

[Short Communication]

**A New Record of *Paracobitis rhadinaea* (Regan, 1906)
after a Hundred Years from Sistan Basin, Southeast of Iran**

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ABSTRACT

After around a hundred years of being without any record of occurrence of *Paracobitis rhadinaea*, a species of Nemacheiline loach, in Sistan basin, southeast of Iran, the year 2012 was the turning point of wild life in this area. Twenty-five specimens were caught from Chahnimeh Reservoir, a water body adjacent to the Hamoun Wetland in Sistan basin. Morphometric and meristic characteristics were measured.

Keywords: *Paracobitis rhadinaea*, *Nemacheilidae*, *Morphometric*, *Meristic*, *Sistan basin*, *Iran*.

INTRODUCTION

Data on presence of commercially uninteresting fishes in Sistan (southeastern Iran) are relatively poor and inadequate. Sistan is actually an 18,000-square-kilometer depression within the lower Helmand Basin. The floor of the depression, commonly called the Sistan Basin or Sistan Proper, is situated 200–300 m below the surface of the Dasht-i Margo and is occupied by the modern, arable Helmand delta and the terminal Hamouns. Three main hamouns and wetlands are situated roughly at the termini of the deltaic distributary channels (Whitney, 2006). The Hamoun wetland and their adjacent water resources are suitable environment for native fish (Boudaghpour, 2011) such as *Schizothorax*, *Schizocypris* genus and species from the Family Nemacheilidae.

Fishes of the subfamily Nemacheilinae Regan (Cypriniformes: Balitoridae) are small sized loaches inhabiting benthic zones of fresh, well aerated waters of Asia, Ethiopia and Europe. The group is characterized by an elongate, rounded body, a subterminal mouth, presence of prepalatine, 3 pairs of barbels; 2 rostral and 1 maxillary, 1 simple ray each in pectoral

and pelvic fins, and absence of spine under or before eye (Nelson, 2006).

The taxonomic history of Nemacheiline loaches from Iranian part of Sistan basin dates back to the early 19th century: Colonel Sir A. Henry McMahon, the officer of the Sistan Arbitration Commission of 1901-1904 collected fishes of Sistan, and his collection had been examined by Charles Tate Regan, former Director of the British Natural History Museum, in 1906. He found two new species out of five collected: *Scaphiodon macmahoni* (= *Cyprinion watsoni*) and *Nemacheilus rhadinaea* (= *Paracobitis rhadinaea*). In 1909 Banawari Lal Chaudhuri, Director of the Indian Museum, reported a new loach (*Nemacheilus macmahoni* (= *Paracobitis rhadinaea*)) and Annandale, founder and then Director of the Zoological Survey of India, reviewed the fishes of Sistan in 1918 and Nine species were described, one of which, (*Nemacheilus macmahoni*), formed the basis for a new genus, *Adiposia*, since synonymized with *Nemacheilus* and now *Paracobitis*. (Coad, 2012). So the *Paracobitis rhadinaea* is one of the fishes of Sistan (Coad, 1981; Nalbant and Bianco 1998; Eschmeyer, 2004). It is not known to what extent the species' characteristic

morphology reflects adaptations to its habitat, since information on its ecology and biology is absent. From 1920 until now there is no report that the *P. rhadinaea* exist in Sistan basin, so our study is the first report after approximately 90 years.

MATERIALS AND METHODS

Twenty-five fish were collected by gillnetting from the Chahnimeh Reservoirs, Sistan basin, 30°76'97.17 N, 61°68'46.28 E, in the period between April

and June 2012. All specimens were fixed and preserved in 4% formaldehyde solution. Measurements were made in the laboratory using digital calipers with a precision of 0.1 mm. In addition to morphological characters used in descriptions of loach species, thirty eight morphometric characters were measured (Banarescu *et al.*, 1972; Kottelat and Freyhof, 2007; Erk'akan *et al.*, 2008) as shown in Table 1.



Fig. 1. *Paracobitis rhadinaea*

Diagnosis: *P. rhadinaea* is distinguished from *macmahoni* by Annandale and Hora (1920) in having an extremely short posterior diverticulum and minute vesicle in the swim-bladder, by the absence of scales, a more elongate body, smaller, narrower and less flattened head, and by differences in the profile of the body. It is noted that in two samples we found one or two relatively big scale close to dorsal fin which is the indicator of *P. macmahoni* according to Annandale and Hora (1920), although it needs more consideration. There is a little information about *P. rhadinaea* biology and need more study. In some specimens, stomach contents include cyprinid fish remains.

Morphometric and meristic data are presented in Table 1. Fin rays formula: D III 7-8, A II 5-6, V I 6-7, P I 8-9, C 19-22.

Distribution: Based on our survey this species is probably restricted to the Sistan basin of Iran and presumably Afghanistan.

Conservation: There are some endemic species in the Sistan basin. For example, the *Schizothorax zarudnyi*, *Schizocypris altidorsalis* have commercial importance. *Paracobitis* have also environmental and biological importance in the Hamoun Wetland and its adjacent regions. Urgent actions such as habitat protection,

education of local fishermen and fishing management are needed to preserve this important species (Mousavi-Sabet *et al.*, 2013). Obviously, the special environment of Sistan provides a variety of habitats for these fish. The diverse microclimates in this area may have led to the differentiation of new species, and the area became a center for speciation (Mansoori, 1994). However, the biodiversity in this area has not received the attention it deserves, and few management or conservation efforts are being undertaken to protect it. In Iran, some hatchery experiments have been conducted to improve the stock of commercially important species, but noncommercial and recreational species remain largely ignored (Coad 1980). The species *P. rhadinaea* does not have any commercial value, it is not known as a distinct fish by local fishermen, and its population size, density, growth, and reproduction is unknown. Therefore, this species should be listed under the Iran Red Book of Endangered Animals, and its natural habitats need to be protected. In protecting the species, the entire ecosystem along the Hamoun International Wetland would be conserved.

Table 1. Morphometric characters of *P. rhadinaea*

Character	Males (14)		Females (11)	
	Mean \pm SD	Range	Mean \pm SD	Range
Total Length TL (mm)	229.66 \pm 25.37	200.28-287.56	221 \pm 26.84	185.04-266.84
Standard Length SL (mm)	199.06 \pm 24.18	171.53-259.03	193.44 \pm 24.22	161.41-236.60
Standard Length (%)				
Dorsal Fin Height	14.93 \pm 2.12	8.89-18.11	14.60 \pm 1.07	13.09-16.42
Base Of Dorsal Fin	11.86 \pm 0.68	10.94-13.07	11.77 \pm 0.65	10.60-12.84
Pectoral Fin Length	13.31 \pm 0.84	12.02-14.83	13.55 \pm 2.41	11.51-50.43
Base Of Pectoral Fin	4.22 \pm 0.43	3.45-4.73	3.92 \pm 0.33	3.48-4.63
Ventral Fin Height	12.03 \pm 0.81	11.10-13.72	11.37 \pm 0.47	10.05-12.80
Base Of Ventral Fin	3.60 \pm 0.28	3.06-4.02	3.39 \pm 0.47	2.39-4.17
Anal Fin Height	12.72 \pm 0.69	11.28-13.40	12.33 \pm 1.18	10.46-14.69
Anal Fin Base	7.51 \pm 0.76	6.46-9.48	7.26 \pm 0.43	6.72-8.21
Caudal fin length	16.47 \pm 1.66	13.05-18.63	16.10 \pm 0.94	14.29-18.13
Caudal fin length in middle	13.89 \pm 0.97	12.87-16.08	14.09 \pm 0.88	13.22-16.12
Adipose fin Height	2.17 \pm 0.52	1.43-3.09	2.31 \pm 0.49	1.71-2.98
Base of adipose Fin	34.47 \pm 2.32	30.60-39.79	34.11 \pm 2.84	30.64-38.85
Pre-dorsal length	47.97 \pm 2.71	43.85-52.75	47.56 \pm 2.28	43.18-50.14
Pre-adipose length	65.72 \pm 3.32	61.02-71.46	65.00 \pm 2.98	60.03-69.26
Pre-ventral length	53.15 \pm 3.14	49.81-59.80	52.11 \pm 2.88	47.51-56.04
Pre-anal length	75.77 \pm 4.04	71.87-86.72	74.35 \pm 2.29	70.37-77.66
Pre-anus length	69.07 \pm 4.14	65.45-79.40	68.10 \pm 2.13	65.54-71.30
Lateral line length	79.37 \pm 4.96	74.82-92.53	79.6 \pm 1.73	77.50-83.62
Body Depth at anal Fin	9.96 \pm 1.08	8.02-11.90	9.89 \pm 0.99	8.68-11.90
Body Depth at dorsal	15.81 \pm 2.62	10.64-20.02	16.26 \pm 2.58	12.39-20.03
Body Width	15.37 \pm 0.99	13.56-16.98	16.16 \pm 2.08	11.72-18.34
Caudal Peduncle length	16.78 \pm 1.81	14.10-20.32	16.80 \pm 1.66	14.97-20.05
Caudal Peduncle height	8.26 \pm 0.81	6.80-10.01	8.03 \pm 0.92	7.06-10.43
Head length (mm)	44.99 \pm 6.59	34.41-60.28	44.02 \pm 5.82	36.16-54.66
Head Length (%)				
Head height at nape	47.19 \pm 4.35	40.45-56.55	45.13 \pm 2.72	40.86-49.41
Head height at eye	38.44 \pm 3.96	33.08-43.79	36.47 \pm 1.50	33.75-38.38
Head width	66.33 \pm 5.41	60.67-80.59	65.69 \pm 4.28	59.06-70.99
Eye diameter	3.75 \pm 0.51	2.91-4.62	3.54 \pm 0.36	2.91-4.18
Snout length	45.55 \pm 3.44	39.79-53.85	44.21 \pm 2.58	37.45-46.84
Dorsal length Of Head	78.99 \pm 9.02	61.25-99.77	80.94 \pm 2.41	77.16-85.54
Postorbital length	50.85 \pm 4.31	47.19-62.02	49.05 \pm 1.82	46.69-51.59
Inter-orbital length	26.66 \pm 2.57	23.01-31.75	25.63 \pm 1.21	23.84-27.72
Upper Jaw length	35.15 \pm 3.18	31.28-42.23	34.12 \pm 3.73	30.12-44.30
First Barbell length	24.73 \pm 3.99	20.04-33.33	21.86 \pm 2.82	16.97-27.43
Second Barbell length	26.03 \pm 4.66	18.46-34.58	23.90 \pm 4.21	18.53-32.25
Third Barbell length	30.44 \pm 3.54	26.10-37.09	29.54 \pm 6.47	23.80-47.74

REFERENCES

- Annandale, N. and Hora, S. L (1920) The fish of Seistan. Records of the Indian Museum, 18:151-203, pls. XV-XVII (includes: - Appendix. Note on the fisheries of the delta of the Helmand and on the use of shaped rafts of bulrushes in India and Seistan, by N. Annandale).
- Bănărescu, P. M. and Nalbant, T. T (1995) A general classification of Nemacheilinae with description of two new genera (Teleostei: Cypriniformes: Cobitidae). Travaux du Muséum d'Histoire Naturelle Grigore Antipa, București, 35:429-496.
- Banarescu, P., Nalbant T.T. and Chelmu, S (1972) Revision and geographical variation of *Sabanejewia aurata* in Romania and the origin of *S. bulgarica* and *S. romanica* (Pisces, Cobitidae). *Annotationes Zoologicae et Botanicae Bratislava*, 75: 49.
- Boudaghpour, S (2011) Arid Season Affecting Hamun Lake in South East Iran Water, Fishing and Agriculture Crisis. International Conference on Food Engineering and Biotechnology. IACSIT Press, Singapore.
- Coad B.W (1980) Environmental change and its impact on the freshwater fishes of Iran. *Biological Conservation*, 19 (1): 51-80.
- Coad, B.W (1981) Fishes of Afghanistan, an annotated check-list. Publication Zoology Natural Museum Canadian. 14:23p.
- Coad, B. W (2012) Freshwater Fishes of Iran. <http://www.briancoad.com>.
- Chaudhuri, B. L (1909) Descriptions of new species of *Botia* and *Nemachilus*. *Records of the Indian Museum*, 3:339-342.
- Erk'akan, F., S.C. Ozeren and Nalbant, T.T (2008) *Cobitis evreni* sp. Nova-A New Spined loach Species (Cobitidae) from the Southern Turkey. *Journal of Fisheries International*, 3(4): 112-114.
- Eschmeyer, W.N (2004) Catalog of fishes. Updated database version of January 2004. Catalog databases as made available to FishBase in January 2004.
- Fowler, H. W. and Steinitz, H(1956) Fishes from Cyprus, Iran, Iraq, Israel and Oman. *Bulletin of the Research Council of Israel*, 5B:260-292.
- Kottelat, M. and Freyhof, J (2007) Handbook of European Freshwater Fishes. Kottelat, Cornol, Switzerland and Freyhof, Berlin, Germany, 646 pp.
- Mansoori, J (1994) The Hamoun Wildlife Refuge. Heidelberg: Max Kasperek Verlag: 1-57.
- Mousavi-Sabet, H., Gharaei, A. and Ghaffari, M (2013) Threatened fishes of the world: *Paracobitis rhadinaeus* (Regan, 1906) (Nemacheilidae). *Croatian Journal of Fisheries*, 71: 87-89.
- Nalbant, T.T. and Bianco, P.G (1998) The loaches of Iran and adjacent regions with description of six new species (Cobitoidea). *Italian Journal of Zoology*, 65:109-125.
- Nelson, J.S (2006) Fishes of the world. 4th ed. John Wiley & Sons, Inc., 141:622 pp.
- Nikol'skii, G. V (1947) Gol'tsy besstochnykh vodoemov Turkmenii [The loaches of the inland waters of Turkmenia]. *Byulleten' Moskovskogo Obshchestva Ispytatelei Prirody, Otdel Biologii*, 52(3):29-34.
- Whitney, J.W (2006) Geology, water, and wind in the lower Helmand Basin, southern Afghanistan: U.S. Geological Survey Scientific Investigations Report 2006-5182, 40 p.

گزارش جدید *Paracobitis rhadinaea* (Regan, 1906) پس از صد سال از حوضه
سیستان، جنوب شرقی ایران

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چکیده

گزارش وجود گونه *Paracobitis rhadinaea* متعلق به رفتگر ماهیان خانواده Nemacheilidae در منطقه سیستان پس از حدود یکصد سال، نقطه عطفی در حیات وحش این منطقه محسوب می شود. در این مطالعه تعداد 25 نمونه ماهی مذکور از چاه نیمه های سیستان که یک منبع آبی در مجاورت تالاب هامون در حوضه سیستان می باشد صید گردید و خصوصیات مورفومتریک (ریخت شناسی) و مریستیک آنها اندازه گیری شد.

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