



Marine and Life Sciences

Journal Homepage: <https://dergipark.org.tr/en/pub/marlife>



Distribution of endemic *Garra culiciphaga* (Pellegrin, 1927) in the Ceyhan River System, some diagnostic characteristics, habitats and conservation requirements

Cemil Kara¹ 

¹ Karadeniz Technical University, Department of Biology, Faculty of Science, Trabzon, TÜRKİYE

✉ Corresponding Author: cemilkara67@gmail.com

Please cite this paper as follows:

Kara, C. (2023). Distribution of endemic *Garra culiciphaga* (Pellegrin, 1927) in the Ceyhan River System, some diagnostic characteristics, habitats and conservation requirements. *Marine and Life Sciences*, 5(2), 51-54. <https://doi.org/10.51756/marlife.1340456>

Research Article

A B S T R A C T

Article History

Received: 10.08.2023

Accepted: 10.11.2023

Published Online: 14.12.2023



In this study, the distribution and some diagnostic features of the endemic *Garra culiciphaga* belonging to the Cyprinidae family in the Ceyhan River systems were determined. Accordingly, the average total length of *G. culiciphaga* individuals is 49.58 mm, and their average weight is 1.32 g. Line lateral scales are 30-33, line transversal 8/7, and pharyngeal teeth are 3.3.5-5.3.3. *G. culiciphaga* has a very limited distribution in the Ceyhan River basin and has been identified from the Kumaşır Lake, Aksu Stream and Akçasu Stream. However, *G. culiciphaga* individuals were detected in May 2015 in Aksu stream could not encountered in the following year (April 2016) due to habitat loss.

Keywords:

Ceyhan River
Diagnostic
Distribution
Endemic
Garra culiciphaga

INTRODUCTION

Garra culiciphaga was first described by Pellegrin in 1927 under the name *Hemigrammocapoeta culiciphaga*. These fish, which are included in the *Hemigrammocapoeta* genus, were included in the *Garra* genus by researchers after DNA barcode studies conducted in 2015 (Chapuis et al., 2015). It is reported that the *Garra* genus has spread from west to east from the Himalayas (Menon, 1964; Goren and Ortal, 1999). In recent studies in Türkiye, it has been stated that *Garra caudomaculata* is endemic species of the Orontes River, *Garra culiciphaga* is found in the Seyhan, Ceyhan and Orontes River systems, and *Garra turcica* is the synonym of *Garra rufa* (Temiz, 2019; Bayçelebi, 2020). Additionally, the existence of endemic species, including *Garra kemali* and *Garra menderesensis*, has been reported in Türkiye (Çiçek et al., 2018). *G. rufa* individuals are reported to have a very wide distribution in the Ceyhan River system (Kara and Alp, 2005;

Kara et al., 2010). *G. culiciphaga*, endemic to Türkiye, has a very limited distribution in the Ceyhan River system. There are very few research on *G. culiciphaga*. In this study, it is aimed to reveal the distribution and some of its diagnostic features of endemic *G. culiciphaga* in the Ceyhan basin.

MATERIALS AND METHODS

This study was carried out in streams in the Ceyhan River basin between April 2014 and May 2016. The Ceyhan River is one of the important rivers of Türkiye, and it arises from the mountains at an altitude of approximately 2200 m in the Göksun, Elbistan, and Afşin districts of Kahramanmaraş and is fed by springs and streams. The Ceyhan River forms a wide delta in Çukurova and empties into the Iskenderun Bay. The most important streams of the Ceyhan River are Söğütlü, Nergele, Hurman, Kömür, Törbüzek, Fırınz, Aksu, Savrun, Yarpuz, Akçasu and Hemite (Kara et al., 2023).

Fish samples were caught in streams by using electroshock devices. The GPS coordinates of the sampling stations were determined. The caught fish samples were transferred to the Hydrobiology Research Laboratory in 5 liter plastic containers in 4 % formaldehyde solution. Then, the length measurements (mm) of the fish were made with a digital caliper with a precision of 0.01 mm, and the weight measurements were made with a digital scale with a precision of 0.01 g. The localities where *G. culiciphaga* individuals were caught are shown in Figure 1.



Figure 1. Distribution of *G. culiciphaga* in streams in the Ceyhan basin

RESULTS AND DISCUSSION

The bodies of *G. culiciphaga* are relatively high and slightly flattened from the sides. The lips are thin and keratinized. The caudal fin is deeply forked. The dorsal fin is located near the midpoint of the body. The back of the body and the upper part of the lateral line are dark gray, the lower part of the lateral line and the abdomen are light silvery or gray. There is usually a thin black spot at the base of the caudal fin and a black band along the line lateral (Figure 2, 3). Within the scope of the research, the colors and patterns of *G. culiciphaga* individuals differed partially in the habitats detected in the Ceyhan river system, and there is always a thin black spot on the base of the tail fin (Figures 2 and 3).



Figure 2. *G. culiciphaga* specimen from Aksu Stream (A) and Kumaşır Lake (B) (Photo: C. Kara)



Figure 3. *G. culiciphaga* specimen from Akçasu Stream (Photo: C. Kara)

It has been determined that *G. culiciphaga* individuals generally prefer gravelly, sandy and slightly flowing waters (Figure 4).



Figure 4. A view from the habitat of *G. culiciphaga* in Akçasu Stream

In addition, the individuals detected in the Kumaşır Lake were determined from the littoral region of the lake, where aquatic plants are abundant (Figure 5).



Figure 5. A view from the habitat of *G. culiciphaga* in the Kumaşır Lake (Kahramanmaraş)

Table 1. Length, weight and some diagnostic features of *G. culiciphaga* individuals detected in the Ceyhan river basin (TL: Total length (mm), W: Weight (g), SD: Standard Deviation)

Localities	N	Mean TL (mm)	Min.-Max.	SD	Mean W (g)	Min.-Max.
Aksu Stream	5	47.54	42.24-55.28	5.41	1.18	0.29-1.93
Akçasu Stream	3	49.93	47.36-54.56	4.01	1.86	1.20-3.15
Kumaşır Lake	3	52.64	47.72-58.75	5.60	1.02	0.66-1.44
Mean	11	49.58	42.24-58.75	5.11	1.32	0.29-3.15
Dorsal	Anal	Ventral	Pectoral	Pharyngeal teeth	L. lateral	L. transversal
III 7-8	II 5	I 7	I 13	3.3.5-5.3.3	30-33	8/7

Bostancı (2006) found that individuals (n: 24) in the Ceyhan River Aksu stream had a standart length of 51.0-58.0 mm. On the other hand, İnnal et al. (2016) stated that the length of *Garra (Hemigrammocapoeta) culiciphaga* individuals (n: 16) in the Seyhan River was 4.3-6.0 cm and their weight is 0.96-3.04 g, which is partially similar to our research findings.



Figure 6. A view from the habitat of *G. culiciphaga* around Aksu Stream, Kahramanmaraş-Osmaniye road sand-gravel quarry (May 2015)

As a result of this research, *G. culiciphaga* individuals showed a very limited distribution in the streams of the Ceyhan River system. In addition, the habitats of *G. culiciphaga*, which lives in small ponds around the Aksu Stream (May 2015), have been destroyed due to the pollution

The free edge of the dorsal fin of *G. culiciphaga* is straight and the ray number is D II 7-8. The number of line lateral scales varies between 30 and 33. The ventral fins are short, with one rigid and seven branched rays. The base of the anal fin is short and the free edge is slightly convex. Pharyngeal teeth are in the rows anda are in the form of 3.3.5-5.3.3 (Table 1). The length and weight of *G. culiciphaga* individuals identified from the research area in question are given in Table 1. According to this, the length of the individuals (n: 11) caught from Aksu and Akçasu Streams, and the Kumaşır Lake varied between 42.24-58.75 mm, and their weight varied between 0.29-3.15 g, and their average length was 49.58 mm, their average weight was 1.32 g (Table 1).

of the stream (Figure 6, 7). For this reason, no *G. culiciphaga* samples were found during the filed studies conducted in April 2016.



Figure 7. Aksu Stream, a view from the locality of the habitat of *G. culiciphaga* (April 2016)

As a result of this research, where slow-flowing aquatic plants were dense in Aksu and Akçasu streams, and the vegetation of *G. culiciphaga* in the Ceyhan River system was dense in the littoral region of the Kumaşır Lake. This species is not important for fishing. However, Geldiay and Balık (2009) reported that species belonging to the genus *Garra (Hemigrammocapoeta)* feed on mosquito larvae and is very importance mosquito control in ponds and swamps.

Deterioration of habitats of endemic *G. culiciphaga* in Ceyhan River is presented in Figure 7, pollution ect. It is under significant pressure due to anthropological activities. Such as according to Eschmeyer's Catalogue, *G. culiciphaga* is an important species for aquarium fisheries (<https://www.aquariumglaser.de>). Innal (2022) states that *Garra (Hemigrammocapoeta) culiciphaga* is an important fish species because it consumes mosquito larvae as food in the fight against malaria. Abak and Bonner (2020) stated that *G. culiciphaga* was a declining and less concerned species. According to the latest red list (IUCN) evaluation, *H. culiciphaga* is considered as missing data (DD). Endemic *G. culiciphaga* has biological and ecological importance and should be protected by relevant institutions and organization in the Ceyhan River system.

Acknowledgements

This research was supported by the Kahramanmaraş Sütçü Imam University Scientific Research Projects (BAP) Coordination Unit, Project No. 2014/1-16 M, and was carried out with the legal consent of the Ministry of Food, Agriculture, and Livestock, General Directorate of Fisheries and Aquaculture (permission date 03.04.2014; permission number: 01334). Thank you to the relevant institutions.

COMPLIANCE WITH ETHICAL STANDARDS

Conflict of Interest

The author declares that there is no conflict of interest.

Ethical Approval

The author declares that formal consent is not required for this type of study.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Funding

This research was supported by the Kahramanmaraş Sütçü Imam University Scientific Research Projects (BAP) Coordination Unit. (Project No. 2014/1-16 M)

REFERENCES

- Abak Gurbuz, Ö; Bonner, T. H. (2020). Current assessment of species composition and biological characteristics of fishes in the transboundary rivers in Turkey. *Proceedings of the Biological Society of Washington*, 133(1), 76-108. <https://doi.org/10.2988/19-00009>
- Bostancı, Z. (2006). Taksonomic Investigation of Freshwater Fish Fauna Living Seyhan, Ceyhan and Asi River (in Turkey). [M.Sc. Thesis, Karadeniz Technical University] (in Turkish).
- Bayçelebi E. (2020). Distribution and diversity of fish from Seyhan, Ceyhan and Orontes river systems, *Zoosystematics and Evolution*, 96 (2), 747-767. <https://doi.org/10.3897/zse.96.55837>
- Chapuis, S. B., Herder, F., Esmaili, H. R., Freyhof, J., Hamidan, N. A., Özuluğ, M., Šanda, R., & Geiger, M. F. (2015). Adding nuclear rhodopsin data where mitochondrial COI indicates discrepancies—can this marker help to explain conflicts in cyprinids? *DNA Barcodes*; 3(1), 187-199. <https://doi.org/10.1515/dna-2015-0020>
- Çiçek, E., Fricke, R., Sungur, S., & Eagderi, S. (2018). Endemic freshwater fishes of Turkey, *FishTaxa*, 3(4), 1-39.
- Menon, A. G. K. (1964). Monograph of the Cyprinid fishes of the genus *Garra* Hamilton, 1822. *Memoirs of the Indian Museum*, 14(4), 173-260.
- Geldiay, R., & Balık, S. (2009). *Türkiye Tatlısu Balıkları*. Ege Üniversitesi Fen Fakültesi Kitaplar Serisi, 97, 644 s.
- Goren, M., & Ortal, R. (1999). Biodiversity of the inland water fishes of Israel. *Biological Conservation*, 89(1), 1-9. [https://doi.org/10.1016/S0006-3207\(98\)00127-X](https://doi.org/10.1016/S0006-3207(98)00127-X)
- Innal, D., Akdoğan Bulut, D., & Mavruk, S. (2016). Occurrence of *Hemigrammocapoeta culiciphaga* (Cyprinidae) and its morphometry in the Seyhan River Estuary. *Review of Hydrobiology*, 9(1), 37-45.
- Innal, D. (2022). Use of fishes as biological control agents for prevention of malaria in Turkey: A journey to history. *Acta Biologica Turcica*, 35(1), 36-45.
- Kara, C., Alp, A., & Bozali, N. (2023). Distribution and some diagnostic properties of *Capoeta damascina* (Valenciennes, 1842) in streams of the Ceyhan and Seyhan River Basins, Türkiye. *Journal of Limnology and Freshwater Fisheries Research* 9(1), 11-16. <https://doi.org/10.17216/LimnoFish.1200932>
- Kara, C., Alp, A., & Şimşekli, M. (2010). Distribution of fish fauna on the upper and middle basin of Ceyhan River, Turkey. *Turkish Journal of Fisheries and Aquatic Sciences*, 10(1), 111-122.
- Kara, C., & Alp, A. (2005). *Garra rufa* 1843'nun Ceyhan Nehir sisteminde dağılımı ve bazı biyolojik özellikleri. *Turkish Journal of Aquatic Life*, 3(4), 25-33.
- Pellegrin, J. (1927). Les Poissons Des Eaux Douces d'asie-Mineure. *Voy. Zool. Gedeau de Kerville*, Tome II, Paris, 150pp.
- Temiz, G. (2019). Freshwater fish fauna of Mersin [M.Sc. Thesis, Nevşehir Hacı Bektaş Veli University] (in Turkish).
- URL-1, (2023). Aquarium glaser GmbH Retrieved on November 10, 2023 from <https://www.aquariumglaser.de>