Need for further research on the freshwater fish fauna of the Ashambu Hills landscape: a response to Abraham et al.

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The updated checklist of the freshwater fish fauna of Ashambu Hills including an undescribed species of the genus *Puntius*, and range extension of four cyprinids (Abraham et al. 2011) is continuing testimony to the fact that ichthyofauna of Western Ghats (WG) is poorly understood and is still influenced by the 'Linnean shortfall' (lack of knowledge of how many, and what kind of, species exist) and 'Wallacean shortfall' (inadequate knowledge on the distribution of species). Ashambu Hills landscape, south of the Shencottah Gap is one of the least explored areas for freshwater fish diversity in Kerala, and so the work of Abraham et al. (2011) is an important first step in filling the knowledge gap. The authors need to be commended for carrying out field surveys for a year in as many as five rivers of this eco-region and collecting 58 species belonging to 16 families, including a species hitherto unknown to science. One of the highlights of this paper is the information provided by the authors on the major threats faced by different species (Table 1 of the article). Such species specific data will surely help policy makers and biodiversity managers and lead to improved conservation action for freshwater fish in the Ashambu landscape.

A very serious problem with ichthyological literature (especially papers in the recent past) is that authors uncritically rely on earlier data, the result that many reviews are merely compilations of old and often incompatible information. Errors are thus propagated over long periods of time (Kottelat & Freyhof 2007). Since the work by Abraham et al. (2011) has been published as an updated and systematic checklist of fishes of a poorly known region of the WG, the paper will surely be referred and cited by regional ichthyologists for years to come.

In this context, I believe that some of the results presented by Abraham et al. (2011) are ambiguous and need additional discussion and deliberation by the ichthyological research community of the WG. The paper has several cases of taxonomic inaccuracies, erroneous remarks and redundant data that the authors have presumably overlooked while preparing this manuscript in haste. As a peer researcher working on fish conservation in the southern WG, I believe that it is my obligation to point out some of the issues and shortcomings in this paper, to prevent future authors from citing inappropriate information, as well as assist the present authors in realizing their oversights.

The first point of interest is that Abraham et al. (2011) does not include *Hypselobarbus thomassi* (Day, 1874) in their updated checklist. This large cyprinid was recorded from the Kallada River at Kulatupuzha (Kurup 2002; Kurup et al. 2004) and Thenmala Dam (Euphrasia et al. 2006). Since Abraham et al. (2011) mention that their checklist is based on a compilation of previous literature on fishes of the Ashambu Hills (in addition to their field surveys), there is a need to understand whether this species was missed out accidentally from their list, or excluded due to any specific reason. Further, as Abraham et al. (2011) have recorded three species within the genus *Hypselobarbus* (*H. curmuca*, *H. kolus* and *H. kurali*) from Kallada River, it is reasonable to speculate that the omission of *H. thomassi* from their list may also have been due

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to taxonomic reasons. A discussion on whether *H. thomassi* is distributed in Kallada River is also timely as there is a current doctoral thesis work being carried out at one of the Universities in Kerala titled 'Life history and population of *H. thomassi* from Kallada River'.

In their paper on the fishes of Ashambu Hills, Abraham et al. (2011) extends the range of *Garra mcclellandi* (Jerdon, 1849) to the Neyyar Wildlife Sanctuary (Neyyar River). *G. mcclellandi* was first described from various locations in the Cauvery drainage (Nilgiri and Wayanad region of Tamil Nadu and Kerala) (Jerdon 1849), and subsequently recorded by many workers from the same or nearby drainages north of the Palakkad Gap. To the best of my knowledge, there are only two drainages south of the Palakkad Gap from where *G. mcclellandi* has been previously recorded, i.e., Periyar (Arun et al. 1996; Arun 1999; Minimol 2000; Easa & Shaji 2003; Thomas 2004) and Chalakudy (Antony 1977 cited in Ajithkumar et al. 1999).

G. mcclellandi was recorded from the Periyar Tiger Reserve (PTR) by Arun et al. (1996), Arun (1999) and Minimol (2000). Subsequently, Gopi (2000a) described a new species, *G. periyarensis* (based on two specimens) from the PTR which closely resembles *G. mcclellandi*, but without providing any information on whether any comparative material was examined. Nevertheless, in the most recent publication on the fishes of PTR, Radhakrishnan & Kurup (2010) suggests that *G. periyarensis* and *G. mcclellandi* have great similarity in body morpho-meristics, and validates the presence of *G. periyarensis* (but not *G. mcclellandi*) inside the PTR.

Silas (1958) in his remarks on the cyprinid fishes described by Jerdon, mentions that Pillay (1929), Hora & Law (1941), and Silas (1951) have recorded *G. jerdoni* (synonym of *G. mcclellandi*) as occurring in the rivers draining the Travancore Hills. Silas (1958) also mentions that the single specimen that he collected from Peermed Hills (Periyar drainage) was different from the typical *G. mcclellandi* in many details and that *G. mcclellandi* appears to be restricted to the Cauvery watershed. This lends further support to the description of *G. periyarensis* by Gopi (2000a).

There are no known types for *G. mcclellandi* (Eschemeyer & Fricke 2011) and hence it would be interesting to know more about the specimens examined by Abraham et al. (2011) for reporting its range extension to the Ashambu Hills. Similarly, it will also be worthwhile to know whether Abraham et al. (2011) had examined the types of *G. periyarensis* housed at the Regional Station of the Zoological Survey of India at Kozhikode (ZSI, CLT V/F 9426 and 9427). I believe that examining types and/or other museum specimens of both these species are crucial to confirming the actual identity of *G. mcclellandi* collected by Abraham et al. (2011) from Neyyar.

I also wish to debate on the record of the range extension of *P. mahecola* and *G. hughi* to the Ashambu Hills made by Abraham et al. (2011). Pethiyagoda & Kottelat (2005) explicitly mentions collecting *P. mahecola* from the Kallada River and Kallar Stream (possibly Vamanapuram River). The figure on page 147 of Pethiyagoda & Kottelat (2005) showing the distribution of *P. mahecola*, has Kallada River as one among the main collection locations. Therefore, it is already known that *P. mahecola* occurs in the Kallada River and the Ashambu Hills landscape. The claim of range extension of *P. mahecola* to the drainages of the Ashambu Hills (especially River Kallada, as mentioned in the second paragraph of discussion) by Abraham et al. (2011) is therefore redundant, and cannot be treated as a range extension record.

G. hughi was recorded from Kallar tributary of Vamanapuram River (Ashambu Hills Landscape) by Johnson & Arunachalam (2010). Although this has been mentioned by Abraham et al. (2011) in their discussion, they still continue to treat their record of *G. hughi* as a range extension to Ashambu Hills and southern Kerala. It is therefore not clear, what Abraham et al. (2011) mean by the term 'range extension'. Like the case of *P. mahecola*, one should also consider the information on the range extension of *G. hughi* as redundant.

Abraham et al. (2011) (citing Pethiyagoda & Kottelat 2005) also mentions that *P. amphibius* is a synonym of *P. mahecola*. This is an entirely wrong statement, as nowhere in the original paper have the authors opined so. Pethiyagoda & Kottelat (2005) (page 151; paragraph 3) only suggests that the "identity of *P. amphibius* remains in question and warrants further investigation; but cannot, however, be resolved without fresh collections from near the type locality". Even the Catalog of Fish (Eschemeyer & Fricke 2011) retains *P. amphibius* as a valid species. It is indeed a reality that *P. amphibius* has a taxonomic ambiguity and much of the confusion is because of misidentifications with, and incorrect references to *P. mahecola* in current

literature (Pethiyagoda & Kottelat 2005). It has also been suggested that the species presently assigned to *P. amphibius* may in fact be distinct and possibly new (Pethiyagoda & Kottelat 2005).

Abraham et al. (2011), citing Gopi (2000b) mention that the southernmost record of *Puntius* (*Hypselobarbus*) *jerdoni* was previously from the Chalakudy River. This is again a wrong statement as this species was recorded by Kurup et al. (2004) and Kurup (2002) from the Achenkovil River which is further south of Chalakudy and very close to the Ashambu Hills landscape.

As mentioned previously, errors in taxonomy and nomenclature of freshwater fish keep appearing in recent checklists, even if they have been corrected in the scientific literature years (sometimes decades) ago. One example of this is *Mystus cavasius*, which is currently known to be restricted to Godavari River and drainages north of it. The species previously recorded as *M. cavasius* in Krishna and rivers south of Krishna, are currently known to be *M. sengtee* (Chakrabarty & Ng 2005). I understand that the authors have not collected this species from the Ashambu Hills but mention *M. cavasius* in their checklist based on previous studies. I recommend that the authors should change the species name to *M. sengtee* based on the updated taxonomy, so that future workers referring to Abraham et al. (2011) will not repeat the same mistake.

Abraham et al. (2011) mentions *Tor malabaricus* as the only species of Mahseer present in the Ashambu Hills landscape. Previous workers including Johnson & Arunachalam (2009) have recorded only *T. khudree* from this landscape. A discussion on why *T. khudree* was not mentioned by Abraham et al. (2011) even in the checklist is therefore necessary. Similarly, Johnson & Arunachalam (2009) have recorded *Botia striata, Puntius melanampyx*, and *Pterocryptis* (*Silurus*) *wynaadensis* from Kallar Stream of Vamanapuram River, while Kurup (2002) has recorded *Glyptothorax lonah* and *Mystus gulio* from Kallada River. However, Abraham et al. (2011) does not mention these species in their checklist. Hence, a discussion on why these species were omitted from the checklist is also required.

An earlier study on the fishes of the Neyyar Wildlife Sanctuary (Thomas et al. 2000) has presumably been overlooked by the authors. This is evident from the fact that the Abraham et al. (2011) have missed out listing *Nemacheilus guentheri* which was collected by Thomas et al. (2000) from this protected area.

There are also several gaps in the information on endemism that has been presented in Table 1 of the paper by Abraham et al. (2011). These authors have mentioned that *Aplocheilus blockii* is an endemic species of WG. However, this species was first described from Sri Lanka (Arnold 1911) and later recorded from Pakistan (Mirza 2003). Probably, the records from Pakistan might need verification, but the fact remains that there are existing records of *A. blockii* from outside the WG. On the other hand, *Pangio goaensis, Horalabiosa joshuai* and *Garra surendranathanii* are endemic to the WG (Dahanukar et al. 2004) but the authors do not indicate this.

One of the main drawbacks of this paper is the lack of information (size, sex of the fish, diagnostic characters, number of samples collected) on the samples of the species whose range extension have been reported, as well as on the comparative material that the authors have (?) examined. The importance of comparative material either from museum collections, or even personal collections of the authors or their colleagues becomes important when reporting range extensions of species that have taxonomic ambiguity (like in the case of *G. mcclellandi*).

There has also been a lack of integration of some key literature on freshwater fishes of Kerala (for e.g. Thomas et al. 2000; Kurup et al. 2004). Two of the additional references that I mention here (Kurup 2002; Euphrasia et al. 2006) have been published in proceedings of conferences and so may not be available for easy access. This could have been one reason why these were not referred to by Abraham et al. (2011). However, Kurup et al. (2004) is one of the most comprehensive reviews on freshwater fish fauna of Kerala that is widely cited. Although it is also part of a published conference proceeding, it is available open access online (ftp://ftp.fao.org/docrep/fao/007/AD526e/ad526e12.pdf) and so easily available to most authors. On the other hand, the paper on the fishes of Neyyar Wildlife Sanctuary (Thomas et al. 2000) has been published in an easily accessible and reputed national journal. By missing key references, Abraham et al. (2011) have been unsuccessful in presenting a checklist of the fishes of Ashambu Hills that is 'updated' and 'systematic' as they claim.

Nevertheless, I still believe that the paper by Abraham et al. (2011) is an important ichthyological work from the southern WG with regard to the data on species richness vis-à-vis four important rivers, stream microhabitats and elevational gradients; and the very

important additional information on species specific threats. I would therefore suggest that the authors attempt to integrate the references that were missed, include the species that were overlooked, discuss the reasons why they think specific species are absent (even though it was recorded by previous workers) and prepare an updated list of fishes of the landscape.

I sincerely hope that Abraham et al. (2011) take my comments and suggestions in the right spirit and engage in a meaningful discussion on various aspects mentioned in this response, so as to further the science of fish taxonomy and conservation in the Western Ghats.

Note: The views expressed here are solely of the author, and in no way mirrors that of the institution(s) he represents.

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