

*Occurrence of a rare gigantic sized deep-sea cod *Lepidion inosimae* (Günther, 1887) in the Northwestern Indian Ocean*

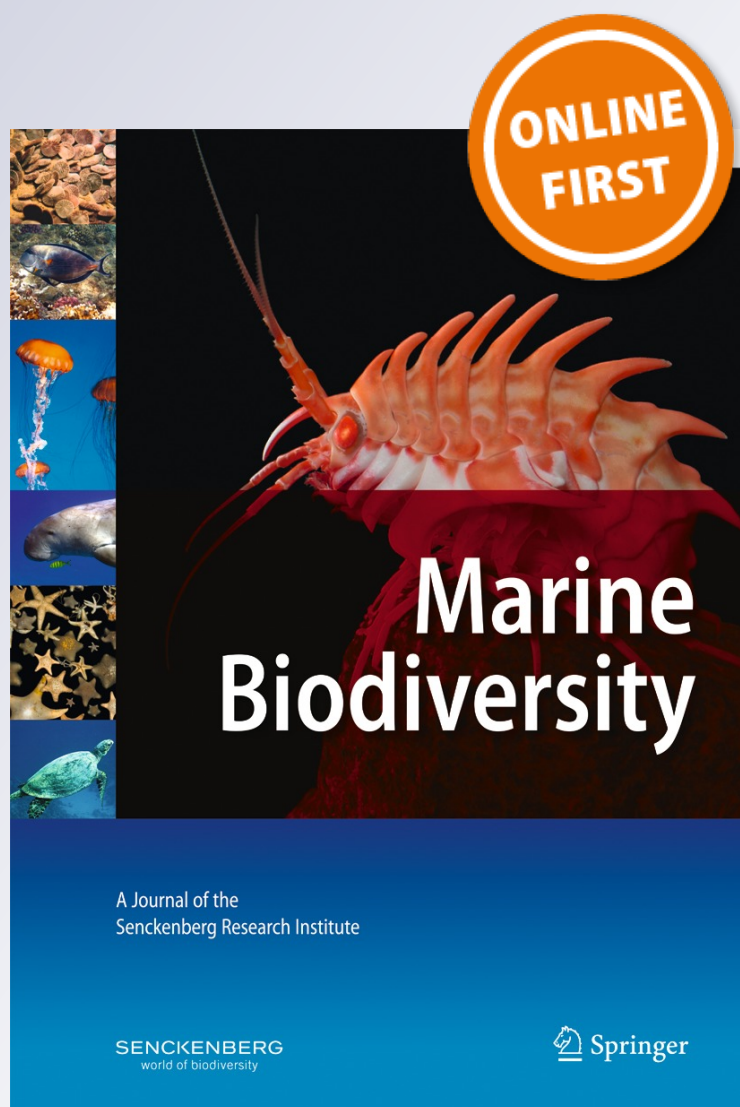
**Jacob Vinu, M. P. Rajeesh Kumar,
K. S. Sumod, K. P. Deepa, M. Hashim,
V. N. Sanjeevan & M. Sudhakar**

Marine Biodiversity

ISSN 1867-1616

Mar Biodiv

DOI 10.1007/s12526-016-0476-3



Your article is protected by copyright and all rights are held exclusively by Senckenberg Gesellschaft für Naturforschung and Springer-Verlag Berlin Heidelberg. This e-offprint is for personal use only and shall not be self-archived in electronic repositories. If you wish to self-archive your article, please use the accepted manuscript version for posting on your own website. You may further deposit the accepted manuscript version in any repository, provided it is only made publicly available 12 months after official publication or later and provided acknowledgement is given to the original source of publication and a link is inserted to the published article on Springer's website. The link must be accompanied by the following text: "The final publication is available at link.springer.com".

SHORT COMMUNICATION

Occurrence of a rare gigantic sized deep-sea cod *Lepidion inosimae* (Günther, 1887) in the Northwestern Indian Ocean

Jacob Vinu¹ · M. P. Rajeeesh Kumar¹ · K. S. Sumod¹ · K. P. Deepa¹ · M. Hashim¹ · V. N. Sanjeevan¹ · M. Sudhakar¹

Received: 3 August 2015 / Revised: 20 February 2016 / Accepted: 11 March 2016
© Senckenberg Gesellschaft für Naturforschung and Springer-Verlag Berlin Heidelberg 2016

Abstract A gigantic sized (total length 800 mm) specimen of *Lepidion inosimae* (Günther, 1887) was collected in a bottom trawl operated at bathyal depth (1330–1360 m) off the Southwest coast of India. The present study discloses the first distribution record of this very rarely reported deep-sea cod from the Northwestern Indian Ocean, with its morphometric and meristic features.

Keywords Gigantic deep-sea cod · *Lepidion inosimae* · Southwest coast of India

Introduction

Lepidion inosimae (Günther, 1887), commonly known as morid-cod, belongs to the family Moridae of the order Gadiformes (Cohen et al. 1990). The genus *Lepidion*, comprising eight nominal species, inhabits benthopelagically on the continental slopes of deep ocean waters (Bañón et al. 2013). Members of this genus are characterized by an elongate first dorsal fin ray, pelvic fins consisting of several fin rays and an emarginate anal fin (Nakaya et al. 1980). *Lepidion inosimae* was originally described under genus *Haloporphyrus* from the waters off Enoshima, in Sagami Bay, Japan (Günther 1887). Distributional records of

L. inosimae are very rare, and all have been restricted to the Western Pacific Region. The present study discloses the known distributional range extension of *L. inosimae* into the northwestern Indian Ocean.

Materials and method

One gigantic sized female specimen of *Lepidion inosimae* was collected during the exploratory deep-sea fishery survey on board *FORV Sagar Sampada* cruise 327, along the Southwest coast of India. The specimen was collected using High Speed Demersal Trawl crustacean version (HSDT-CV), operated off Trivandrum, Southwest coast of India (7°51'N, 76°24'E) at a speed of 2.5 knots along a depth of 1330–1360 m on 26 July 2014.

The specimen was identified as *Lepidion inosimae*, following a comparative key (Norman 1935; Cohen 1986; Cohen et al. 1990) and original description by Günther 1887. Meristic counts and morphometric measurements were taken from the fresh specimen following Nakaya et al. 1980. Meristic counts and morphometric measurements in percentage of the standard length (SL) with a comparison to the holotype (Günther 1887) and syntypes (Nakaya et al. 1980; Paulin 1984) are shown in Table 1.

Results

SYSTEMATICS

Order GADIFORMES

Family MORIDAE

Genus *Lepidion* Swainson, 1838

Lepidion inosimae (Günther, 1887)

Figure 1

Communicated by R. Thiel

✉ Jacob Vinu
vinujacob01@gmail.com

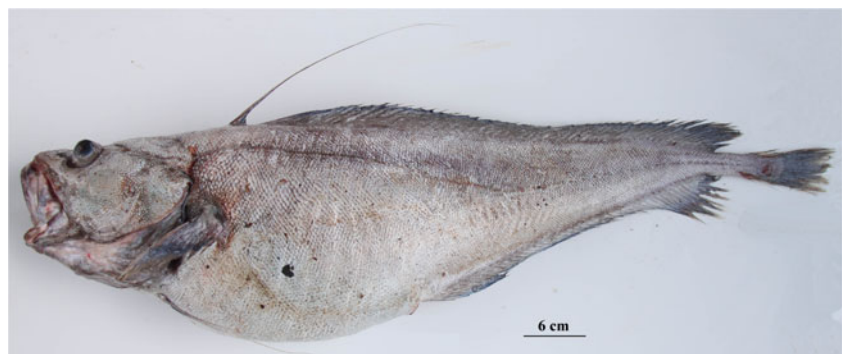
¹ Centre for Marine Living Resources & Ecology (CMLRE) Ministry of Earth Sciences (MoES), Govt. of India, C-Block, 6th Floor, Kendriya Bhavan, CEPZ (PO), Kochi-37, India

Table 1 Comparison of meristic counts and morphometric measurements of *Lepidion inosimae* (Günther, 1887) collected off the Southwest coast of India with type specimens

Meristic counts and morphometric measurements	Present specimen (♀)	Nakaya et al. 1980	Paulin 1984
Total length (mm)	800	465–604	–
Standard Length (mm)	730	424–556	640
Meristic counts			
1st Dorsal fin	1 + 4	1 + 4–5 (5*)	6
2nd Dorsal fin	55	55–58 (60*)	55
Anal fin	51	49–55 (52*)	48
Pectoral rays	22	21–23	22
Pelvic rays	7	7	–
Branchiostegal rays	7	7	–
Gill rakers	5 + 12	5 + 11–12	3 + 10
Pyloric caeca	17		17
Proportional measurements (%SL)			
Head length	22.6	24.5–27.1	24.0
Snout length	7.5	7.0–9.4	6.6
Pre-dorsal length	25.8	24.9–27.2	29.0
Pre-anal length	49.3	44.1–50.5	50.9
Eye diameter	4.1	4.1–4.9	5.0
Inter eye	5.1	5.6–6.8	5.3
Upper jaw length	11.0	11.1–12.4	11.6
Caudal peduncle height	3.4	2.8–3.4	3.2
Barbel length	6.6	–	2.9
1st dorsal height	39.0	–	–
2nd dorsal height	7.5	–	–
Anal fin height	6.8	–	–
Pelvic length	22.6	–	–
Pectoral length	14.8	–	–
2nd dorsal base	63.0	–	–
Anal base	42.5	–	–
Body depth at first dorsal origin	27.4	–	–
Body depth at anal origin	16.4	–	–
Caudal fin length	9.6	–	–

* Holotype

Fig. 1 *Lepidion inosimae* (Günther, 1887) from the southwest coast of India (TL 800 mm, ♀)



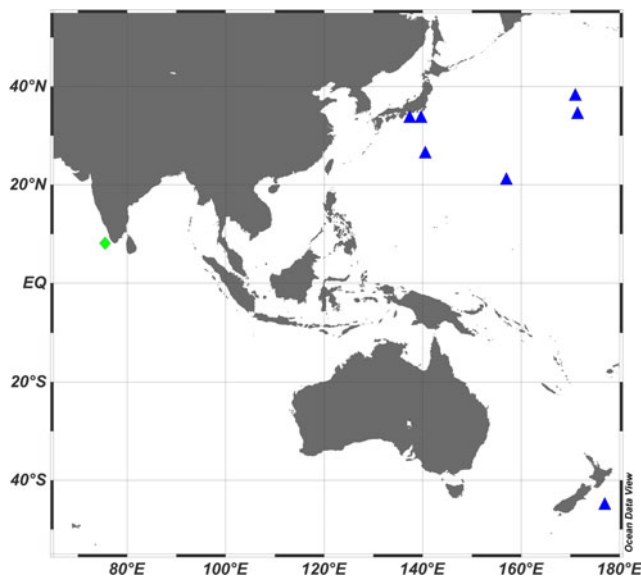


Fig. 2 Known localities of *Lepidion inosimae* (Günther, 1887) in the world oceans (blue triangles), including the present sampling location (green diamond)

Diagnosis

First dorsal fin very much elongated, 1.7 times of head length (HL); snout very short, 3 in (HL), upper margin of eye touching the dorsal profile of the head; posterior nostril immediately anterior to eye; orbit diameter 5.5 in HL; second dorsal fin with 55 rays; anal fin with 51 rays; small, round-shaped vomerine tooth patch.

Description

Body elongate and fusiform, maximum body depth at the origin of dorsal fin, about 3.7 in SL; thereafter tapering towards a very slender caudal peduncle. Head small and depressed, about 4.4 in SL. Mouth terminal and wide, with small villiform teeth on the maxilla and mandibles, upper jaw ends about the center of level of eye; a small round patch of villiform teeth present on the vomer. Nostrils are very close to middle eye level; anterior and posterior nostrils separated by a membranous wall in between. Inter-orbital slightly convex and its distance is 1.2 times orbit diameter. Eye almost touching the dorsal profile of head, its diameter about 5.5 in HL. Barbel on chin is 1.6 times orbit diameter.

First dorsal with five rays, first ray greatly elongate to about 2.6 in SL. Second dorsal fin completely separated from first with 55 rays, outer margin nearly straight, posterior rays somewhat longer than first forming a lobe. Anal fin with 51 rays, outer margin is evenly concave at middle, elongated rays forming a lobe posteriorly. Pectoral fin 1.5 in HL. Pelvic fins slender, outer ray elongated; its length equals HL, jugular in origin. Caudal fin truncate. Lateral line running from the upper part of the gill opening, parallel to the body profile of the body,

curving downward to middle part of trunk, then running almost straight to middle of caudal peduncle. Body fully scaled, including most parts of dorsal and anal fins, outer surface of pectoral and pelvic fins and base of caudal fin; areas around nostrils, jaws and branchiostegal membrane scale less.

Colour: body of fresh specimen appears grayish brown, fin margins are dark grayish and lighten near body.

Distribution (Fig. 2): previous distribution records of *L. inosimae* was restricted in the Western Pacific Region: in temperate waters off Japan; Sagami Bay, Ramapo Bank and Emperor Seamounts (Günther 1887; Nakaya et al. 1980); Southeastern Australia, New Zealand North off Chatham Rise and off New Caledonia (Paulin and Roberts 1997); in tropical waters off Hawaiian Archipelago (Mundy 2005). The present report of *L. inosimae* from the Southwest coast of India indicate a marked extension its range of distribution from the Western Pacific (type localities) to the Western Indian Ocean.

Discussion

Lepidion inosimae (Günther, 1887) has five rays in its first dorsal fin, with a minute ray in front of the elongated second. Later, Tanaka 1927 described a new species *L. oidema*, which differs from *L. inosimae* in having a smaller number of anal fin rays (49 instead of 52) and the absence of a minute ray in front of the elongated second dorsal fin ray. Nakaya et al. (1980) examined both specimens and found that these differences are not significant in this genus, and synonymized *L. oidema* under *L. inosimae*. The present specimen is also lacking the minute ray before the elongated dorsal fin ray. Two species of *Lepidion* are known to be distributed in the Indian Ocean, viz. *L. capensis* Gilchrist, 1922 and *L. natalensis* Gilchrist, 1922. The present specimen of *L. inosimae* differs from *L. capensis* in its possession of smaller eyes (5.5 in HL vs. 2.5–3) and a greater number of anal fin rays (51 vs. 43–49); and from *L. natalensis* in having a shorter snout (1.8 in eye diameter vs. <1). Morphometric features in proportion to the standard length of the present specimen match with the holotype and other known specimens with slight deviation in head length (Table 1). The maximum size of *L. inosimae* reported is up to 640 mm from New Zealand waters (Paulin 1984). The present female specimen of *L. inosimae* (TL 800 mm, weight 6.2 Kg) is the largest of its kind reported elsewhere.

Acknowledgments We would like to express our gratitude to all scientific participants of *FORV Sagar Sampada* Cruise No. 327. We thank all our colleagues and friends in CMLRE for the constant support and encouragement. The suggestions and comments of the anonymous reviewers, which improved the manuscript are gratefully acknowledged.

References

- Bañón R, Arronte JC, Vázquez-Dorado S, Del Río JL, Carlos AD (2013) DNA barcoding of the genus *Lepidion* (Gadiformes: Moridae) with recognition of *Lepidion eques* as a junior synonym of *Lepidion lepidion*. *Mol Ecol Resour* 13(2):189–199
- Cohen DM (1986) Moridae. In: Smith MM, Heemstra PC (eds) *Smiths' sea fishes*. Macmillan, Johannesburg, pp 326–328
- Cohen DM, Inada T, Iwamoto T, Scialabba N (1990) *FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to data*. *FAO Fisheries Synopsis* (125), pp 1–452
- Günther A (1887) Report on the deep-sea fishes collected by H.M.S. *Challenger* during the years 1873–1876. *Zoology* 78:1–47, **Challenger report**
- Mundy BC (2005) Checklist of the fishes of the Hawaiian archipelago. *Bishop Mus Bull Zool* 6:1–703
- Nakaya K, Amaoka K, Abe K (1980) A review of the genus *Lepidion* (Gadiformes, Moridae) from the Northwestern Pacific. *Jpn J Ichthyol* 27:41–47
- Norman JR (1935) *Coast fishes. Part I. The South Atlantic*. *Discov Rep* 12:1–58
- Paulin CD (1984) First record of *Lepidion inosimae* (Günther) and *L. schmidtii* Svetovidov (Pisces: Moridae) from New Zealand. *N Z J Zool* 11(1):59–62
- Paulin CD, Roberts CD (1997) Review of the morid cods (Teleostei, Paracanthopterygii, Moridae) of New Caledonia, southwest Pacific Ocean, with description of a new species of *Gadella*. *Mémoires du Muséum national d'histoire naturelle* 174:17–41