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論説（Article）：オリジナルな研究論文で，内容の主要な部分が学術論文としてほかに印刷発表されていないもの．20ページ以内．

総説（Review）：古生物学のある分野あるいは話題に関する現在までの研究成果を総括したもの．20ページ以内．

短報（Short note）：古生物のコミュニティーにとって有益な，新たな発見，データ，アイデア，実験手法に関する報告．要旨なし．4ページ以内．

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② Abstract アブストラクト（短報：Short notes にはアブストラクトはありません）
③ Keywords キーワード
④ Main text 本文
⑤ Acknowledgments 謝辞（必要に応じて記載してください）
⑥ References 引用文献
⑦ Author contributions 著者の貢献（共著論文の場合）
⑧ Figure and Table captions （図と表の説明）
⑨ Appendix 追記

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・カバーページには以下を記載してください．(1) タイトル，(2) 全著者の氏名および所属先，(3) 査読結果や校正の送り先となる著者の連絡先（住所，電話・ファックス番号，E-mail address），(4) Running title（右ページ上に書かれる短縮したタイトル，40文字以内）を記載して下さい．
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Introduction
Material and methods
Results
Discussion
(Conclusions)

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Introduction
Geological setting (Stratigraphy)
Systematic description
Discussion
(Conclusions)

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例：
This species was described by Kobayashi (1950).
This character was discovered by Kobayashi (1950; p. 120).
This species is also found from Hokkaido (Yabe, 1940; Kobayashi, 1950; Makiyama, 1955).

3-5. Acknowledgments　謝辞

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例

Ager, D. V., 1963: *Principles of Paleoecology*, 371 p. McGraw-Hill Co., New York.

Barron, J. A., 1983: Latest Oligocene through early Middle Miocene diatom biostratigraphy of the eastern tropical Pacific. *Marine Micropaleontology*, vol. 7, p. 487–515.

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3-8. Figure and Table captions

論文に用いる図と表の説明を順に行ってくださ
い.

3-9. Appendix　追記

長大なデータ（多数の計測データや分岐分類に用いる形質のデータ行列など）等は，論文最後にAppendixとして入れてください.

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以下に投稿のご参考のため，論文のサンプルを示します．実際の論文から主要な部分のみ抜き出してあります．また行も詰めて表示しています.

カバーシート

***Ikiculter chojabaruensis*, a new genus and species of cyprinid fish from the Miocene of Iki Island, Nagasaki, Japan**

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Running title: New Miocene cyprinid fish from Japan

We declare that none of the material in this manuscript has been published or is under consideration for publication elsewhere.

以下，本文（カバーシートからページを改めて始めてください）

***Aaaaaa bbbbbb*, a new genus and species of cyprinid fish from the Miocene of Iki Island, Nagasaki, Japan**

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Abstract. ***Aaaaaa bbbbbb*** **is described on the basis of three specimens from the Miocene of Iki Island, Nagasaki, Japan, as a new genus and species of the family Cyprinidae. This new species possesses an elongate body, modified first unbranched fin ray of dorsal fin, extremely stout third dorsal spine like fin ray with smooth posterior edge, apart tips of deeply forked basipterygium with a dorsal wing, elongated pterotic, smooth surface of opercle, large third vertebra twice as large as second one, 13 branched anal fin rays and 21 abdominal and 20 caudal vertebrae. A phylogenetic study using the character matrix of previous study suggests that the species is related to leuciscins + phoxinins, *Ecocarpia*, *Iquius*, xenocyprinins and cultins and is probably a sister taxon to a clade of *Iquius* + xenocyprinins and cultrins. There was an extinct group closely related cultrins and xenocyprinins in Miocene East Asia.**

ZooBank registration: urn:lsid:zoobank.org:pub************

Keywords: Cyprinidae, *Aaaaaa bbbbbb*, Iki Island, Japan, Miocene, phylogenetic analysis.

Introduction

Fossil fishes from Iki Island in Nagasaki Prefecture are representatives of the Miocene freshwater fishes in Japan. The fossils were found in diatomite beds of the Early to Middle Miocene Chojabaru Formation in the Iki Group. The fish fauna consists of eight or nine species of cyprinids, two species of percoids, one bagrid, two gobiids, and one mastacembelid (Hayashi, 1975). Jordan (1919) described *Iquius nipponicus* as the first fossil fish from Japan and placed it provisionally in the herring family Clupeidae, although he recognized its resemblance to cyprinids. It is distinct and a valid genus and closely related to cultrins and xenocyprinins of the family Cyprinidae (Yabumoto and Sakamoto, 2010). From the same beds, Watanabe and Uyeno (1999) described a bagrid fish, *Pseudobagrus ikiensis* that is close to *P. fulvidraco* widely distributed in China, Siberia and the Korean Penisula and *P. nudiceps* distributed in Japan and Yabumoto and Uyeno (2009) described a percoid fish, *Coreoperca maruoi* that is close to *C. kawamebari* distributed in the western part of Japan and the southern end of the Korean Penisula. The fish founa of the Chojabaru Formation is significant for understanding freshwater fishes in the Miocene and the origin of extant freshwater

fish fauna in East Asia. In the present study, a new genus of cyprinids from the Chojabaru Formation is described and the origins of cultrin and xenocyprinin fishes are discussed.

Methods

Preparation.—Any remains of bones were removed from the specimens with a needle under a microscope. The bone impressions of fossils were then coated with a very thin synthetic resin, surrounded with a low clay wall. Latex was poured onto the fossil impression in a vacuum. The latex was allowed to dry for about an hour and then the latex was peeled off from the fossil. The latex cast was scanned and drawn on a personal computer and observed under a microscope.

Counts and Measurements.—Standard length measurements were made from the estimated tip of the snout to the posterior end of the hypural along the midline of the body. Body depth measurements were made at the origin of dorsal fin. Head length measurements were made from the estimated tip of the snout to the posterior end of the opercle along the midline of the body. Fin ray counts were made according to Chen (1998) and vertebral counts were made according to Uyeno (1984).

Osteological Terminology.—Names of skull bones and the anterior part of vertebrae follow Britz. and Conway (2009), Chen *et al*. (1984), Dahdul, *et al*. (2010) and Harrington (1955), and caudal bones follow Fujita (1999).

Systematic description

Order Cypriniformes Bleeker, 1859

Family Cyprinidae Cuvier, 1817

Aaaaaa gen. nov.

ZooBank lsid: urn:lsid:zoobank.org:act:********

Type species.—Aaaaaa bbbbbb sp. nov.

Etymology.—Iki, after the name of the island that contains the Chojabaru Formation, *culter*, generic name of cyprinid fish, knife and plowshare in Latin.

Diagnosis.—Same as for type species.

Aaaaaa bbbbbb sp. nov.

ZooBank lsid: urn:lsid:zoobank.org:act:********

Diagnosis.—A member of the Cyrprinidae distinguished by the following combination of characters: body elongate, standard length 4.5 to 4.6 times body depth and 3.6 to 4.2 times head length; large eye, head length 3.4 to 4.2 times orbital diameter; apart tips of deeply forked basipterygium with a dorsal wing, the pterotic elongated, smooth surface of the opercle, unbranched and unsegmented first three dorsal fin rays, the first one vestigial, the third one extremely stout and spine-like with smooth posterior margin; seven supraneurals between dorsal fin and supraneural 3 bone, supraneural 4 bone largest with an anterior extended wing; first proximal pterygiophore of dorsal fin large bony plate with stout struts along anterior, posterior and dorsal margins and weak

strut between anterior and posterior struts; anal fin with three unbranched and 13 branched rays; the most dorsal principal caudal fin ray branched; third vertebra almost twice of second one in length; and 21 abdominal and 20 caudal vertebrae.

Material.—Holotype, KMNH (Kitakyushu Museum of Natural History and Human History) VP *********, a nearly complete specimen, estimated 109 mm in standard length (SL). Paratype, KMNH VP *********, a nearly complete specimen, the middle part of the body at the origin of dorsal fin and the posterior part of the caudal fin missing, estimated 90 mm SL; KMNH VP 100,266, anterior part of the body.

Locality and horizon.—All specimens were discovered from the rock belonging to the Middle Miocene Chojabaru Formation (15.3 Ma: personal communication from Kimura in Watanabe and Uyeno, 1999) in the Iki Group. Diatomite at Hachiman, Ashibe, Iki Island, Nagasaki Prefecture, Japan.

Etymology.—chojabaru after the locality of the type specimens and the name of the formation.

Description of holotype.—The body is slender, the standard length 4.6 times the body depth and 4.2 times the head length. The eye is large, the head length 3.4 times the orbital diameter (Figure 1).

Skull. The dorsal part of the lateral ethmoid is thick with the v-shaped concavity on the lateral side. The preethmoid and vomer are not clearly visible. The frontal is a large, elongate bone that forms the dorsal roof of the orbit. There are five openings of the sensory canal. The parietal is almost square in shape. The pterotic is long with a bony tube for the postorbital sensory canal. The anterior end of the bone extends over the posterior border of the orbit. The parasphenoid is preserved, but the anterior part is obscure (Figure 2).

Infraorbital bones. The first infraorbital (= lachrymal by Harrington, 1955) is a large flat bone, composed of a middle bony tube for the infraorbital sensory canal with flanges extending on either side. The second infraorbital is slightly shorter than the third and fourth infraorbitals, which are almost of equal size. The sensory canal runs along the dorsal margin of the second and third infraorbitals, and the middle of the fourth one. The fifth infraorbital is short, only nearly one-thirds of the fourth one (Figure 2).

—— Systematic description 以下略 ——

Discussion

This new genus and species, *Aaaaaa bbbbbb*, is a member of the family Cyprinidae because of toothless jaws, the short anteriorly curved ribs of the fourth vertebra; three branchiostegal rays; having the upper jaw bordered only by the premaxilla; presence of an opercular canal; and the structure of the caudal skeleton (see Cavender and Coburn, 1992; Chen *et al.*, 1984; Nelson, 2006). Although there are many systematic and phylogenetic studies on the family Cyprinidae, there is no consensus on the interrelationships of the family among ichthyologists and different researchers have been holding different views on the subdivision of subfamilies and generic

composition of each subfamily (Chen *et al.*, 2005).

To date there have been few studies of morphological phylogenetic analyses of the family utilizing cladistic methods. The most recent morphological phylogenetic analysis of relationships in the family Cyprinidae is that of Yabumoto and Sakamoto (2010). This data matrix was based on the matrix of Cavender and Coburn (1992), which relied heavily on the 25 characters for the Asiatic cyprinids used by Chen *et al.* (1984), with correction of the coding of their character 28 by Chen *et al.* (2005) following the description of *Ecocarpia ningmingensis* Chen, Fang and Chang 2005 from the mid-Tertiary of the Ningming Basin, Guangxi Zhuang Autonomous Region, China.

—— Discussion 以下略 ——

Acknowledgments

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Figure and Table captions.（新たなページで始めてください）

Figure 1. *Aaaaaa bbbbbb* gen. *et* sp. nov. **A.** photo of holotype. KMNH VP *********. **B.** latex peel of A. **C.** line drawing of B. Abbreviations: EPN, epineural; EPP, epipleural; LL, lateral line scales.

Figure 2. *Aaaaaa bbbbbb* gen. *et* sp. nov., holotype, KMNH VP *********. **A.** latex peel of the head. **B.** line drawing of A. Abbreviations: ANG, angular-articular; BAH, basihyal; BRA, branchiostegal rays; CHY, anterior ceratohyal; CLE, cleithrum; CRA, coracoid; DEN, dentary; EPN, epineural; ETH LAT, lateral ethmoid; FRO, frontal; HYO, hyomandibular; INO, interopercle; IO1, first infraorbital; IO2, 2nd infraorbital; IO3, 3rd infraorbital; IO4, 4th infraorbital; IO5, 5th infraorbital; LHYPH, lower hypohal; MAX, maxilla; MET, metapterygoid; NP3, lateral process of the 3rd neural arch; NPZ, neural prezygaphophysis; OOS, outer arm of the os suspensorium; OPE, opercle; P1, pectoral fin; PAL, autopalatine; PAR, parietal; PARA, parasphenoid; POP, preopercle; PREM, premaxilla; PTO, pterotic; Q, quadrate; R5, fifth rib; RET, retroarticular; RD, radial; SC, scapula; SO, supraorbital; SPN3, supraneural 3 bone; SPN4, supraneural 4 bone; SRPE, supraethmoid; TRI, tripus; UH, urohyal; UHYPH, upper hypohyal.

Figure 3. Dorsal fin of *Aaaaaa bbbbbb* gen. *et* sp. nov., holotype, KMNH VP *********. Arrow indicates the vestigial first dorsal fin ray.

Figure 4. *Aaaaaa bbbbbb* gen. *et* sp. nov., holotype, KMNH VP *********. **A.** latex peel of the pelvic fin and basipterygium. **B.** line drawing of A.

Figure 5. *Aaaaaa bbbbbb* gen. *et* sp. nov., holotype, KMNH VP *********. **A.** latex peel of the caudal skeleton and fin. **B.** line drawing of A. Arrows indicate longest fin rays of upper and lower lobes of caudal fin. These fin rays are usually unbranched, but the fin ray of the upper lobe is branched and the one of the lower lobe is branched at the middle part in this species. Abbreviations: EPN, epineural; EPP, epipleural; EPU, epural; HPU2, haemal spine of second preural centrum; HYU1, first hypural; HYU2, second hypural; HYU5, fifth hypural; NPU1, neural spine of first preural centrum; PARH, parhypural; PL, pleurostyle; PP, hypurapophysis; PU1, first preuralcentrum; PU2, second preuralcentrum; U1, first ural vertebra; UN2, second uroneural.

Figure 6. *Aaaaaa bbbbbb* gen. *et* sp. nov. **A.** latex peel of paratype, KMNH VP *********. **B.** line drawing of A. Abbreviation: EPN, epineural; EPP, epipleural; LL, lateral line scales.

Figure 7. *Aaaaaa bbbbbb* gen. *et* sp. nov., paratype, KMNH VP *********. **A.** latex peel of head. **B.** line drawing of A. Abbreviations: ANG, angular-articular; BRA, branchiostegal rays;

CHY, anterior ceratohyal; CLE, cleithrum; CRA, coracoid; DEN, dentary; ETH, ethmoid; ETH LAT, lateral ethmoid; EPN, epineural; FRO, frontal; HYO, hyomandibular; INO, interopercle; IO1, first infraorbital; IO3, 3rd infraorbital; MAX, maxilla; MET, metapterygoid; OOS, outer arm of the os suspensorium; OPE, opercle; PAL, autopalatine; PAR, parietal; PARA, parasphenoid; PCL, postcleithrum; POP, preopercle; PREM, premaxilla; PT, posttemporal; PTO, pterotic; Q, quadrate; R5, fifth rib; RET, retroarticular; SC, scapula; SO, supraorbital; SNP3, supraneural 3 bone; SPN4, supraneural 4 bone; SRPE, supraethmoid; SUPC, supracleithrum; UHYPH, upper hypohyal.

Figure 8. *Aaaaaa bbbbbb*. **A.** latex peel of paratype, KMNH VP *********. **B.** line drawing of A. Abbreviations: BAH, basihyal; BAP, basipterygium; CB5, ceratobranchial 5 (= pharyngeal bone by Harrington, 1995); CRA, coracoid; DEN, dentary; EPN, epineural; FRO, frontal; MAX, maxilla; NPZ, neural prezygaphophysis; OOS, outer arm of the os suspensorium; OPE, opercle; PAR, parietal; PREM, premaxilla; PTO, pterotic; Q, quadrate; R5, fifth rib; SO, supraorbital; SPN4, supraneural 4 bone; SYM, symplectic.

Figure 9. A. One of the ten equally parsimonious cladograms under the branch-and-band search option (TBR). Numbers at the right of branches are apomorphic states of each clade. **B.** Strict consensus cladogram resulting from of the equally parsimonious cladograms. **C.** 50% majority-rule consensus cladogram of 10 equally most parsimonious cladograms.

Table 1. Comparison of fossil cyprinid fishes from China and *Ikiculter chojabaruensis* gen. *et* sp. nov.