

Supplementary Figure S1. General appearance of *Botia dario*. (A) Collected from Atrai River, AR; (B) collected from Dhorala River, DhR; (C) collected from Danu River, DR; (D) collected from Jamuna River, JR; and (E) collected from Padma River, PR. .

Supplementary Table S1. MANCOVA tests for effect of sampling sites, total length (TL) (covariate) and their interaction of body morphology of *Botia dario*.

Effect	Wilk's Lambda	F	Hypothesis df	Error df	<i>p</i>
TL	0.089	1.44E3	2	283	0.000*
SS	0.979	3.082	2	283	0.047*
SS*TL	0.793	8.716	8	566	0.000*

*significant value ($p < 0.05$), SS: Sampling sites

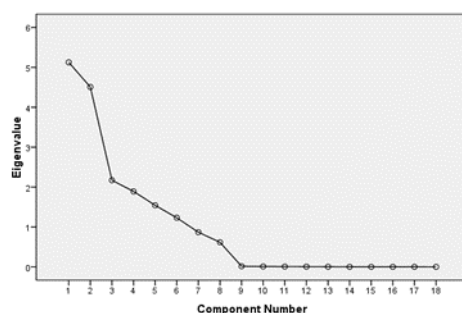
Supplementary Table S2. Univariate ANOVA of morphometric lengths and their ratios of *Botia dario* stocks collected from the five rivers of Bangladesh.

Characteristics and ratios	Wilks' Lambda	F	df1	df2	p
FL	0.906	7.411	4	285	0.000*
SL	0.897	8.205	4	285	0.000*
TrL	0.946	4.056	4	285	0.003*
PrOL	0.972	2.024	4	285	0.091
PsOL	0.793	18.620	4	285	0.000*
EL	0.753	23.311	4	285	0.000*
UCL	0.627	42.390	4	285	0.000*
LCL	0.835	14.093	4	285	0.000*
TL_FL	0.993	0.534	4	285	0.711
TL_SL	0.884	9.327	4	285	0.000*
TL_TrL	0.931	5.250	4	285	0.000*
FL_SL	0.928	5.491	4	285	0.000*
FL_TrL	0.963	2.770	4	285	0.028*
SL_TrL	0.958	3.137	4	285	0.015*
TrL_UCL	0.726	26.897	4	285	0.000*
TrL_LCL	0.817	15.971	4	285	0.000*
PrOL_PsOL	0.639	40.275	4	285	0.000*
TL_UCL	0.742	24.765	4	285	0.000*
TL_LCL	0.856	12.028	4	285	0.000*
UCL_LCL	0.884	9.347	4	285	0.000*
*significant value ($p < 0.05$)					

Supplementary Table S3. Factors loading of different morphometric measurements and their ratios by using PCA among different stocks of *Botia dario* collected from the five rivers of Bangladesh.

Characteristics	PC1	PC2	PC3	PC4	PC5	PC6
FL	0.503	0.722	0.222	0.268	0.076	0.277
SL	0.637	0.659	0.263	0.250	0.044	-0.096
TrL	0.905	0.344	-0.065	-0.181	-0.112	0.081
PsOL	-0.034	0.399	-0.017	0.322	0.244	0.079
EL	-0.089	0.207	0.468	-0.018	-0.209	-0.451
UCL	-0.260	0.485	0.291	-0.654	0.424	-0.011
LCL	-0.207	0.803	-0.520	-0.128	0.040	-0.113
TL_SL	-0.620	-0.675	-0.266	-0.242	-0.060	0.094
TL_TrL	-0.902	-0.376	0.048	0.164	0.081	-0.073
FL_SL	-0.311	0.137	-0.096	0.039	0.071	0.857
FL_TrL	-0.684	0.288	0.308	0.500	0.205	0.196
SL_TrL	-0.607	0.251	0.395	0.540	0.193	-0.225
TrL_UCL	0.783	-0.442	-0.109	0.158	0.370	-0.022
TrL_LCL	0.739	-0.485	0.417	0.017	-0.127	0.152
PrOL_PsOL	0.011	-0.034	-0.257	0.529	-0.804	0.042
TL_UCL	0.372	-0.741	-0.137	0.365	0.371	-0.069
TL_LCL	0.188	-0.781	0.567	0.010	0.127	0.103
UCL_LCL	-0.251	0.035	0.741	-0.331	-0.437	0.192

The first four principal components are shown here. The most important morphometric variables and ratios contributed to the PC1 and PC2 are marked as bold face.



Supplementary Figure S2. Wilk's lambda test for verifying differences among stocks of *Botia dario* with morphometric measurements and ratios, using canonical variate analysis (CVA).

Supplementary Table S4. Wilk's lambda test for verifying differences among stocks of *Botia dario* with morphometric measurements and ratios, using canonical variate analysis (CVA).

Test of Function(s)	Wilks' Lambda	Chi-square	df	p
1 through 4	0.145	537.603	64	0.000*
2 through 4	0.351	291.742	45	0.000*
3 through 4	0.616	135.001	28	0.000*
4	0.879	36.072	13	0.001*

*significant value ($p < 0.05$)

Supplementary Table S5. Contribution of morphometric measurements and ratios to the canonical variate scores in *Botia dario* collected from five rivers in Bangladesh.

Characteristics	CV1	CV2	CV3	CV4
FL	-0.251*	0.121	0.091	-0.028
TL_SL	0.244*	-0.179	-0.212	-0.156
UCL	-0.244	0.820*	0.019	-0.109
TL_UCL	-0.184	-0.577*	0.335	0.059
PrOL_PsOL	0.488	-0.489*	-0.322	0.136
EL	0.318	0.435*	0.307	-0.052
PsOL	-0.307	0.085	-0.520*	0.228
TrL_UCL	-0.317	-0.436	0.464*	0.001
TrL_LCL	-0.089	-0.372	0.459*	0.366
TL_TrL	0.185	-0.018	-0.236*	0.093
TrL	-0.150	-0.008	0.236*	-0.095
FL_TrL	-0.036	0.126	-0.235*	0.105
SL	-0.223	0.158	0.232*	0.154
LCL	0.004	0.398	-0.335	-0.466*
UCL_LCL	0.192	0.263	-0.041	0.433*
TL_LCL	-0.078	-0.305	0.393	0.418*
FL_SL	-0.062	-0.085	-0.315	-0.407*
FL_TrL	-0.007	0.185	-0.104	0.327*
Eigenvalues	1.418	0.756	0.426	0.138
% of Variance	51.8	27.6	15.6	5.1
Cumulative %	51.8	79.4	94.9	100.0
Canonical Correlation	0.766	0.656	0.547	0.349

Variables ordered by absolute size of correlation within function. * Largest absolute correlation between each variable and any canonical variates.

Supplementary Table S6. Classification of *Botia dario* into their original stocks using classification matrix (original and cross-validated) of the CVA based on morphometric measurements and ratios.

Stock Name	Danu River	Padma River	Jamuna River	Dhorola River	Atrai River	Total
Original ^a						
Danu River	39 (65.0%)	8 (13.3%)	6 (10.0%)	2 (3.3%)	5 (8.3%)	60 (100.0%)
Padma River	12 (5.0%)	21 (42.0%)	6 (12.0%)	9 (18.0%)	2 (4.0%)	50 (100.0%)
Jamuna River	5 (9.4%)	3 (5.7%)	34 (64.2%)	3 (5.7%)	8 (15.1%)	53 (100.0%)
Dhorola River	0	5 (8.9%)	0	50 (89.3%)	1 (1.8%)	56 (100.0%)
Atrai River	4 (5.6%)	4 (5.6%)	6 (8.5%)	2 (2.8%)	55 (77.5%)	71 (100.0%)
Cross-validated ^b						
Danu River	36 (60.0%)	11 (18.3%)	6 (10.0)	2 (3.3)	5 (8.3)	60 (100.0%)
Padma River	14 (28.0%)	15 (30.0%)	7 (14.0)	12 (24.0)	2 (4.0)	50 (100.0%)
Jamuna River	7 (13.2%)	3 (5.7%)	30 (56.6)	5 (9.4)	8 (15.1)	53 (100.0%)
Dhorola River	0	5 (8.9%)	3 (5.4)	46 (82.1)	2 (3.6)	56 (100.0%)
Atrai River	4 (5.6%)	4 (5.6%)	7 (9.9)	2 (2.8)	54 (76.1)	71 (100.0%)

^a 68.6% of original grouped cases correctly classified^b 62.4% of cross-validated grouped cases correctly classified

Percentages of correct classification is written in bold and corresponding number of individuals are marked in parentheses

Supplementary Table S7. Univariate ANOVA of morphometric lengths and their ratios of *Botia dario* stocks collected from the five rivers of Bangladesh.

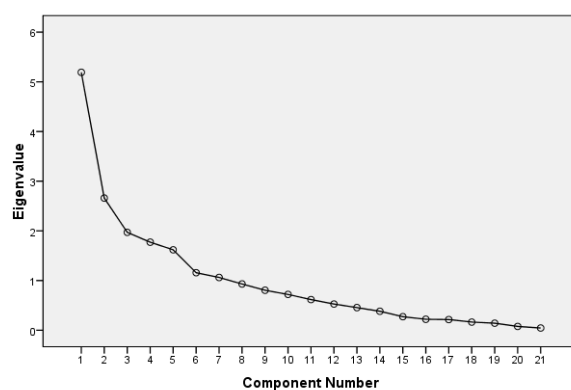
Characteristics	Wilks' Lambda	F	df1	df2	p
1_2	0.689	32.228	4	285	0.000*
2_3	0.714	28.599	4	285	0.000*
3_4	0.857	11.915	4	285	0.000*
4_5	0.852	12.360	4	285	0.000*
5_6	0.858	11.773	4	285	0.000*
6_7	0.954	3.412	4	285	0.010*
7_8	0.837	13.880	4	285	0.000*
8_9	0.952	3.614	4	285	0.007*
9_10	0.880	9.740	4	285	0.000*
10_11	0.855	12.094	4	285	0.000*
11_12	0.791	18.829	4	285	0.000*
12_1	0.712	28.865	4	285	0.000*
2_12	0.701	30.419	4	285	0.000*
2_11	0.297	168.786	4	285	0.000*
2_10	0.869	10.776	4	285	0.000*
2_9	0.917	6.488	4	285	0.000*
2_8	0.890	8.851	4	285	0.000*
5_7	0.976	1.725	4	285	0.144
3_11	0.754	23.184	4	285	0.000*
3_10	0.983	1.204	4	285	0.309
5_8	0.791	18.835	4	285	0.000*
4_10	0.648	38.680	4	285	0.000*
4_8	0.908	7.203	4	285	0.000*
*significant value ($p < 0.05$)					

Supplementary Table S8. Factors loading of truss measurements using PCA among different stocks of *Botia dario* collected from the five rivers of Bangladesh.

Truss measurements	PC1	PC2	PC3	PC4	PC5	PC6	PC7
1_2	0.170	0.408	0.548	0.220	-0.610	-0.156	-0.016
2_3	0.272	0.121	0.452	0.416	-0.667	-0.054	-0.122
3_4	0.195	0.632	-0.087	0.189	0.320	-0.169	-0.233
4_5	0.434	-0.627	0.159	0.005	-0.098	0.257	0.260
5_6	0.351	0.372	0.278	-0.008	0.353	-0.286	0.094
6_7	0.416	-0.113	0.043	0.148	0.293	-0.489	0.346
7_8	-0.058	-0.378	0.589	0.274	0.349	0.148	-0.258
8_9	0.109	0.239	0.285	-0.014	0.121	0.387	0.473
9_10	0.551	-0.068	-0.061	-0.494	-0.088	-0.270	-0.151
10_11	0.586	-0.439	-0.031	0.065	-0.043	-0.152	-0.175
11_12	-0.304	0.109	-0.168	0.709	0.145	-0.016	0.205
12_1	0.310	0.529	0.220	-0.183	0.053	-0.233	0.270
2_12	0.627	0.428	0.213	-0.219	0.086	0.220	0.050
2_11	0.314	0.500	-0.436	0.362	-0.020	0.345	0.074
2_10	0.544	-0.128	-0.351	0.564	0.023	0.001	-0.045
2_9	0.792	-0.166	-0.318	0.095	-0.072	-0.188	-0.080
2_8	0.859	-0.175	-0.187	0.139	-0.033	-0.074	0.092
3_11	0.788	0.063	-0.069	-0.100	-0.064	0.283	-0.245
5_8	0.334	-0.311	0.585	0.229	0.483	0.049	-0.144
4_10	0.663	0.369	0.012	-0.158	0.196	0.302	-0.254
4_8	0.618	-0.301	0.017	-0.153	-0.142	0.106	0.411

The first four principal components are shown here. The most important morphometric variables and ratios contributed to the PC1 and PC2 are marked as bold face.

The most important morphometric variables and ratios contributed to the PC1 and PC2 are marked as bold face.



Supplementary Figure S3. Wilk's lambda test for verifying differences among stocks of *Botia dario* with truss measurements using canonical variate analysis (CVA).

Supplementary Table S9. Wilk's lambda test for verifying differences among stocks of *Botia dario* with truss measurements using canonical variate analysis (CVA).

Test of Function(s)	Wilks' Lambda	Chi-square	df	p
1 through 4	0.019	1089.025	84	0.000*
2 through 4	0.134	554.061	60	0.000*
3 through 4	0.377	269.366	38	0.000*
4	0.713	93.371	18	0.000*
*significant value ($p < 0.05$)				

Supplementary Table S10. Contribution of truss measurements to the canonical variate scores in *Botia dario* collected from five rivers in Bangladesh.

Truss measurements	CV1	CV2	CV3	CV4
2_11	-0.622*	0.026	0.239	-0.210
7_8	0.179*	-0.050	0.009	-0.002
6_7	0.086*	-0.010	0.059	0.033
4_10	-0.163	0.446*	0.147	-0.114
2_12	-0.106	0.444*	0.007	0.099
1_2	0.024	0.434*	0.199	0.428
2_3	0.042	0.397*	0.342	0.081
11_12	-0.032	-0.362*	0.153	0.024
3_11	-0.102	0.319*	0.297	-0.017
12_1	-0.067	0.310	-0.476*	0.083
4_5	0.085	0.056	0.365*	-0.119
5_6	-0.014	0.227	-0.277*	-0.084
2_8	0.013	0.182	0.224*	-0.217
4_8	0.043	0.153	0.221*	-0.099
3_4	-0.115	0.156	-0.219*	0.060
2_10	-0.043	0.051	0.257	-0.437*
9_10	0.045	0.218	0.016	0.309*
8_9	-0.039	0.055	-0.022	0.297*
5_8	0.179	0.106	0.167	-0.262*
2_9	-0.015	0.161	0.170	-0.205*
10_11	0.140	0.083	0.174	-0.186*
Eigenvalue	5.947 ^a	1.805 ^a	0.892 ^a	0.403 ^a
% of Variance	65.7	20.0	9.9	4.4
Cumulative %	65.7	85.7	95.6	100.0
Canonical Correlation	0.925	0.802	0.687	0.536
* Largest absolute correlation between each variable and any discriminant function				

Supplementary Table S11. Classification of *Botia dario* into their original stocks using classification matrix (original and cross-validated) of the CVA based on truss measurements.

Stocks Name	Danu River	Padma River	Jamuna River	Dhorola River	Atrai River	Total
Original ^a						
Danu River	54 (90.0%)	1 (1.7%)	4 (6.7%)	1 (1.7%)	0	60 (100.0%)
Padma River	4 (8.0%)	40 (80.0%)	4 (8.0%)	2 (4.0%)	0	50 (100.0%)
Jamuna River	6 (11.3%)	6 (11.3%)	41 (77.4%)	0	0	53 (100.0%)
Dhorola River	1 (1.8%)	1 (1.8%)	1 (1.8%)	53 (94.6%)	0	56 (100.0%)
Atrai River	1 (1.4%)	0	0	0	70 (98.6%)	71 (100.0%)
Cross-validated ^b						
Danu River	52 (86.7%)	1 (1.7%)	5 (8.3%)	2 (3.3%)	0	60 (100.0%)
Padma River	7 (14.0%)	37 (74.0%)	4 (8.0%)	2 (4.0%)	0	50 (100.0%)
Jamuna River	8 (15.1%)	6 (11.3%)	38 (71.7%)	1 (1.9%)	0	53 (100.0%)
Dhorola River	1 (1.8%)	1 (1.8%)	2 (3.6%)	52 (92.9%)	0	56 (100.0%)
Atrai River	1 (1.4%)	0	0	0	70 (98.6%)	71 (100.0%)

^a 89.0% of original grouped cases correctly classified
^b 85.9% of cross-validated grouped cases correctly classified
Percentages of correct classification is written in bold and corresponding number of individuals are marked in parentheses