REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No.1 (2024)
http://www.veterinaria.org
Article Received:06 June 2024, Accepted:12 June 2024, Published:24 June 2024

First Record of The Pterygoplichthys Gibbiceps (Exotic Invasive Catfish) In The Munneru River Of Khammam (D) Telangana.

Dr.P.Ayodhya Reddy[1], Dr.T.Jagadeeshwara chari[2] , Bhukya Saikumar[3*], Dharavath Ram kumar[4]

[1]Associate Professor of Zoology**,** Government Degree & PG College (A) Siddipet, Telangana, India, (0009-0005-6701-1921**),**
,[2]Lecturer In Fisheries, Government Degree & PG College (A) Siddipet, Telangana, India. 0000-0003-1764-5609
[3*]M.Sc. Fisheries Pursuing, Government Degree & PG College (A) Siddipet, Telangana, India. 0009-0001-0694-1130
[4] Lecturer In Fisheries, Government Degree & PG College (A) Siddipet, Telangana, India. 0009-0006-9400-1160**.**

ABSTRACT
Pterygoplichthys fishes are catfishes under order siluriformes and family Loricariidae native to South America and an important resource for the ornamental fish industry. Recently, studies reveals that the exotic populations have been introduced into the rivers in five continents. Despite its commercial and environmental importance, P. pardalis is identified in various rivers throughout Telangana state in the recent times there are Seven introduced species or hybrids of the genus Pterygoplichthys have been reported from five continents, plus an extended range in their native South America, and twenty-one countries, in the present study we have collected p.gibbiceps from munneru river this is an exotic invansive leopard catfish of genus Pterygoplichthys due to the patterns arrangement the fish body resembles a leopard , The fish were identified based on morphological tests. these fishes are considered a threat to the freshwater fish population Color pattern is generally dark brown with either darker spots or lighter spots or vermiculation's, The adult size of this genus of Pterygoplichthys can grow between 50–70 cm.

Keywords: p.pardalis, p.gibbiceps, catfish , morphological , Loricariidae.

1.Introduction

The Pterygoplichthys pardalis American suckermouth armored catfishes (Loricariidae) are native to the Amazon River of Brazil and Peru and placed under the largest family of the order Siluriformes, of over 700 species with about 80 genera are placed and occurring naturally in south-central American water (Nelson, 2006) . The same genus of P. liposarcus Loricariidae characters has eight -nine dorsal fin rays or more and is popularly identified as sailfin catfishes (Ferraris, 2007 ,Weber, 1992; Fuller 1999; Nelson, 2006;) . This sailfin catfish belongs to the Loricariidae family genus Pterygoplichthys spp. is one of the invasive fish groups more extremely dangerous to the entire freshwater ecosystem (Liang et al. 2005; Chavez et al. 2006; Nico, 2010) have been introduced all around the world from South America by the aquarium trade (Wakida-Kusunoki et al. 2007) based on feeding activities it is an excellent algae eater and detritus (Ozedilek, 2007,Li-Wei et al. 2011;) they also may ingest young insect, and its larvae fish eggs and other bottommost dwellers but the vast majority of diet includes the detritus algae and numerous plant matters (Mendoza et al. 2009) . The wild convergent distribution of both P. disjunctivus and P. pardalis were reported in Indonesia, Singapore and the Philippines (Chavez et al. 2006; Kottelat and Whitten 1993; Page and Robins, 2006) . species of the genus Pterygolichthys, or Liposarcus sensulato, have four phylogenetically close Pterygolichthys spp. with very comparable morphology and biology in the Amazon River basins and the Orinoco are (Weber, 1992) P. pardalis (Castelnau, 1855) , P.multiraditus (Hancock, 1828) , P. disjuntivus (Weber, 1991) Pterygoplichthys anisitsi (Eigenmann and Kennedy, 1903; Weber, 1991; Weber, 1992; Montoya-Burgos et al. 2002; Armbruster et al. 2004) . The genus Pterygoplichthys spp. is a fast-scattering invasive aquatic species invading the aquatic habitat globally, introduced primarily through uncontrolled pet trafficking by the aquaculturists attack of these fishes on natural freshwater bodies results in serious economic and environmental consequences (Nico, 2012) , munneru river has largest catchment area it has largest species diversity where the catfishes available in large quantity in this present study we had collected the species of p.pardalis and related species which has different pattern compared to the p.pardalis the doubtful fishes has collected and undergone for morphological analysis

2.Materials and methods

2.1 Study Area

Munneru river is a left tributary of Krishna river which originates from mahabubabad district and flows through Khammam district majorly it drains Theerdhala ,Kamanchikal , polisettigudem , dornakal , it has a length of 195 km . munneru river has largest ichthyofaunal diversity nearly 80 fish species including p.pardalis are found in munneru river (Dr.P.Ayodhya et.all 2024)(30)

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No.1 (2024)
http://www.veterinaria.org
Article Received:06 June 2024, Accepted:12 June 2024, Published:24 June 2024

Fig :1 munneru River view

2.2 sample collection sites and identification

Fish samples are collected from species richness area of munneru river various sites had selected with the guidelines of the local fishermen's where the catchment is Higer and available at all seasons. The samples are collected monthly the frequency of collection is based on the information provided by local fish farmers the collected samples are preserved in the formalin (10%) solution .

Table : 1 sample collection of Pterygoplichthys species

S.no	Species	Month	Area	Weight	Distribution status
1.	p.pardalis	April-2024	Theerdhala	250gms	+ + + + +
2.	p.pardalis	May-2024	Polisettigudem	100gms	+ + +
3.	p.gibbiceps	May-2024	Kamanchikal	120gms	+ +
4.	p.pardalis	June-2024	Maddivarigudem	300-gms	+ + + +
5.	p.gibbiceps	June-2024	Kamanchikal	90gms	+ + +

Distribution status + indicates 2 species catch per a catchment

Taxonomic identification was done by using the previously published descriptions of species. Morphological statistics were used to make an evaluation with the newly collected specimens. Specimens were identified based on the nature of their abdominal patterns in existing available keys provided by Weber (1991; 1992) , for characteristic peculiarities and photographs of specimens. Armbruster and Page, (2006) presented a revised key of the species in the genus Pterygoplichthys spp... The fishes were preserved and maintained in the fisheries laboratory

2.3Morphometric Analysis

Morphometric and meristematic characters were analyzed following the standard methods of Armbruster (2003) [4]. Other external characters were also examined. Pterygoplichthys pardalis & Pterygoplichthys gibbiceps (Kner, 1854)

Fig 2: left side p.gibbiceps (leopard patterns) right side p.pardalis (striped pattern)

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No.1 (2024)
http://www.veterinaria.org
Article Received:06 June 2024, Accepted:12 June 2024, Published:24 June 2024

Fig 3 : fins differentiation among both species upper fin p.gibbiceps (leopard patterns) lower fin p.pardalis (staright black patterns on dorsal fin)

Fig :4 juvenile stage and mouth position p.gibbiceps

Fig :5 colour pattern arrangement of p.pardalis and p.gibbiceps

Meristic Characters p.pardalis : Dorsal Fin Spines (DFS) 12 , Caudal Fin Rays (CFR) 16 Pectoral Fin Rays (PeFR) 6 , Pelvic Fin Rays (PvFR) 6 ,Anal Fin Rays (AFR) 4

Meristic characters of p.gibbiceps : Dorsal Fin Spines (DFS) 8 , Caudal Fin Rays (CFR) 14 Pectoral Fin Rays (PeFR) 6 , Pelvic Fin Rays (PvFR) 6 ,Anal Fin Rays (AFR) 4

2.4 Identification based on karyotype evolution

Recent cytogenetic studies have revealed the knowledge of fish genomes and karyotypic evolution. Cytogenetics is usually the first line of genetic information for taxonomy and evolutionary issues [14]. In addition, chromosomal markers are useful for aquaculture purposes, such as for polyploidy constructs [15,16], karyotype variation assessments [17], and hybrid monitoring [18]. Currently, seven species of Pterygoplichthys have been karyotyped Despite of conservative

REDVET - Revista electrónica de Veterinaria - ISSN 1695-7504
Vol 25, No.1 (2024)
http://www.veterinaria.org
Article Received:06 June 2024, Accepted:12 June 2024, Published:24 June 2024

diploid number of 2n = 52, variations in chromosome morphology and C-bands were detected among species and populations The hypothetical ancestral karyotype of Loricariidae is assumed to have 2n = 54 [19], which implies a reduction of diploid number to 2n = 52 in the common ancestor of Hypostomini .

Species	KF(m+sm+st+a)	BC	NOR	CMA_3	18_S	5_S	Rex_1	Rex_3	Rex_6	Authors
p.gibbiceps	20+24+8+0	-	21	-	-	-	-	-	-	(20)
p.pardalis	18+18+8+8	-	11	-	11	11	+	+	+	(21)
p.multiraditus	22+18+12+0	-	10	-	10	-	-	-	-	(20,22)

Table : 2. Cytogenic data table of Pterygoplichthys fish species Karyotypic formula (KF), C-banding (BC),Nucleolar organizing regions (NOR), Chromomycin A3 (CMA3), FISH of rDNA probes (18Sand 5S), FISH of retrotransposons probes (Rex1, Rex3, Rex6), metacentric (m), submetacentric (sm),sub telocentric (st), acrocentric (a), not analyzed (-), analyzed (+).The karyotype of P. pardalis from the lower Amazon River has 2n = 52 chromosomes and an FN = 100, a karyotypic formula of 18m + 18sm + 8st + 8a, and no distinction of differentiated sex chromosomes.

Table : 3 Taxonomical positions of Pterygoplichthys

Kingdom	Animalia
Phylum	Chordata
Subphylum	Vertebrata
Super class	Actinopterygii
Order	Siluriformes
Family	Loricariidae
Genus	Pterygoplichthys
Species	P.pardalis(Castelnau, 1855)
Kingdom	Animalia
Phylum	Chordata
Subphylum	Vertebrata
Super class	Actinopterygii
Order	Siluriformes
Family	Loricariidae
Genus	Pterygoplichthys
Species	gibbiceps (Kner, 1854)

Pterygoplichthys pardalis found in munneru River, and belongs to the family Loricariidae is an extremely large and diverse group of American freshwater fish have sucker mouth distinguished by depressed body ,dark spots on its sidelong and caudal region with mostly discrete ventral spots. The collected fish species Pterygoplichthys pardalis size ranges from 10-30cms

Pterygoplichthys gibbiceps found in munneru River, and belongs to the family Loricariidae is an extremely large and diverse group of leopards pleco freshwater fish have sucker mouth distinguished large skull, leopard-like spots on its sidelong and caudal peduncle; with mostly. The collected fish species Pterygoplichthys gibbiceps has 8 number of dorsal fin rays most of plecos has 10 number of rays size ranges from 10-30cms .

3.RESULT

The examination of fishes established on coloration, morphometric, and meristic attributes reported and revealed the occurrence of species P.pardalis (Castelnau, 1855) Pterygoplichthys gibbiceps (Kner, 1854)in the munneru river. The taxonomical position of both species is mentioned in the(table 3). The collected species are of different sizes and colours, Juvenile fishes were found throughout the year from the river, indicating their successful invasion. The fin formula of p.pardalis Dorsal fin spines 12, Caudal fin rays 16, Pectoral fin rays 6, Pelvic fin rays 6, and anal fin rays 4. The fin formula of p.gibbiceps is Dorsal fin spines 08, Caudal fin rays 14, Pectoral fin rays 6, Pelvic fin rays 6, and anal fin rays 4.

4.DISCUSSIONS

The present study revealed the occurrence of Pterygoplichthys gibbiceps & p.pardalis, a non-native invasive facultative air-breathing fish in the munneru river of Khammam district Telangana . The sample was identified as Pterygoplichthys gibbiceps based on the morphometric and meristic characters (Weber, 1991) ,

sailfin catfishes into the rivers have led to their visible naturalization and threats to native ichthyofauna diversity. Several researchers recorded the invasion of species Pterygoplichthys have successfully arriving territorial water bodies of several countries worldwide, USA (Nico and Martin, 2001) Europe (Keszka et al. 2008)populations of Pterygoplichthys disjunctivus in Philippine waters and Pterygoplichthys pardalis by Chavez and his colleagues (2006)

In America, 150 species were reported that belong to the genus Pterygoplichthys spp., out of the four species were recorded in India implying the invasion in Indian aquatic habitats (Rama and Venugopal, 2017)
Pterygoplichthys pardalis is reported in the coastal regions of West Bengal, Bihar, Uttar Pradesh, Andhra Pradesh, Tamil Nadu, and Kerala in India also documented. Four species of the suckermouth Armoured catfishes viz., Pterygoplichthys anisitsi found in Bihar (Sinha et al. 2010)

Pterygoplichthys pardalis species invasion in the munneru River Khammam which is introduced into the freshwater ecosystem of munneru river by the aquaculturists accidentally. The freshwater riverine system is highly rich in diversity with a variety of species, which is ecologically sensitive due to the introduction of invasive species that will disturb and destroy the biodiversity of native species in this ecosystem. Moreover, the present study reported the existence of Pterygoplichthys gibbiceps in the freshwater ecosystem of munneru river Khammam(d) Telangana.

5.CONCLUSION

We here by conclude that the p.gibbiceps is distributed in some areas of Kamanchikal region of munneru river this Pterygoplichthys pardalis and p.gibbiceps are the invansive fish species of munneru river , which is a threat to the native fish species it destroys aquatic environment by over feeding , this is an exotic fish which previously placed in ornamental culture, this papers helps to the fishery department and fisheries students to know the evolution and distribution of subspecies of Pterygoplichthys and government has to take action and ban these exotic fish species import to the aquarium keepers which helps to decreasing native species threat.

6.REFERENCES

1. Nelson JS. Fishes of the World, John Wiley & Sons: Hoboken, NJ, USA, 4th ed.; c2006.
2. Weber C. Révision du genre Pterygoplichthys sensulato (Pisces, Siluriformes, Loricariidae). Revue Francaise d'Aquariologie Herpétologie. 1992;19:1-36. http://pascalfrancis.inist.fr/vibad/index.php?action=getRecordDetail& idt=5621198\
3. Fuller PL, Nico LG, Williams JD. Non-indigenous fishes were introduced into inland waters of the United States. Am. Fish. Soc. Spec. Pub. 1999;27:1-622.
4. Page LM. Identification of sailfin catfishes introduced to Florida. Florida Scientist. 1994;57(4):171-172.
5. Chavez JM, De La Paz RM, Manohar SK, Pagulayan RC, Carandang JRVI. New Philippine record of South American sailfin catfishes (Pisces: Loricariidae). Zootaxa
6. Wakida-Kusunoki AT, Ruiz-Carus R, Amador-del-Angel E. Amazon sailfin catfish, Pterygoplichthys pardalis (Castelnau, 1855) (Loricariidae), another exotic species established in southeastern Mexico. Southwest. Nat. 2007;52:141-144. https://doi.org/10.1894/0038- 4909(2007)52[141:ASCPPC]2.0.CO;2
7. 8. Li-Wei Wu, Chien-Chin Liu, Si-Min Lin. Identification of Exotic Sailfin Catfish Species (Pterygoplichthys, Loricariidae) in Taiwan Based on Morphology and mtDNA Sequences. Zoological Studies. 2011;50(2):235- 246. 39.
8. Mendoza-Alfaro RE, Cudmore B, Orr R, Fisher JP, Contreras-Balderas S, Courtenay WR, et al. Trinational risk assessment guidelines for aquatic alien invasive species. Test cases for the snakeheads (Channidae) and armoured catfishes (Loricariidae) in North American inland waters. Commission for Environmental Cooperation Montreal. Quebec; c2009.
9. Kottelat M, Whitte T, Kartikasari SN. Freshwater fishes of western Indonesia and Sulawesi. Singapore: Periplus Editions; c1993. p.259.
10. Weber C. Nouveaux taxa dans Pterygoplichthys sensulato (Pisces, Siluriformes, Loricariidae). Revue Suisse de Zoologie. 1991;98:637-643. http://pascalfrancis.inist.fr/vibad/index.php?action=getRecordDetail& idt=5281442
11. Castelnau FL, Poissons Sud, De Rio de Janeiro à Lima, Et de Lima au Para. Animaux Nouveaux or Rares Recueillis Pendant l'Expédition dans les Parties Centrales de l›Amérique du. 50; C1855.
12. Armbruster JW. The species of the Hypostomus cochliodon group (Siluriformes: Loricariidae). Zootaxa. 2003;249:1-60. https://doi.org/10.11646/zootaxa.249.1.1.
13. Nico LG, Butt PL, Johnson GR, Jelks HL, Kail M, Walsh SJ. Discovery of the South American Suckermouth Armoured Catfish (Loricariidae, Pterygoplichthys spp.) in the Santa Fe River drainage, Suwannee River basin, USA. Bioinvasion Records. 2012;1:179-200. Doi: http://dx.doi.org/10.3391/bir.2012.1.3.04 50. Ozedilek SY. The possible threat to mid
14. Majtánová, Z.; Moy, K.G.; Unmack, P.J.; Ráb, P.; Ezaz, T. Characterization of the Karyotype and Accumulation of Repetitive Sequences in Australian Darling Hardyhead Craterocephalus amniculus (Atheriniformes, Teleostei). PeerJ 2019, 7, e7347.

15. Arai, K. Genetic Improvement of Aquaculture Finfish Species by Chromosome Manipulation Techniques in Japan. Reprod. Biotechnol. Finfish Aquac. 2001, 205–228.
16. Bertolini, R.M.; Lopez, L.S.; do Nascimento, N.F.; Arashiro, D.R.; de Siqueira Silva, D.H.; dos Santos, S.C.A.; Senhorini, J.A.; Yasui, G.S. Strategies for Aquaculture and Conservation of Neotropical Catfishes Based on the Production of Triploid Pimelodus maculatus. Aquac. Int. 2019, 28, 127–137.
17. Colihueque, N.; Corrales, O.; Parraguez, M. Karyotype and Nuclear DNA Content of Trichomycterus areolatus (Siluriformes, Trichomycteridae). Genet. Mol. Biol. 2006, 29, 278–282.
18. Porto-Foresti, F.; Hashimoto, D.T.; Alves, A.L.; Almeida, R.B.C.; Senhorini, J.A.; Bortolozzi, J.; Foresti, F. Cytogenetic Markers as Diagnoses in the Identification of the Hybrid between Piauçu (Leporinus macrocephalus) and Piapara (Leporinus elongatus). Genet. Mol. Biol. 2008, 31 (Suppl. S1), 195–202.
19. Artoni, R.F.; Bertollo, L.A.C. Cytogenetic Studies on Hypostominae (Pisces, Siluriformes, Loricariidae). Considerations on Karyotype Evolution in the Genus Hypostomus. Caryologia 1996, 49, 81–90.
20. Alves, A.L.; Oliveira, C.; Nirchio, M.; Granado, Á.; Foresti, F. Karyotypic Relationships among the Tribes of Hypostominae (Siluriformes: Loricariidae) with Description of XO Sex Chromosome System in a Neotropical Fish Species. Genetica 2006, 128, 1–9.
21. Araújo da Silva, F.; Feldberg, E.; Moura Carvalho, N.D.; Hernández Rangel, S.M.; Schneider, C.H.; Carvalho-Zilse, G.A.; Fonsêca da Silva, V.; Gross, M.C. Effects of Environmental Pollution on the RDNAomics of Amazonian Fish. Environ. Pollut. 2019, 252, 180–187.
22. Alves, A.L.; de Borba, R.S.; Pozzobon, A.P.B.; Oliveira, C.; Nirchio, M.; Granado, A.; Foresti, F. Localization of 18S Ribosomal Genes in Suckermouth Armoured Catfishes Loricariidae (Teleostei, Siluriformes) with Discussion on the Ag-NOR Evolution. Comp. Cytogenet. 2012, 6, 315–321.
23. Armando TWK, Ramon RC, Enrique AA. Amazon sailfin catfish Pterygoplichthys pardalis (Castelnau, 1885) (Loricariidae), another exotic species established in south-eastern Mexico. Southwest. Nat. 2007;52(1):141- 144. Doi: 10.1894/0038-4909(2007)52[141: ASCPPC]2.0.CO;
24. Ajithkumar CR, Biju CR, Thomas R. Plecostomus multiradiatus-an armoured catfish from freshwater ponds near Kunnamkulam, Kerala and its possible impact on indigenous fishes. LAK News, Limnological Association of Kerala; c1998. p. 1-2.
25. Alexander Benjamin Orfinger, Daniel Douglas Goodding. The Global Invasion of the Suckermouth Armoured Catfish Genus Pterygoplichthys (Siluriformes: Loricariidae): Annotated List of Species, Distributional Summary and Assessment of Impacts. Zool Stud. 2018;57:e7. DOI: 10.6620/ZS.2018.57-07
26. Armbruster JW. The species of the Hypostomus cochliodon group (Siluriformes: Loricariidae). Zootaxa. 2003;249:1-60. https://doi.org/10.11646/zootaxa.249.1.1
27. Armbruster JW. Phylogenetic relationships of the suckermouth armoured catfishes (Loricariidae) with emphasis on the Hypostominae and the Ancistrinae. Zool. J Linn. Soc. 2004;141:1-80. http://el.erdc.usace.army.mil/elpubs/pdf/ansrp-v04-1.pdf
28. Armbruster JW, Page LM. Redescription of Pterygoplichthys punctatus and description of a new species of Pterygoplichthys (Siluriformes: Loricariidae). Neotropical Ichthyology. 2006;4(4):401-409. https://doi.org/10.1590/S1679-62252006000400003
29. Bachan AKH. Riparian vegetation along the middle and lower zones of the Chalakudy River, Kerala, India. Report. Project 26/2000. Kerala Research Program on Local Level Development. Center for Development Studies, Trivandrum, Kerala; c2003.
30. Dr.P. Ayodhya reddy(et all 2024) a study on ichthyofaunal diversity of munneru river Khammam (d) TS , African journal of biological sciences Afr.J.Bio.Sc. 6(5) (2024). 3312-3327 ISSN: 2663-2187 https://doi.org/10.33472/AFJBS.6.5.2024. 3312-3327.