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Research Article

First report of anguilliform catfish *Olyra praestigiosa* Ng & Ferraris 2016 from the state of Arunachal Pradesh, a biodiversity hotspot

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ABSTRACT

Olyra praestigiosa, an anguilliform catfish was first described exclusively from Darjeeling Himalayas of north Bengal. However, during an ichthyological survey along Tissa river system from February 2023 to April 2024, 8 individuals of Olyrids were collected from 7 distinct sampling locations which were later identified as *O. praestigiosa*. Additionally revealing it's occurrence very distant from the original type locality of Chel river in West Bengal. Consequently signifying the first report of *O.praestigiosa* from the state of Arunachal Pradesh. It is defined by having an anguilliform body, first and second dorsal fin rays being non-ossified as well as the upper caudal fin lobe being significantly expanded. A comparison of morphological characteristics of *Olyra praestigiosa* specimens collected from the Tissa River system with the original description of *O. praestigiosa* available in the literature revealed slight variation in dorsal fin to adipose fin distance as well as wider range of adipose fin base length in proportion to it's standard length. Additionally the altitudinal range of its distribution was expanded from 382 m in type locality to 212 – 919 m in Tissa river originating in the Indo-Myanmar borders.

Key words: *Olyra praestigiosa*, first record, Arunachal Pradesh, Tissa river system.

INTRODUCTION

The genus *Olyra* was initially defined by McClelland (1842) from the Khasyah hills in the northeastern part of India with *Olyra longicaudata* as the type species and was considered as the only genus of the family Olyridae. However, phylogenetic analyses based on morphological (Mo, 19991) and molecular (Sullivan *et al*., 2006) evidence validated its placement within Bagridae family which has the maximum diversity of species as a family within old-world catfishes. It is defined as having an anguilliform body, non-ossified first and second dorsal fin rays and significantly expanded upper caudal-fin lobe (Mo, 1991).With the recent addition of new species *Olya parviocula* (Kosygin, Shangningam & Gopi, 2018) from Kameng River in Arunachal Pradesh, the total number of confirmed species within genus *Olyra* has now been updated to seven viz *O.longicaudata* (McCllend, 1842), *O.burmanica* (Day, 1872), *O.horae* (Prasad & Mukherji, 1929), *O.astrifera* (Arunachalum *et al*., 2013), *O. saginata* (Ng *et al*., 2014) and *O.praestigiosa* (Ng & Ferraris, 2016). Previous studies have revealed that these small bodied elongate catfish species inhabit rheophilic streams and fast-flowing rivers of the Ganges and Brahmaputra River system in the northern part of India, Manimalai River draining in the southwestern India and Mae Klong River draining eastwards in western Thailand (Ng *et al*., 2014). The genus has been predominantly reported across north-eastern India and Myanmar. Nonetheless a single report from Nepal (Subba, 1995) and Bangladesh (Ng *et al*., 2016) has been witnessed. Additionally, within Indian region are known to occur in Kerala, Darjeeling Himalayas of North Bengal and northeastern states like Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland and Assam (Arunachalum *et al*., 2013; Pathak *et al*., 2013; Ng *et al*., 2014). While studying the ichthyological diversity of Tissa River system during February 2023 to April 2024, 8 individuals recorded from 7 sampling sites is reported herein is a case of state new record.

MATERIALS AND METHODS

An exploratory field survey was carried out along the Tissa River system in Arunachal Pradesh's easternmost Longding District, situated at latitude 26°28′ N - 27°30′ N and longitude 95°E - 96°E from February – march 2023 till march-April 2024. Sampling was done twice a year in two seasons namely pre-monsoon (Feb-April) and post-monsoon (Oct-Nov). Gill nets and cast nets of varying mesh sizes were ranging from 0.5 to 5cm used for sampling along with the incorporation of traditional fishing methods like bamboo basket traps, angling and utilization of river bed substrates to build temporary fish breeding grounds within the river channel The samples were collected from different sampling sites constituting of 100m reach along the channel of Tissa river. Collected samples were fixed in 10% formaldehyde for further analysis in the laboratory. Measurements were made point to point with digital calipers and value noted to the nearest 0.1 mm. All the morphometric measurements and meristic counts were made on the left side of the specimen whenever possible, following Ng and Kottelat (2013), aside from the caudal fin length which was measured at the upper lobe (Ng & Ferraris, 2016). Meristic characters including simple and branched rays of fins were counted under a stereo zoom light

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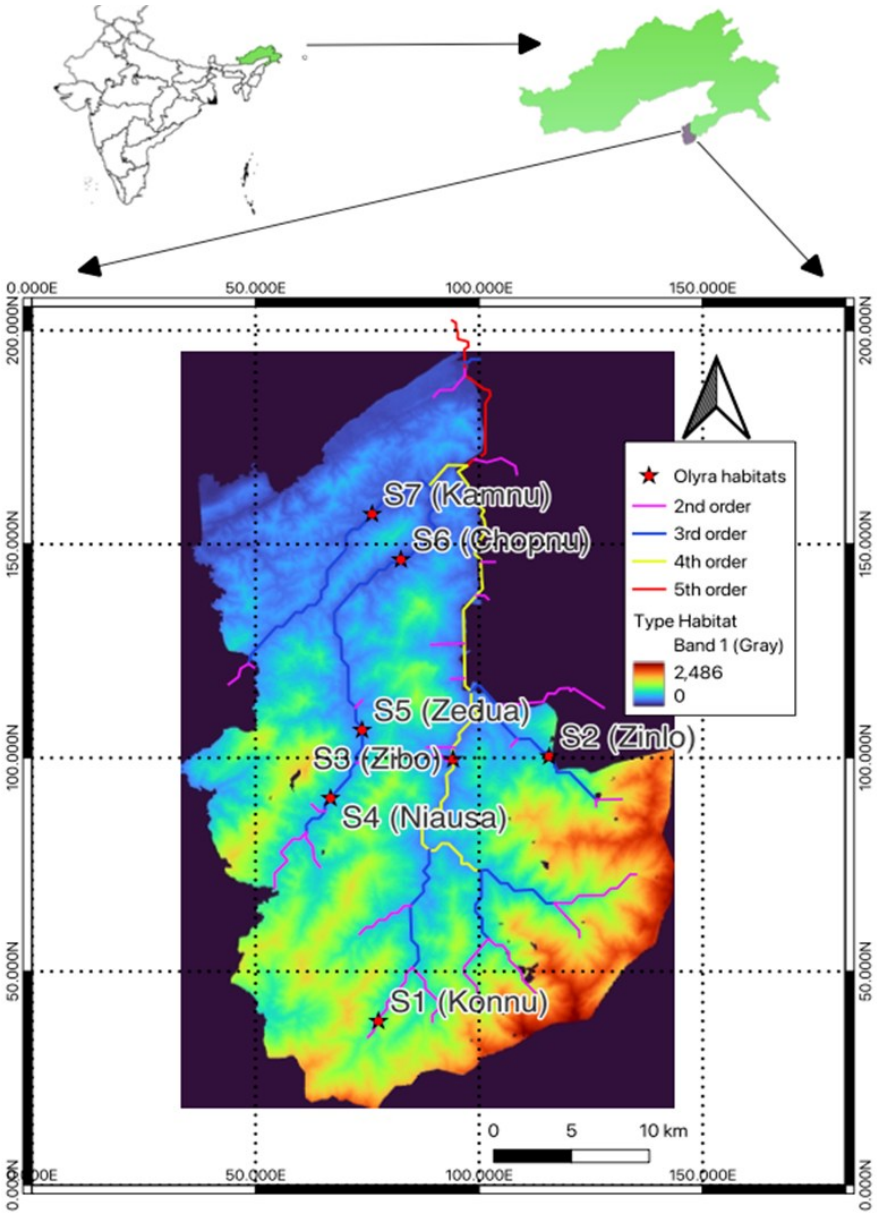

Figure 1. Study area map of Tissa river basin depicting all sampling sites of *Olyra praestigiosa* collected during pre-monsoon 2023 and pre-monsoon 2024.

Microscope. Parameters related to the subunits of the head are presented as proportion of the Head Length (HL). Additionally Head length and other morphometric parameters of the body parts are presented as proportion of Standard Length (SL). Specimens examined in this research work are deposited at the fish museum of Dera Natung Government College in Itanagar. Valid genera name and latest systematic status of species were cross-checked with California Academy of Sciences website: http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp.

RESULTS AND DISCUSSION

***Olyra praestigiosa* Ng & Ferraris, 2016**

(Figure 1 and table 1)

Material examined: DNGC /MF/118, 68.45 - 121.36 (n=8); India, Arunachal Pradesh, Papumpare district, Itanagar, Dera Natung Government College, collected by Junngam Khiham, Feb-2023 to April 2024.

Description:

All Morphometric data recorded is presented in Table 1. General appearance through photographs of the specimen given in Fig. 4-6. Body long, elongate, loach-like, depressed anterior and becomes compressed caudally.

Head profile when viewed ventrally is faintly convex, approximately straight along the proximal edge of branchiostegal membranes till the end of anal-fin base and head appears flat or compressed. On dorsal view, snout is ovate or convex, maxillary barbel is housed within the dorsolateral groove. Lips fleshy, jaws nearly equivalent in length but the upper jaw protruding minutely exceeding lower jaw and both provided with a number of open pores. Nostrils broadly segregated. Nasal barbels are continues with the anterior margins of hind nares placed nearer to the orbital margin than to snout tip. Eyes small, subcutaneous, oviform positioned nearer to snout tip than to opercle edge. Interorbital

Table 1. Morphometric characters of *Olyra praestigiosa* from Tissa river

	***Olyra praestigiosa* from Tissa river (n=11)**		***Olyra praestigiosa* (Ng & Ferraris, 2016)**	
Morphometric characters	**Range**	**Mean ± SD**	**Range**	**Mean ± SD**
Standard length (SL)	68.45 - 121.36	93.16 ± 19.14	54.0- 117.9	
In % of SL				
Head length (HL)	14.26 - 17.83	16.37 ± 1.23	16-19	17 ± 0.9
Head depth	6.76 - 9.98	7.95 ± 1.01	6-8	7 ± 0.8
Head width	10.53 - 14.56	11.97 ± 1.26	9-12	11± 0.9
Predorsal distance	31.10 - 36.54	34.36 ± 2.11	34-38	36.5 ± 1.4
Prepectoral distance	14.39 - 17.08	15.73 ± 1.11	15-18	16 ± 0.8
Pre-pelvic distance	32.96 - 40.87	36.55 ± 2.57	34-40	36 ±1.7
Pre-anal distance	53.20 - 60.12	56.27 ± 2.24	54-60	57 ± 1.5
Length of dorsal fin	16.20 - 20.62	17.86 ± 1.41		
Dorsal fin base length	7.40 - 11.01	9.11 ± 1.08	9-12	10 ± 0.7
Length of Anal fin base	25.43 - 29.56	27.57 ± 1.37	26-30	28 ± 1.5
Pectoral fin length	7.85 - 10.98	9.48 ± 0.99	8-10	9 ± 0.6
Pectoral spine length	4.89 - 6.35	5.67 ± 0.53	5-7	6 ± 0.6
Pelvic fin length	8.72 - 12.83	11.09 ± 1.40	9-13	11 ± 1.3
Caudal fin length (upper)	25.26 - 29.61	26.67 ± 1.80	28-30	32 ± 4.1
Adipose fin base length	6.26 - 9.32	7.99 ± 1.08	9-16	13 ± 2.4
Dorsal-adipose distance	39.46 - 42.53	40.71 ± 1.32	21-31	27 ± 2.7
Post adipose length	15.28 - 20.83	18.18 ± 1.66	15-18	17 ± 0.9
Caudal peduncle length	14.99 - 18.72	16.71 ± 1.38	14-19	17 ± 1.5
Caudal peduncle depth	6.58 - 8.37	7.55 ± 0.61	6-8	7 ± 0.7
Body depth at anus	7.69 - 9.87	8.37 ± 0.83	6-9	8 ± 0.9
Body depth at dorsal fin origin	7.38 - 11.27	9.39 ± 1.25		
In % of HL				
Snout distance	23.46 - 30.30	27.42 ± 2.14	29-30	33 ± 2.4
Inter-orbital distance	30.69 - 36.13	33.41 ± 1.81	30-37	32 ± 2.5
Eye diameter	8.05 - 11.17	9.79 ± 1.15	9-14	11 ± 1.3
Nasal barbel length	34.14 - 48.76	40.79 ± 5.32	20-50	36 ± 9.1
Maxillary barbel length	118.05 - 164.16	143.07 ± 13.77	111-158	134 ± 17.8
Inner mandibular barbel length	143.07 ± 13.77	42.07 ± 6.32	25-55	46 ± 10.3
Outer mandibular barbel length	57.70 - 88.41	72.53 ± 10.25	58-86	73 ± 10.2

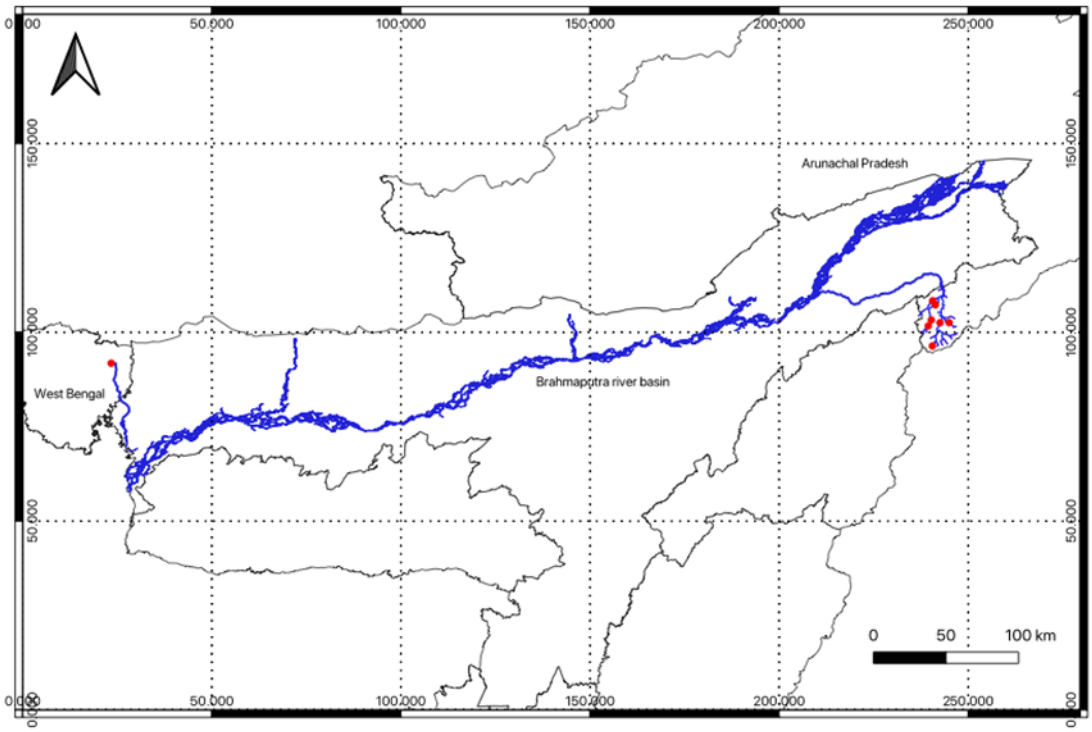

Figure 2. Map showing type locality of O.praestigiosa in West Bengal and new locality in Arunachal Pradesh of Brahmaputra river basin.

space is distinctly concave. Barbels are four paired. Nasal barbel short and extends a little beyond posterior orbital margin. Maxillary barbel is the longest reaching the posterior tip of pectoral fin length. Outer mandibular barbel just reaches the origin of pectoral fin base. The inner mandibular barbel is concise and about three by fifth times of the length of outer mandibular. The dorsal-fin appears convex, with i-7 (8) rays; non-ossified first and second dorsal fin rays. The dorsal fin is positioned just about vertically opposite to the pelvic fin insertion. First simple fin ray of Pectoral fins is modified into strong, sharp ossified spine and i-7 (8) fin rays. Short spine with serraes present. Pelvic fin is supplied with one simple and 5 branched finrays. Anal fin is elongated with vii-12 (4), vi-11-I (1), ix-11 (1), ix-10 (1), ix-9 (1) rays. Adipose fin low with very short base originating at about 73% of SL. Adipose fin is distinctly separated from principal fin rays of upper caudal lobe with discrete posterior margin and it terminates into small extended projection. Deeply forked caudal fin supplied with i-7 and i-6 finrays in the upper and lower caudal fin respectively; upper caudal fin is 1.6 times longer to lower fin. Complete lateral line extending till compound caudal complex. The Anus is positioned at three times in distance from the origin of pelvic fin to the origin of anal fin. The urogenital papilla is separate from anus and is elongated in males, positioned very close to the origin of anal fin base.

Coloration in alcohol:

Lateral as well as dorsal surface of the body appears dark brown and gradually becomes lighter or creamy towards ventral surface. Lateral flank surface is supplied with three broad longitudinal stripes, dark brown in colour; extends from behind opercle to the base of caudal fin. Several features on the head region like dorsum, dorso-posterior region of opercle and other features like

Figure 3. Habitat of *O.praestigiosa*, Tissa hill stream.

adipose fin, caudal fins and longitudinal stripes appears dark brown in colour. Pectoral and pelvic finrays are brownish gray dorsally but creamy or lighter ventrally and at the bases of fin origin. Nasal and maxillary barbels brownish black. Both outer and inner mandibular barbels appear creamy.

Ecological notes:

Olyra has been collected from 2nd order and 3rd order streams with riffles as the dominant mesohabitat type followed by some proportion of pool habitat type. Substrates like boulders, cobbles, sand and gravel were domineering substrates in the river channel. Few individuals were also collected from turbid water. Details of water parameter measures are given in table 2. Other fish species sampled from the habitat include – *Garra lissorhynchus* (McClelland 1842), *Badis triocellus* (Khynriam & Sen 2013), *Opsarius bendelisis* (Hamilton 1807), *Amblyceps apangi* (Nath & Dey 1989),

Figure 4. Dorsal, Ventral and lateral profile of *O.praestigiosa,* Topotype: 107.37 mm SL, India, Arunachal Pradesh.

Figure 5. Dorsal and ventral head profile of *O.praestigiosa*

Figure 6. Caudal fin of *O. praestigiosa.*

Table 2. Physico-chemical characteristics of water.

Parameters	S1 (Konnu)	S2 (Zinlo)	S3 (Zibo)	S4 (Niausa)	S5 (Zedua)	S6 (Chopnu)	S7 (Kamnu)
pH	7.97-8.14	8.43-9.15	8.46-8.86	8.92-9.04	8.64-8.87	8.23-8.38	8.36-8.54
TDS (ppm)	93.3-101.8	130.2-158	146-177	78.5-95.8	92.3-104.2	48.7-51.1	41.3-44.5
EC (μS/cm)	142.7-153.8	172.4-230	224-276	122.8-147.9	131.8-158.4	73.4-77.83	63.2-69.2
DO (ppm)	9.1-9.8	9-9.4	8.6-9.7	8.94-8.86	10.8-10.9	8.76-9.3	9.01-8.54
T (Celsius)	21.72-22.22	14-16	24.7-27.05	21.8-22.11	75.5-76.2	20.55-21.11	23.11-23.61
S (ppm)	70.2-76.3	85-112	110-134	58.8-70.7	66.7-78.8	36.7-38.5	31.3-33.4
Alt (msl)	919	370	375	548	362	248	212

Total Dissolved Solids (TDS), Electrical conductivity (EC), Dissolved oxygen (DO), Temperature (T), Salinity (S), Altitude (TLT)

Danio assamila (Kullander 2015), *Devario aequipinnatus* (McClelland 1839), *Channa stewartii* (Playfair 1867), *Paracanthocobitis botia* (Hamilton 1822), *Pethia arunachalensis* (Shangningam, Kosygin & Chowdhury 2020), *Mastacembelus armatus* (Lacepede 1800), *Psilorhynchus balitora* (Hamilton 1822) and several species of *Schistura*.

Distribution:

Previous study by Ng & Ferraris, has shown the occurrence of *Olyra praestigiosa* in Brahmaputra River basin in Bangladesh, northern Bengal and northeastern state of India. This paper reveals the collection of *O.praestigiosa* outside of its type locality from different sections of tissa river channel in Arunachal Pradesh.

CONCLUSION

The genus *Olyra*, first established by McClelland (1842) with the description of *Olyra longicaudata* as type species characterized as fighting catfishes with soft, elongated bodies and a flattened snout. Over the time, additional species were discovered such as *Olyra burmanica* by Day (1871) and *Olyra kempi* by Chaudhuri (1912). However, it was later synonymized with *O. longicaudata (Talwar & Jhingran, 1991) a decision which was consequently reiterated by* Jayaram (1999, 2006). *O. horae* another species was described by Prasad & Mukerji (1929). Although *Olyra* was initially considered the only genus in the family Olyridae, Mo (1991) reclassified it as a highly specialized member of the family Bagridae. The species of the *Olyra* genus are distributed across eastern Himalaya in the

Brahmaputra River system in northeast India, Nepal, Bangladesh and Myanmar (Jayaram, 1999; Vishwanath, Lakra & Sarkar, 2007; Vishwanath, 2021; Ng *et al*., 2014) but was later extended to peninsular India with the discovery of *O. astrifera* from the Manimalai River drainage in Kerala by Arunachalam *et al*., (2013). The eastern Himalayan Biodiversity hotspot, has witnessed significant distribution of *Olyra* species within its region. Nath & Dey (2000) provided detailed systematic account of *O. longicaudata* from Arunachal Pradesh while Pathak *et al*., (2013) documented Olyra species from the hill streams of Assam among others. Besides this, several new *Olyra* species have emerged from the region including *O. saginata* described by Ng *et al*., (2014) from Mizoram, *O. praestigiosa* by Ng & Ferraris, (2016) from Teesta River basin in North Bengal and the most recent discovery of *O. parviocula* by Kosygin & Shangningam (2018) from Arunachal Pradesh further highlighted the region's significant *Olyra* diversity. Additionally in the state of Arunachal Pradesh, the presence of only two species of *Olyra* viz *O.longicaudata* and *O. parviocula* from Brahmaputra drainage has been acknowledged (Gurumayum, Kosygin & Tamang, 2016). Ichthylogical survey was carried out along the Tissa river system in Longding district, where individuals of small Olyids collected were reconfirmed as *O. praestigiosa (*following Talwar & Jhingran, 1991; Jayaram, 1999; Vishwanathan *et al*., 2021; Kosygin & Shangningam, 2018). Thus, reporting the first ever record from Arunachal Pradesh along different sections of Tissa river collected across 2023 and 2024 during the months of February to April. To date, *O. praestigiosa* has been exclusively documented form its designated type locality in the Teesta river system in Darjeeling Himalayas of north Bengal. However, its distributional range has been extended further eastward into the Indo-Myanmar region with its first record within Tissa river system. The altitude of the type locality for *O. praestigiosa* was recorded at 382 msl (Ng & Ferraris, 2016), whereas the Olyrids from the Tissa River were collected from altitudes ranging between 212 to 919 m across various sections along the channel. This significant variation in altitude highlights the species' wide spatial distribution across diverse habitats.

A comparison of morphological characteristics of *O. praestigiosa* specimens collected from the Tissa River system was conducted with the original description of *O. praestigiosa* available in the literature, as presented in Table 1(Ng & Ferraris). Except for the distance between dorsal fin origin and adipose fin base origin in proportion to standard length (SL) which varied from the original range of 21 - 31% to 39 - 42%, all other characters revealed no significant variation. Additionally, the minimum range of dorsal fin base length in proportion to SL expanded from 9% to 6% in Olyrids collected from Tissa river. Besides this, the maximum SL of the individuals sampled were recorded up to 121 mm compared to previous record of 117mm. However, the potential for its recognition as a new species through future projects based on molecular analysis cannot be ruled out.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest regarding the publication of this manuscript. This research was conducted independently, with no commercial or financial relationships that could be construed as potential conflicts impacting the results or interpretations presented.

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