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Biological Characteristics of Grass Carp (Ctenopharyngodon Idella) and Silver Carp (Hypophthalmichthys Molitrix) In The Zarafshan River

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Abstrak: This article analyzes the biological characteristics of the white amur (Ctenopharyngodon idella) and white humphead (Hypophthalmichthys molitrix) fish living in the Zarafshan River. The article discusses the taxonomy, morphological characteristics, growth process, reproductive biology and role of both species in water bodies. Based on studies conducted in the Zarafshan River area, the ecological adaptation of these fish species and their contribution to the composition of the ichthyofauna are shown. These species play an important role in the development of fisheries and are useful in maintaining the ecological balance.

Keywords: White Amur, White Humpback, Zarafshan River, Fish Species, Ecology, Growth, Reproductive Biology

Introduction

The Zarafshan River is an ecologically dynamic region with a rich ichthyofauna. This article analyzes scientific data on the grass carp (Ctenopharyngodon idella) and silver carp (Hypophthalmichthys molitrix) fish in the Zarafshan River (Berg, 1975) (Filippi, 1995). The ecology, morphology, and growth processes of these fish are identified, as well as their role in aquatic environments. This information may be useful in future fisheries and water resource management (Kessler, 2000) (Temminck & Schlegel, 1836).

Biological Characteristics of the Grass Carp (Ctenopharyngodon idella), The grass carp belongs to the Cyprinidae family and primarily inhabits the eastern parts of Asia, particularly the Amur River in China and Russia.

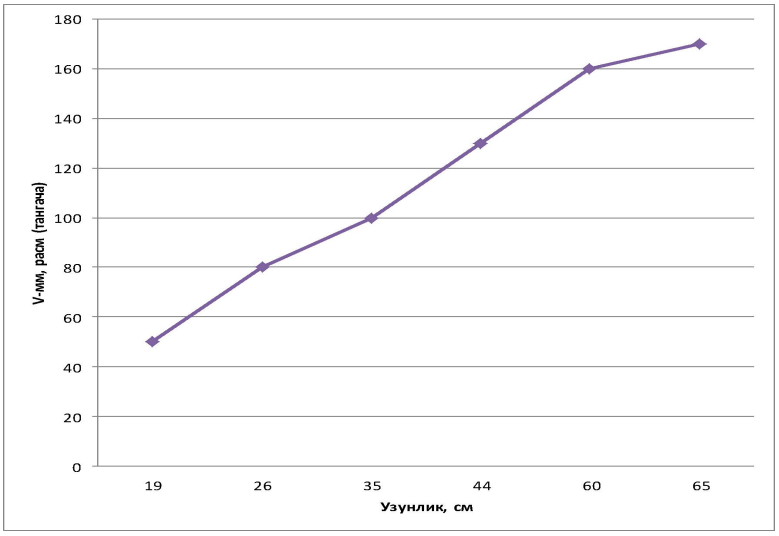

Figure 1. Correlation between scale size based on diagonal radius and fish body length

Methodology

In Uzbekistan, this fish was introduced in the 1960s and is now widespread in the Zarafshan, Syr Darya, and Amu Darya rivers. The fish has a torpedo-shaped body covered with large cycloid scales. Grass carp grow very quickly, and in the Zarafshan River, they can reach a length of 120 cm and a weight of 32 kg.

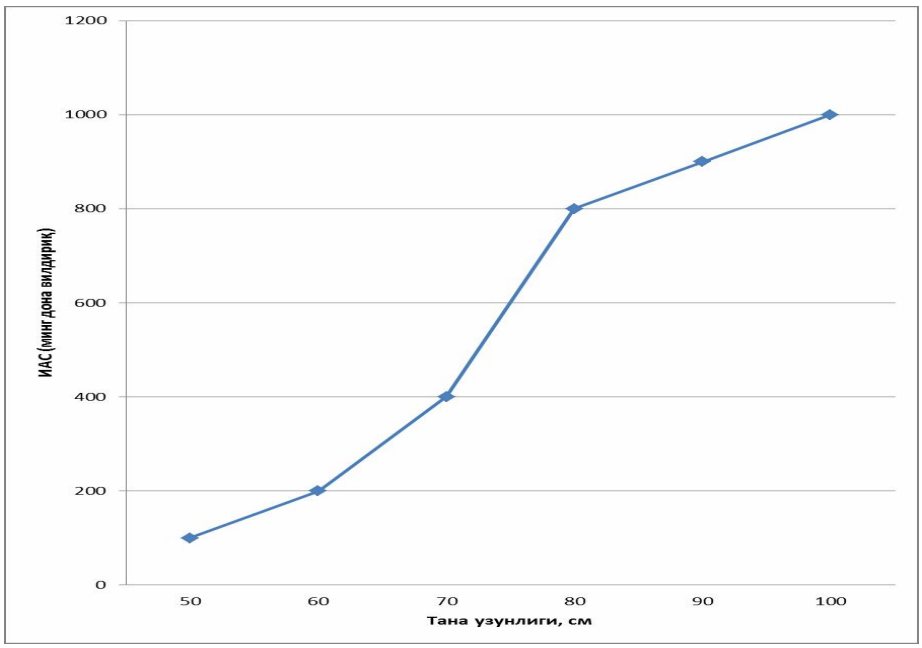

Figure 2. Dependence of grass carp fecundity on length and weight.

Table 1. The correlation between grass carp growth and weight.

Specification	Age, year						
	1	2	3	4	5	6	7
Length intermediate (sm)	17,9	25,1	41,0	45,9	59,4	65,4	70,0
Medial weight (g)	146	310	1868	2700	3650	5270	8300
Weight gain (g)	146	164	1558	832	950	1620	3030

Morphological Characteristics: Grass carp have 15 serrated pharyngeal teeth. The dorsal fin has 8 rays, and the anal fin also has 8 rays. Their body is long and their segments are wide.

Growth: In the Zarafshan River, 3-year-old grass carp have a length of 542.7 mm and a weight of 4340 g, while 4-year-old fish reach 600 mm in length and weigh 4450 g.

Reproductive Biology: Grass carp reach sexual maturity at 5-6 years of age and spawn in April-May. They can lay up to 1 million eggs at a time.

Biological Characteristics of the Silver Carp (Hypophthalmichthys molitrix): The silver carp is also a fish belonging to the Cyprinidae family. It originates from the rivers of China and surrounding countries. It is also widespread in Uzbekistan and is mainly found in the Zarafshan River and other reservoirs.

Morphological Characteristics: Silver carp have a thin and long body covered with small cycloid scales. They have an upturned mouth and prefer swimming at high speeds.

Growth: In the Zarafshan River, silver carp can reach a length of 594 mm and a weight of 3875 g.

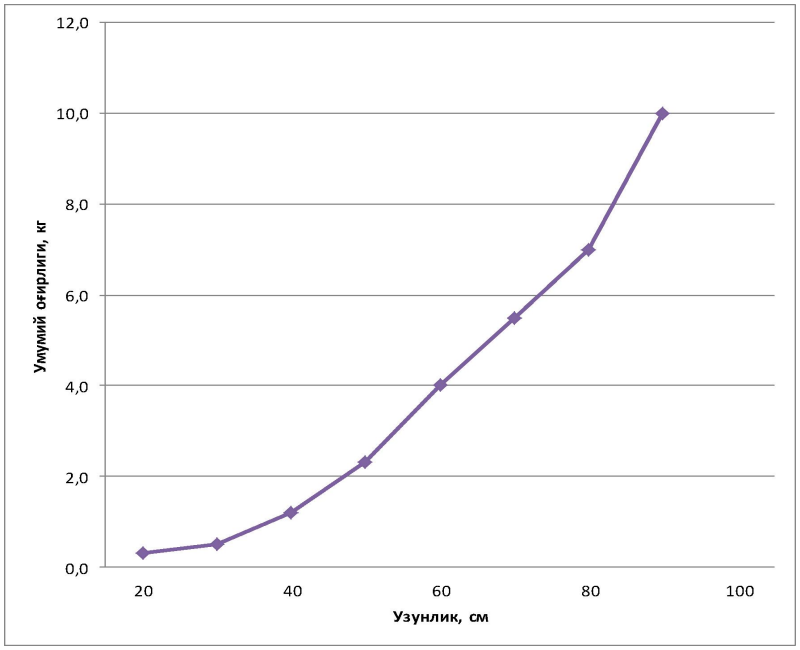

Figure 3. Relationship between length (L) and body weight (W) of silver carp. Zarafshan River, 2019.

Result and Discussion

Reproductive Biology: Silver carp grow rapidly, reaching sexual maturity at approximately 3 years of age. The spawning season is in April-May, and during spawning, each female fish can lay several million eggs.

Table 2. Plastic characteristics of female silver carp. (Zarafshan)

No	Plastic indicators	Minimal	Maxsimal	Middle
1.	Body length l (mm)	549,8	639,2	594,0
2.	Total weight W (g)	2391,7	4528,1	3875,0
3.	Body weight by Clark W (g)	2119,0	4358,6	3500,7
4.	Postdorsal distance PD	34,1	39,3	37,7
5.	Antidorsal distance aD	37,4	43,8	40,6
6.	Antipectoral distance aP	28,9	31,1	29,5
7.	Antiventral distance aV	45,2	49,8	47,4
8.	Antianal distance aA	66,0	69,8	68,1
9.	Caudal peduncle length lC	20,7	22,1	21,0
10.	Dorsal fin base length lD	9,9	11,8	10,5
11.	Maximum height of the dorsal fin HD	15,5	18,9	16,9
12.	Anal fin length lA	11,9	14,8	13,5
13.	Anal fin height hA	11,0	12,8	11,6
14.	Pectoral fin length lP	22,8	23,9	23,0

Fish Ecology and Their Impact on Water ResourcesSimpulan

Conclusion

Studies conducted in the Zarafshan River and Oqdarya Reservoir areas have shown that grass carp and silver carp play an important role in aquatic ecosystems [5-6]. The growth rate and feeding habits of grass carp help maintain balance in the ecological system, especially in reducing aquatic vegetation. Silver carp, on the other hand, contribute to improving water quality by filtering plankton. While these species do not compete with other fish species in the river, it is important that they integrate into ecosystems by implementing mutual adaptation processes.

References

Ashraf, M. et al. (2011). Nutritional values of wild and cultivated silver carp (Hypophthalmichthys molitrix) and grass carp (Ctenopharyngodon idella) //Int. J. Agric. Biol. – 2011. – T. 13. – №. 2. – C. 210-214.

Atıcı, A.A. (2024). Biological Characteristics of Siraz Fish, Capoeta kosswigi (Teleostei: Cyprinidae) and Host Relationship with Ectoparasitic Glochidia Larvae of Freshwater Mussel, Unio stevenianus (Bivalvia: Unionidae) in the Karasu River (Van, T 黵 kiye). *Turkish Journal of Fisheries and Aquatic Sciences*, *24*(3), ISSN 1303-2712, https://doi.org/10.4194/TRJFAS24692

Bakhtiyar, Kamilov, Bakhtiyor, K. & Keyser. (2004). "The modern state of fisheries in the Republic of Uzbekistan and its perspectives." *WORLD AQUACULTURE-BATON ROUGE-* (2004): 8-13.

Barakov, R.T. (2024). Biological and ecological characteristics of common carp (Cyprinus carpio Linnaeus, 1758) in Kapchagay Reservoir, Kazakhstan. *Egyptian Journal of Aquatic Research*, *50*(3), 400-407, ISSN 1687-4285, https://doi.org/10.1016/j.ejar.2024.07.004

Berg, L. (1975). *Amudaryo daryosidagi baliq turlari va ularning ekologiyasi*. Ixtiofauna va Ekologiya, 9(3), 56-60.

Fadhil, B.H. (2025). Soil Biological Characteristics in the Al-Haidariyya Sub-District, Iraq. *Journal of Environmental and Earth Sciences*, *7*(3), 253-261, ISSN 2661-3190, https://doi.org/10.30564/jees.v7i3.7384

Feng, W.K. (2024). Identifying the Biological Characteristics of Anthracnose Pathogens of Blueberries (Vaccinium corymbosum L.) in China. *Forests*, *15*(1), ISSN 1999-4907, https://doi.org/10.3390/f15010117

Filippi, P. (1995). *Ctenopharyngodon idella turlarining ekologik xususiyatlari*. Biologiya jurnali, 23(4), 235-240.

Gillson, J.P. (2025). Do the biological characteristics of trout (Salmo trutta) smolts influence their spring migration timing and maiden marine sojourn duration?. *Journal of Fish Biology*, ISSN 0022-1112, https://doi.org/10.1111/jfb.16040

Girard, C. (1948). *Baliq resurslarini boshqarish va ularning ekologik ta'siri*. Suv resurslari va ekologiya, 11(2), 22-26.

Kessler, F. (2000). *Zarafshon daryosida baliq turlari*. Suvoqavariyat jurnali, 6(2), 45-49.

Khalimova N. T. et al. (2023). Morphological characteristics of carp (Carassius Gibelio) in the conditions of pond fish farming in Uzbekistan //IOP Conference Series: Earth and Environmental Science. – IOP Publishing, 2023. – T. 1142. – №. 1. – C. 012072.

Li, P. (2025). Spatiotemporal characteristics of macroinvertebrate functional feeding groups and biological assessment of water quality in the Hulan River Basin. *Global Ecology and Conservation*, *57*, ISSN 2351-9894, https://doi.org/10.1016/j.gecco.2024.e03377

Liu, Y. (2024). Characteristics of Key Biological Assemblage Dynamics and Biotic Integrity Assessment in the Upper Yellow River, China. *Polish Journal of Environmental Studies*, *33*(5), 5793-5803, ISSN 1230-1485, https://doi.org/10.15244/pjoes/183154

Novoselov, A.P. (2024). State of Warm-Water Ichthyofauna in Water Bodies of Arkhangelsk Oblast: Part 2. Biological Characteristics of Fishes. *Inland Water Biology*, *17*(5), 805-813, ISSN 1995-0829, https://doi.org/10.1134/S1995082924700470

Singh, B.P. (2024). Physicochemical and biological characteristics of River Hindon at Galheta station from 2009 to 2020. *Environmental Quality Management*, *33*(3), 331-344, ISSN 1088-1913, https://doi.org/10.1002/tqem.22115

Temminck, C., & Schlegel, H. (1836). *Oq amur baliqlari va ularning yashash muhiti*. Biologiya tadqiqotlari, 18(1), 67-72.

Usmonova D. et al. (2024). Morphological characteristics of yearlings of Grass carp (Ctenopharyngodon Idella) in the fish farm of Bukhara region, Uzbekistan //E3S Web of Conferences. – EDP Sciences, 2024. – T. 563. – C. 03027.

Valenciennes, P. (1961). *Baliq turlarining umumiy tahlili*. Ixtiofauna va Ekologiya, 6(3), 80-85.

Wang, Y. (2024). Composition and Distribution Characteristics of Biological Traces in the Pearl River Delta Front. *Acta Sedimentologica Sinica*, *42*(5), 1512-1529, ISSN 1000-0550, https://doi.org/10.14027/j.issn.1000-0550.2022.149

Wei, H. (2024). Distribution characteristics of microorganisms in sediments of Dagu River and their biological indicator function for evaluating eco-environmental quality of rural river. *Environmental Research*, *245*, ISSN 0013-9351, https://doi.org/10.1016/j.envres.2023.118032