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*On a new synonym of *Barilius tileo* Hamilton from Doon Valley (Uttarakhand) -A Critical Taxonomical Analysis

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Abstract

The present communication deals with a critical taxonomical analysis of the specimens of fish identified as *Barilius tileo* from Song river in Eastern part of Doon Valley (Uttarakhand) in the light of *Barilius dimorphicus* sp. nov. described from the same locality by Tilak and Husain (1990). They , on one hand , regarded it closely related to *Barilius tileo* but on the other different in as many as 12 most distinguishing features (as compared to Day 1878, 1889). This communication thoroughly analyses the present material in the light of the taxonomic descriptions of *Barilius tileo* available in literature and comes to firm conclusion that *Barilius dimorphicus* be considered conspecific to *Barilius tileo* and hence a new synonym.

Key words : Fish taxonomy, Eastern Doon, *Barilius* sp., river Song.

Introduction

Garhwal region [Western Himalayas, Uttarakhand] has been extensively explored from Ichthyological and allied points of view by various workers *viz.*, Badola and Pant, (1973); Badola, (1975); Grover and Baloni, (1977); Badola and Singh, (1977a, b, 1981); Baloni, (1980); Baloni and Grover, (1982); Tilak and Baloni, (1984); Sharma, (1984); Dobriyal and Singh, (1988); Juyal and Gosain, (1990); Dobriyal, *et al,*. (1992); Joshi *et al.*, (1993); Husain, (1995); Gosain and Gosain (2001), Nautiyal (2001,2005); Bahuguna *et al.*, (2005) ; Negi and Malik , (2005) Uniyal (2009) *etc.*

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The Kumaun region of Western Himalayan system (Uttarakhand) , too , has been explored from fishery point of view by prominent workers like Menon (1949); Chaudhary and Khandelwal, (1960); Pant (1970); Husain, (1976, 1979, 1980, 1995); Joshi (1999); Nautiyal (2005) *etc.*

It was in 1936 when Hora and Mukherji for the first time explored the fishes of Eastern Doon (part of 'Doon Valley', Western Himalayas, Uttarakhand). Since then, Doon Valley (District Dehradun), has not only been fascinating for Ichthyologists but also for environmentalists for exploring the aquatic habitats and knowing about the state of fish in the streams of Doon. The pioneering workers like Das (1960); Lal and

Chatterjee (1963); Singh (1964); Grover, (1970); Husain, (1975, 1987, 1995, 2003) ; Husain and Tilak, (1994); Grover *et al.,* (1994); Uniyal (2002); Uniyal, *et al.,* (2003); Uniyal and Kumar (2006); Uniyal and Mehta (2007) *etc.,* have worked out the ichthyofuanal diversity of Doon valley (Eastern or Western) from time to time.

The contents of all the above-cited references revealed that *Barilius tileo*, does not form part of the fish fauna of Western Himalayas, particularly Garhwal and Kumaon region. Basically, it is the resident of Eastern Himalayas (Day, 1878, 1889; Shaw and Shabbeare, 1937; Menon, 1963 ; Dutta Munshi and Srivastava 1988; Talwar and Jhingran, 1991; Menon, 1999; Nautiyal, 2005 and Vishawanath *et al.*, 2007).

The authors, while on routine field investigations in Eastern Doon , procured a good number of fish specimens , instantly identified as those belonging to *Barilius tileo* as per characterizations done by Day (1878, 1889) , Shaw and Shabbeare (1937), Dutta Munshi and Srivastava (1988) , Talwar and Jhingran (1991) and Vishawanath *et al.*, (2007) .

The literature also revealed the description of *Barilius dimorphicus* sp. nov. (stated to be a close alley of *B. telio*) by Tilak and Husain (1990) from the same locality from where the present material has been collected and hence it was deemed essential to compare the present material with the taxonomic descriptions of *B. telio* as well as *Barilius dimorphicus* .

The present communication, thus, deals with taxonomical analysis of a "**.....closely related species of *Barilius tileo i.e., Barilius dimorphicus* sp. nov. ....**" (Tilak and Husain , 1990) from Eastern Doon Valley.

As will be evident from the observations and discussion given ahead, a critical taxonomical examination has led to firm conclusion to consider ***Barilius dimorphicus*** as a **'new synonym'** of ***Barilius tileo***.

Materials and Methods

The material (43 specimens, 108-184mm in total length) concerned with the present communication was collected (April 2008-January (2009) from river Song at Teen Pani, close to Rajaji National Park from Eastern Doon (about 350-400 msl). The sampling site is thickly forested at both the banks with range of variations in important physico-chemical features as – pH - 6.8 - 8.4; temperature - 10.0 - 21.0° C; dissolved oxygen - 7.04 - 9.98mg / l; carbon-di-oxide - 0.21-1.19mg / l; hardness-120.0-212.0mg / l; alkalinity - 55.0-135.0mg / l; turbidity - 9.5-880.0 JTU; nitrate – 2.98-5.07mg / l and phosphorous - 0.13-0.23mg / l.

For taxonomical analysis , the material was customarily examined for morphological , meristic and morphometric characters and compared with *B. telio* of Day (1878, 1889); Shaw and Shabbeare (1937); Dutta Munshi and Srivastava (1988); Talwar and Jhingran, (1991) and Vishawanath *et al.,* (2007) and also with *B. dimorphicus* of Tilak and Husain (1990) .

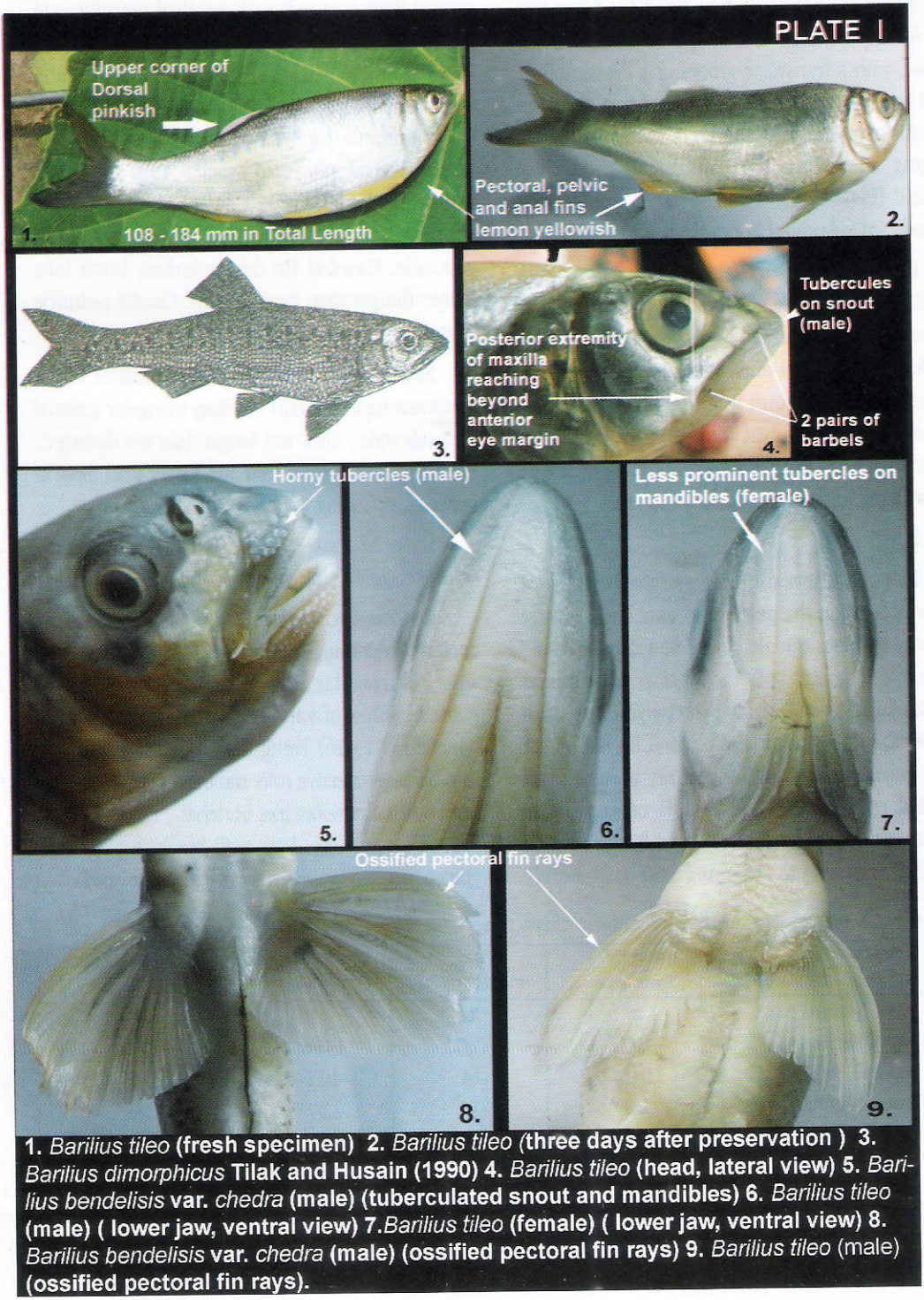
Observations

Description (Plate I , Figs. 1 – 9)

- **Morphological features**

Body contour (Plate I , Fig. 1 & 2) :

Trout like; compressed laterally, ventral profile more arched than the dorsal. Mouth terminal, cleft deep (directed upwards), posterior extremity of maxilla reaching to below 1/4th to 3/4th of eye diameter when mouth is closed (but almost reaching to below anterior border of eye when mouth is opened). Jaws subequal, the upper one being slightly longer (Plate I, Fig. 4) than the lower one and with a shallow notch in the middle



1. *Barilius tileo* **(fresh specimen) 2.** *Barilius tileo* **(three days after preservation) 3.** *Barilius dimorphicus* **Tilak and Husain (1990) 4.** *Barilius tileo* **(head, lateral view) 5.** *Barilius bendelisis* **var.** *chedra* **(male) (tuberculated snout and mandibles) 6.** *Barilius tileo* **(male) (lower jaw, ventral view) 7.***Barilius tileo* **(female) (lower jaw, ventral view) 8.** *Barilius bendelisis* **var.** *chedra* **(male) (ossified pectoral fin rays) 9.** *Barilius tileo* (male) **(ossified pectoral fin rays).**

into which the corresponding tip of the lower jaw fits. A symphysial knob is altogether absent. Snout obtuse, with a transverse groove or a depression in front and close to nostrils. The latter being closer to anterior margin of eye than tip of snout. Eyes large, bulging, visible from both dorsal and ventral sides of head (Plate I, Fig. 6 and 7). Interorbital space arched. 3rd suborbital bone widest and deepest.

Barbels two pairs (Plate. I , Fig. 4) , one small rostral and one small maxillary pair. Rostral barbel originating slightly anterior to the anterior border of the nostril and about the middle of the snout length at a point where a suture separates pre-orbital and nasal bone. Maxillary pair originating a bit prior to the end of maxilla and to below about 1/4th of the diameter of eye.

Fins:

Dorsal, short with cut margins, originates midway between the pelvic and anal base; almost midway between middle of eye and caudal base ; when folded against body the tip of its anterior rays not reaching tip of last ray ; the longest ray much shorter than body depth and pectoral fin but longer than pelvic fin and the longest ray of anal ; last divided ray extending to middle of anal base. **Pectoral** usually shorter than head length ; length variable , reaching to or beyond anal base. **Pelvic** shorter than pectorals with notched margins; not reaching anal opening (falling short of a distance equal to an eye diameter) ; outer unbranched and first branched ray almost equal and extending to below the anterior 1/3rd of dorsal base. Last two rays thickened and fused basally. **Anal** originates just below the base of last dorsal ray; last ray the shortest, reaching to almost middle of caudal peduncle. **Caudal** fin deeply forked; lower lobe longer (longer than head length). Caudal peduncle narrow and longer than its height.

Scales with more prominent radii in larger specimens (upto 184mm) . Axillary triangular scales at pectorals wide , thick and longer than eye diameter ; those of pelvics narrow, thin and longer than those of pectorals, extending to beyond pelvic base.

Lateral line curved downward and passing below the middle of caudal peduncle.

Colouration (when live) bluish brown along dorsum , becoming silvery on the flanks and belly ; with 2-4 irregular rows of vertically-oval bluish-black blotches of varying sizes ; the spots of the upper row (14-16) being the biggest. The anterior spots of all successive rows sometimes coalescing to form vertical streaks-like blotches , not extending beyond lateral line. Eyes with blackish pupil and golden iris. Dorsal fin grayish (at tips from IVth to

Table 1: A comparative analysis of meristic characters.

S. No.	Characters (Fin Formula)	Present Specimens	Day (1878, 1889)	Tilak and Husain (1990)	Talwar and Jhingran (1991)
1	Branchiostegeal rays	iii	iii	iii	-
2	Dorsal Fin Rays	II/7	9(2/7)	II/6-7	II/7
3	Pectoral Fin Rays	I/13	14	I/12-13	I/13
4	Ventral Fin Rays	I/8	9	I/7-8	I/8
5	Anal Fin Rays	III/9-10	13(3/10)	III/10-11	III/10
6	Caudal Fin Rays	19-20	20	17-19(8-10/9)	-
7	Lateral line scales	58-68	70-75	60-66	65-75
8	Lateral transverse rows	12.5-13. 5/3.5-4.5	14/7	12.5/7.5	-
9	Predorsal scales.	26-30	30	25-27	28-30

Table 2 : A comparative morphometric analysis of characters in relation to Total Length [TL] and Standard Length [SL].

S. No.	Characters / Ratios	Present Specimens	Day (1878, 1889)	Tilak and Husain (1990)	Talwar & Jhingran (1991)
1	Head length	4.26 – 5.21* (3.2 – 4.14)**	4 . 75 – 5.25	4 .67 – 5 .44 (3.60 – 4.12)	
2	Body depth	3.94 – 5.30 (3.02 – 4.2)	4.66	4.59 – 5.75 (3.47 – 4 .05)	(3.4 – 3.7)
3	Body width	6.13 – 10.5 (4.86 – 8.4)		6 .83 – 10.45 (5.29 – 7.69)	
4	Height of body at anal origin	3.79 – 6.25 (2.85 – 5.0)		5.25 – 6 .76 (3 .96 – 4.70)	
5	Height of Dorsal fin	6.0 – 7.71 (4.62 – 6.0)		7.11 – 8.85 (5.38 – 6 .47)	
6	Dorsal base	8.0 – 10.8 (6.14 – 8.2)		9.17 – 10 .95 (7 .10 – 7 .80)	
7	Pectoral fin	5.52 – 7.37 (4.19 – 5.79)		6.22 - 7 .19 (4 .78 – 5.39)	
8	Pectoral base to pelvic base distance	5.2 – 6.9 5 (4.09 – 5.95)		5 .47 – 6 .89 (4.23 – 5.32)	
9	Pelvic fin	7.6 7 – 10.8 (5.93 – 8.4)		8.32 – 10 .45 (6.40 – 7.57)	
10	Pelvic base to anal origin	5.2 – 7.2 (4.23 – 5.74)		6 .04 – 7.50 (4.68 – 5.78)	
11	Anal fin (Height)	7.94 – 10.8 (6.12 – 8.4)		9.74 – 11.56 (7.48 – 8 .87)	
12	Anal base	5.95 – 8.65 (4.57 – 6.47)		6.65 – 8.85 (5.15 – 6.25)	
13	Caudal fin (lower lobe longer)	3.71 – 5.6 (2.93 – 3.43)	4.75	- (3.08 - 3.50)	
14	Caudal fin (upper lobe)	4.45 – 5.81		4.08 – 4.79	
15	Predorsal distance	2.13 – 2.56 (1.71 – 1.94)		2.32 – 2.61 (1.79 – 1.95)	
16	Postdorsal distance	2.50 – 3.77 (2.0 – 2.91)		2.71 – 3.19 (2.11 – 2.25)	
17	Prepectoral distance	4.0 –4.89 (3.04 – 3.89)		3.97 – 4.48 (3.11 – 3.44)	
18	Postpectoral distance	1.58 – 1.85 (1.25 – 1.46)		1.66 – 1.98 (1.28 – 1.40)	
19	Prepelvic distance	2.23 – 3.0 (1.93 – 2.28)		2.56 – 2.87 (1.95 – 2.11)	
20	Postpelvic distance	1.98 – 2. 57 (1.73 – 2.0)		2.1 9 – 2.61 (1.70 – 1.92)	
21	Preanal distance	1.0 9 – 2.05 (1.07 – 2.5)		1.86 – 2.05 (1.43 – 1.53)	
22	Postanal distance	3.34 – 4.31 (2.55 – 3.37)		3.35 – 4.11 (2.61 – 3.04)	
23	Caudal peduncle length	6.42 – 9.35 (5.0 – 7.10)		6.33 – 7.93 (4.83 – 5.93)	

* Ratios given outside parenthesis are in relation to Total Length (TL)

** The ratios given in the parenthesis ( ) are in relation to the Standard Length [SL].

Table 3: A comparative morphometric analysis of characters in relation to Head Length.

S. No.	Characters / Ratios	Present Specimens	Day (1878, 1889)	Tilak and Husain (1990)	Talwar and Jhingran (1991)
1	Head width	1.77 – 2 .55	4.0 – 4.50	1.67 – 1.96	(any of the ratios mentioned in first three columns has not been undertaken)
2	Head height	1.19 – 1.56		1.10 – 1.33	
3	Snout length	2.71 – 4.27		3.12 – 3.67	
4	Eye diameter	3.28 – 5.28		3.08 – 4.12	
5	Interorbital width	2.22 – 3.43		2.72 – 3.23	
6	Postorbital head length	1.50 – 2.30		1.82 – 2.72	
7	Cleft of mouth	2.31 – 3.37		2.27 – 2.86	
8	Height of dorsal fin	1.25 – 1.74		1.31 – 1.72	
9	Dorsal base	1.64 – 2.30		1.79 – 2.09	
10	Pectoral fin	1.22 – 1.56		1.25 – 1.47	
11	Distance between outer edges of pectoral base	1.90 – 3.00		2.12 – 2.87	
12	Pectoral base to pelvic base distance	1.11 – 1.71		1.10 – 1.38	
13	Pelvic fin	1.67 – 2.5		1.73 – 2.04	
14	Distance between outer edges of pelvic base	2.92 – 5.0		3.47 – 4.60	
15	Pelvic base to anal base distance	1.12 – 2.0		1.19 – 1.61	
16	Anal fin (height)	1.62 – 2.73		1.96 – 2.29	
17	Anal base	1.19 – 1.76		1.35 – 1.69	
18	Length of Caudal peduncle	1.15 – 2.31		1.17 – 1.60	
19	Caudal fin (Upper lobe)	0.92 – 1.19		0.75 – 0.95	

IXth ray) with upper corner pinkish (at upper margin of Ist to IIIrd rays). Pectoral , pelvic and anal fins lemon yellowish (Plate I , Fig. 1 & 2) . Caudal fin grayish , lower lobe being more so.

- **Meristic and morphometric characters**

For a ready reference and convenient comparison the meristic and morphometric characters are presented in Tables 1, 2, 3 and 4. The comparison of the present material is mainly done with Day (1878, 1889), Tilak and Husain (1990), and Talwar and Jhingran (1991).

- **Sexual dimorphism**

The present material clearly exhibits such characters (Table 5) on the basis of which sex distinction can be done in the field as well as laboratory, particularly in full grown specimens (total length about 147-184 mm).

Discussion

Besides including the conventional ratios as considered by Day (1878, 1889) ; Shaw and Shabbeare (1937) ; Dutta Munshi and Srivastava (1988); Talwar and Jhingran (1991) and Vishawanath *et al.*,(2007); Tilak and Husain (1990) while describing the morphometric characters calculated a number of other ratios, too, in Total Length (TL), Standard Length (SL), Head Length (HL) *etc,* (Tables 2 , 3 and 4).

Therefore, a critical taxonomical analysis of the present material has been done primarily in the light of the descriptions given by Day (1878, 1889), Talwar and Jhingran (1991) and Vishawanath *et al.*, (2007). A ready comparison of ratios

Table 4 : A comparative morphometric analysis of miscellaneous body proportions / ratios majorly considered by Tilak and Husain (1990) .

S. No.	Characters / Ratios	Present Specimens	Day (1878, 1889)	Tilak and Husain (1990)	Talwar and Jhingran (1991)
1	Eye diameter in snout length	1.0 – 2.17	1.0 – 1.33	0.90 – 1.31	(any of the ratios mentioned in first three columns has not been undertaken)
2	Eye diameter in Interorbital Width	1.14 – 2.5	1.5	1.00 – 1.37	
3	Interorbital width in Head width	1.18 – 1.71		1.55 – 1.80	
4	Postorbital head length in head width	0 76 – 1.09		1.04 – 1.22	
5	Distance from snout tip to nostril in snout length	1.0 – 2.0		1.31 – 1.63	
6	Distance from nostril to anterior margin of eye in snout length	1.67 – 4.5		4.50 - 6.18**	
7	Length of dorsal base in length of anal base	1.07 – 1.54		1.20 – 1.43	
8	Length of pectoral fin in pectoral to pelvic distance	0.90 – 1.31		0.95 – 1.20	
9	Distance between outer edges of pectoral base in head width	1.0 – 1.45		1.16 – 1.67	
10	Distance between outer edges of pectoral base in pectoral to pelvic distance.	1.26– 2.5		1.61 – 2.15	
11	Length of pelvic fin in distance between pelvic base to anal origin	1.25 – 1.83		1.2 7 – 1.59	
12	Distance between outer edges of pelvic in head width	1.28 – 2.50		1.89 – 2.40	
13	Distance between outer edges of pelvic base in pelvic base to anal origin distance.	2.0 – 4.0		2.69 – 3.5 0	
14	Least height of caudal peduncle in its length.	1.08 – 2.27		1.56 – 1.93	

** Pl. see point No. 4. of the discussion.

Table 5 : A comparative analysis of Sexually Dimorphic Characteristics.

S. No.	Characters	Male	Female
1	**Tubercles at lower mandibular surface and snout**	More and spiny along the lower mandibular surface (felt rough while moving fingertips); also along the lower border of snout (Pl. I , Fig. 6).	Less prominent and lesser in number (felt smooth while moving fingertips); absent on the snout. (Pl. I Fig. 7).
2	**Tuberculated scales**	Present below in front of dorsal fin.	Absent
3	**Ist unbranched ray and I and II branched rays of pectoral fin(Pl. I , Fig. 9)**	Osseous and thickened	Normal

exclusively taken up by Tilak and Husain (1990) can be made out from the Tables 2 , 3 and 4 and a comparison will reveal that the present material is akin to that of Tilak and Husain (1990). Besides, the ratios of present material given in Tables 2, 3 and 4 also indicate enlargement in ranges of variations.

All the major meristic (except number of lateral line scales) and morphometric features, *viz.*, head length , body depth , lower lobe of caudal fin

Table 6 : A comparison of 12 distinguishing characters considered by Tilak and Husain (1990) worthy of naming a new species.

S. No.	Characters	Present Specimens	Day (1878 , 1889)	Tilak and Husain (1990)	Talwar and Jhingran (1991)
1	**Jaws**	Upper jaw longer, when mouth is closed	Upper longer	Lower longer	Jaws short
2	**Posterior extremity of maxilla**	Reaching to below 1 / 4th to 3 / 4th of eye dia. when mouth is closed but reaching to anterior border of eye when mouth is opened.	Reaching to beneath the middle of eye	Extending to below anterior margin of eye	Extending to below middle of orbit
3	**Barbels**	2 pairs	Very rudimentary or entirely absent	2 minute pairs	A rudimentary maxillary pair
4	**Eye diameter in interorbital width**	1 . 14 - 2 . 5	1. 50	1.00 - 1. 37	-
5	**Origin of dorsal fin**	Midway between the pelvic and anal base; almost midway between middle of eye & caudal base	Midway between hind edge of eye and caudal base	Midway between middle of eye and caudal base	Inserted in advance of anal fin
6	**Pectoral fin**	As long as head excluding snout	As long as head excluding snout	Longer than head excluding snout	-
7	**Caudal fin rays**	19 – 20	20	17 – 19	-
8	**Lateral line scales**	58 – 68	70 – 75	60 – 66	65 – 75
9	**Lateral transverse rows (L.tr.)**	12 ..5 - 13. 5 / 3.5 - 4. 5	14 / 7	12. 5 / 7. 5	-
10	**Predorsal scales**	26 – 30	30	25 – 27	28 – 30
11	**Max. Total length**	184 mm	127 mm	185 mm	150 mm
12	**Distribution**	Song river (Teen Pani) Eastern Doon (Uttarakhand)	Bengal and Assam	Rajaji National Park, Song River (Teen Pani) & Pauri – Garhwal Districts Uttarakhand.	Eastern Himalayas, Bangladesh, Nepal and Burma

in total length (Table 2); eye diameter in head length (Table 3); eye diameter in snout length and interorbital width (Table 4) are well in agreement with Day (*op.cit*) .

Tilak and Husain (1990) on the basis of the specimens collected from Eastern Doon valley, described a new species called *Barilius dimorphicus* , and while giving description , it was said to be, "**.....closely related to *Barilius tileo* Hamilton – an Eastern Indian form".** They considered this '**closely related**' species different from *Barilius tileo* on the basis of as many as 12 distinguishing characters (Table 6) in the light of those observed by Day (*op.cit*). Curiously enough , an analysis of taxonomic characters of the present specimens focused mainly on these 12 characters has made it clear that all these characters (except lateral line scales) , considered by Tilak and Husain (1990) quite contrasting (Table 6) come closure to Day (*op.cit*) and Talwar and Jhingran (1991) and hence the observations / contentions by Tilak and Husain (1990) are not convincing enough to describe and raise the material collected and studied by them to a new specific status. .

As far as the number of lateral line scales (58-68) of the present specimens is concerned, they definitely do not agree with Day (70-75) but fall within the range of 60-66, as also observed by Tilak and Husain (1990). Lesser number of scales in lateral line might be one reason for Tilak and Husain (1990) considering their material different and assigning a new specific status but lesser number (as compared to Day) of lateral line scales *i.e.,* 65-75 by Talwar and Jhingran (1991) and 58-59 by Vishawanath *et al.,* (2007) have also been recorded from the specimens of Eastern Himalayan region and these workers still found this character conspecific with *Barilius tileo* and didn't consider it to be so alarming as to create a new species. This point of discussion is also substantiated by the fact that Talwar and Jhingran (1991) synonymised *Barilius menoni* (lateral line scales 65 *nec* 62) , reported as new species from North Bihar (Sen, 1976) [on the basis of single specimen !] , with *B. telio*. Creation of a new species on the basis of single specimen and variable characters is a shear violation of taxonomic principles (Gupta, 1983), and thus Talwar and Jhingran (1991) were quite right in synonymizing *B. menoni* with *B. telio* .

Besides the above, description given by Tilak and Husain (1990) finds few more lapses as compared to the description given by Day (*op.cit*) *viz.,*

1. Lateral transverse rows of scales (L.tr.):

The fin formula given by Tilak and Husain (1990) mentions, "Lateral transverse (L.tr.) - 12.5 / 7.5 " which differs from Day (*op. cit.*) with respect to transverse rows of scales above the lateral line (*i.e.,* 14) but in agreement with the present material (Table 1 and 6). As far as the transverse rows of scales below the lateral line are concerned , they are never 7.5 rows [from below the lateral line up to the base of pelvic fin; the correct way of counting the rows of scales below the lateral line (Jayaram , 1981)]. The correct number *i.e.,* 3.5 – 4.5 rows below the lateral line , has been given by Day (*op. cit* .) in the description [not in the fin formula]; which is in full agreement with the present material .

Tilak and Husain (1990) represented the same data , given by Day (*op. cit.*), in the fin formula without affirming that in lateral transverse rows (L.tr.) the data given below the slash line (/) is counted from lateral line up to the base of pelvic fin. If it has to be mentioned as 7. 0 or 7.5, it should be mentioned categorically that these are the number of rows counted from below the lateral line to beyond the pelvic base up to mid-ventral

line. Hence, this lapse needs correction ; and lateral transverse (L. tr.) be correctly verified as 12.5 - 13.5 / 3.5 - 4.5.

2. Distance from nostril to anterior margin of eye in snout length ! [Table 4, point No. 6 marked with double asterisk ( )] :**

Tilak and Husain (1990) mentioned this ratio to be 4.50 – 6.18 which is quite deviating from the present one (*i.e.,* 1.67 – 4.5) and seems to be a serious lapse on the part of the workers . The ratio given by them is not to be expected when the snout length in all the present specimens varies from 0.65 mm–13 mm and the distance from the nostril to the anterior margin of eye varies from 0.25 – 0.45 mm.

3. Length of caudal fin (in TL and SL) :

As per conventions , the ratio of caudal fin in total length is calculated after measuring the length of that lobe of the fin which is longer (Jayaram, 1981), but Tilak and Husain (1990) has given the ratio of the caudal fin in total length, considering the length of the upper lobe (Table 2), which is against the convention and hence cannot be considered for comparison. The present observations are in agreement with Day (*op. cit.*) as far as the ratio in TL is considered and also with Tilak and Husain (1990) where they have given the ratio of caudal fin (lower lobe) in standard length (Table 2).

4. Colour of pectoral , pelvic and anal fins (Pl. I , Fig. 1 and 2) :

Tilak and Husain (1990) described the colour of pectoral , pelvic and anal fins to be whitish . Actually, live specimens have lemon yellowish colourations (Plate I, Fig.1) on the said fins as also stated by Day (*op.cit*) . This colouration does not fade out even after 4 -5 days of preservation (Plate I, Fig. 2) . In principle , the long preserved specimens loose their natural hue all over the body, making even the blotched - rows and margin of dorsal fin and lower caudal lobe more darker.

5. Colour at upper margin of the dorsal fin (Pl. I , Fig. 1 & 2) :

According to Tilak and Husain (1990) the colour of the upper margin of dorsal fin is 'whitish' against 'pinkish' as observed by Day (*op. cit.*) and also as substantiated by the present observations . Needless to emphasize here again that the margin becomes whitish after the specimens undergo a prolonged preservation .

6. Sexual Dimorphism :

The information given by Tilak and Husain (1990) regarding sexual dimorphism is decidedly new to literature but it does not sound appropriate to have considered it as to be the criteria to name any species as *'dimorphicus'*. From the term *'dimorphicus'*, instantly , any Zoologist may reach on the conclusion that the species in question is 'dimorphic' , obviously with reference to sexual dimorphism in this case , as it is highlighted in the description by Tilak and Husain (1990). Husain and Tilak (1994) , while discussing the Fish Fauna of Rajaji National Park makes it clear that *'dimorphicus'* name to the species was most probably given on account of the fact that "This species exhibits sexual dimorphism....." . No other character justifying 'dimorphic' nature becomes apparent in the description given by Tilak and Husain (1990).

All the characters of sexual dimorphism observed in present material (Table 5, Plate I, Fig. 6, 7 and 9) are in agreement with Tilak and Husain (1990) but some relevant points of differences are essential to be rectified *e.g.,*

The tubercles on the lower mandibular and branciostegeal surfaces in males (Pl. I , Fig. 4 & 6) described to be lacking in females are also noticed to be present in females of the present material but,

comparatively , they are less prominent , lesser in number and felt smooth while moving finger tips on them (Pl. I Fig. 7) (Table 5) ; presence of tubercles on the snout of males (Pl. I , Fig. 4) (absent in females) was not mentioned by Tilak and Husain (1990) but later on a correction was made by Husain and Tilak (1994) .

The Ist unbranched ray of the pectoral fin in males has been described to be ossified and strongly developed (Tilak and Husain, 1990) but it is not only the Ist unbranched ray but the Ist and the 2nd branched rays also which are osseous and thickened (in females this character is normal). Husain and Tilak (1994) further corrected the earlier lapse by saying ".....2nd branched ray of the pectoral fin is thickened.."

It will not be out of place to mention that the character of 'sexual dimorphism' is exhibited by a number of other fish species , including those belonging to genus *Barilius e.g., Barilius bendelisis* var. *chedra* (Pl. I , Fig. 5 and 8) and *Barilius bendelisis* var. *cocsa* are described to be the male and female, respectively, in the description by Day (*op. cit.*) long before and later on by Grover and Tripathi (1985). Sexual dimorphism (nature of tuberculated structures on snout, cheeks; thickened pectoral fin rays *etc.,*) had also earlier been discussed in *Barilius barna* by Mukherjee (1935). Therefore , it will be quite misleading if a species of a particular Genus , where sexual dimorphism is not uncommon , is named as to be **'dimorphic'**.

Conclusion

On the basis of present observations , sufficient evidences are provided to prove the present material 'conspecific' to *Barilius telio* , and the species described earlier as *B. dimorphicus* (Tilak and Husain, 1990) from the same locality be considered its new synonym.

The occurrence of the population of *Barilius tileo* in the streams of Doon (Western Himalayas) has, obviously, added new dimensions to its distribution and the range should be considered to have been extended from the Eastern to Western Himalayas , an important aspect of dispersal of East Himalayan forms to Western region from zoogeographical distribution point of view .

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