problematic when there are different resolutions over species status of the concerned taxa, resulting in different concepts of the same name. The *P. cupanus* sensu Rahman (1989, 2005) thus represents both *P. dayi* and *P. cupanus*, whereas *P. cupanus* sensu Pethiyagoda (1991) excludes *P. dayi*. Thus, following the concept of *P. dayi* and *P. cupanus* as different species, one must consider *P. cupanus* sensu Rahman as two taxa based on his distribution data, and it becomes unclear whether it is *P. dayi* or *P. cupanus* that does not exist in Bangladesh. It is an illusion of a trinomen that that it can be abbreviated to just the specific name (the name of the nominotypical subspecies), and therefore recommendable never to use just the specific name for a polytypic species, but retain the trinomen, or better yet, consider to abandon the use of trinomen. Trinomen have been next to abandoned from ichthyology following Rosen (1978). Out of 33032 valid fish species recognized in FishBase (Froese & Pauly, 2015), only 59 species include 2–6 subspecies, many of them obsolete. The use of subspecies is contentious in taxonomy as a whole and has been contested as being inconsistently applied and/or incongruent with genetic variation and/or lacking evolutionary context (e.g., Gippoliti & Amori, 2007; Kodandaramaiah *et al.*, 2012; Kullander, 1999; Sangster, 2014; Wilson & Brown, 1953; Zink, 2004). The case of *P. cupanus* is further testimony to the confusing nature of trinomen.

To add to the confusion *P. cupanus* is now reported as extinct in Bangladesh (Hossain, 2014). That is perhaps the best solution, as it removes the enigma. Several of the species listed as extinct by Hossain (2014), however, either never occurred in Bangladesh (e.g., *Pangio oblonga* (Valenciennes)), are misidentified but still very much in existence (e.g., *Danio dangila* (Hamilton)), or are not extinct at all (the majority). It is understandable, however, that a species may be categorized as extinct if it is listed by several authoritative sources, but fails to show up in inventories. Another recent source, however, lists *P. cupanus* as common in one site in Bangladesh (Islam, 2012),

but may be based on literature. *Pseudosphromenus cupanus* is not reported as extinct anywhere else than in Bangladesh. It is not even threatened anywhere. The information in the global IUCN assessment (Abraham 2013) is just copied from literature (citing the same wide distribution as Talwar & Jhingran 1991) and is not authoritative. It is probably correct in the classification as Least Concern, however. If *P. cupanus* does not exist in Bangladesh it is not because it has become extinct, but because it never occurred there.

A consequence of erroneous distribution data is that the Bangladeshi list of extinct species now contains one too many species. However, there is a lesson here that threat status has to be evaluated in a more thorough manner, searching first for the evidence of the historical existence of the species. Red listing and protection measures cost time and money which should not be spent on ghost fishes. Consider only the possibility that a major programme had been started to re-introduce *Pseudosphromenus* in Bangladesh.

That information about geographical distribution of species of *Pseudosphromenus* is non-trivial is also exemplified by the inclusion of *P. cupanus* in a survey of fish species feeding on mosquito larvae by Chandra *et al.* (2008), citing the distribution of *P. cupanus* as “Eastern India, Sri Lanka, Western Burma (now Myanmar), Malay Peninsula and Sumatra. Larvivorous fishes may be important agents in biological control of malaria, and as such introduced in new areas or boosted in areas of natural occurrence (Kamareddine, 2012). Introductions for biological control may affect natural faunas adversely, and must rely on extremely precise and reliable information. Use of false distribution data in decisions on harvesting or application could harm the indigenous fauna or be ineffective for the intended purpose.

We have assumed here that there are no *Pseudosphromenus* in Bangladesh. We assume so because there is no evidence that there were ever any. There are no specimens known to be present in local collections, and our own country-wide surveys in 2014 and 2015 failed to find any. There is also no evidence of this genus in Myanmar or in South-east Asia. This does not exclude the possibility that there are *Pseudosphromenus* in the region. Perhaps they are not reported because they are already in the books (without evidence), or because published illustrations are misleading, depicting other species. *Pseudosphromenus cupanus* is or at least has been exported as an ornamental fish from Kolkata (NRM 40344), relatively close to the Bangladesh/India border, and there is a potential risk of escapes of the species from holding facilities in Kolkata expanding eastward. There are, however, no records of *P. cupanus* from West Bengal (cf. Sen, 1992), the Indian state immediately west of Bangladesh. The genus is absent from species catalogues for the northern Indian states of Uttar Pradesh and Bihar (Srivastava, 1998) and the northeastern Indian states (Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura) (Vishwanath *et al.*, 2007), several of which border with Bangladesh or Myanmar. Given that there is no recent revision of the genus covering the entire distribution and including type material, there is a possibility that it may contain more species diversity, further complicating the issue of which particular species of *Pseudosphromenus* does not exist where the genus does not exist. It is, however, even more unlikely that still undiscovered species will be found within areas of concluded non-existence.

We thus offer illustrations of both *P. dayi* and *P. cupanus* here as a standard of reference for local fishwatchers, as an aid to recognition and discovery of these and potential new species.

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