Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 15 (3): 523–526
https://doi.org/10.15560/15.3.523

PENSOFT

New record of the hydrothermal vent-endemic polychaete *Archinome jasoni* Borda et al., 2013 (Annelida, Amphinomidae) from the Northwest Pacific

Naoto Jimi[1], Chong Chen[2], Hiroshi Kajihara[3]

1 Bioscience group, National Institute of Polar Research, 10-3 Midoricho, Tachikawa, Tokyo, 190-8518, Japan. **2** X-STAR, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), 2-15 Natsushima-cho, Yokosuka, Kanagawa, 237-0061, Japan. **3** Faculty of Science, Hokkaido University, Kita 10 Nishi 8 Kitaku, Sapporo, Hokkaido, 060-0810, Japan.
Corresponding author: Naoto Jimi, beniimo7010@gmail.com

Abstract
The hydrothermal vent-endemic polychaete *Archinome jasoni* Borda et al., 2013 is known from the Atlantic, Indian, and Southwest Pacific oceans. In this study, we report *A. jasoni* from Okinawa Trough, Japan, which represents the first record of this species and the genus from the Northwest Pacific. We determined 16S and 28S rRNA gene sequences from 1 of the 7 specimens collected. We compared our Northwest Pacific specimens to specimens from the Southwest Pacific, Atlantic, and Indian oceans, and our specimen was genetically most closely related to individuals from the Southwest Pacific.

Keywords
Amphinomida, deep sea, Okinawa Trough, Polychaeta.

Academic editor: Sergio N. Stampar | Received 23 February 2019 | Accepted 13 June 2019 | Published 28 June 2019

Citation: Jimi N, Chen C, Kajihara H (2019) New record of the hydrothermal vent-endemic polychaete *Archinome jasoni* Borda et al., 2013 (Annelida, Amphinomidae) from the Northwest Pacific. Check List 15 (3): 523–526. https://doi.org/10.15560/15.3.523

Introduction

The amphinomid annelid genus *Archinome* Kudenov, 1991 consists of 5 species, all of which are known from deep-sea hydrothermal vent and hydrocarbon seep areas (Borda et al. 2013). Members of the genus are distributed worldwide, and 1 species, *Archinome jasoni* Borda et al., 2013, was originally described from hydrothermal vents across the Atlantic, Indian, and the Southwest Pacific oceans (Borda et al. 2013). The species was originally described by Borda et al. (2013) based on DNA sequence data.

Our specimens of *Archinome* were collected from deep-sea hydrothermal vents in the Okinawa Trough, Northwest Pacific. Based on morphological and molecular examinations, we identify the specimens as *A. jasoni*.

Methods

Worms were collected by a suction sampler installed on the remotely operated vehicle (ROV) *Hyper-Dolphin* on-board R/V *NATSUSHIMA* (cruise NT15-13) and ROV *KAIKO* (with vehicle *Mk-IV*) on-board R/V *KAIREI* (cruises KR15-16 and KR15-17) from hydrothermal

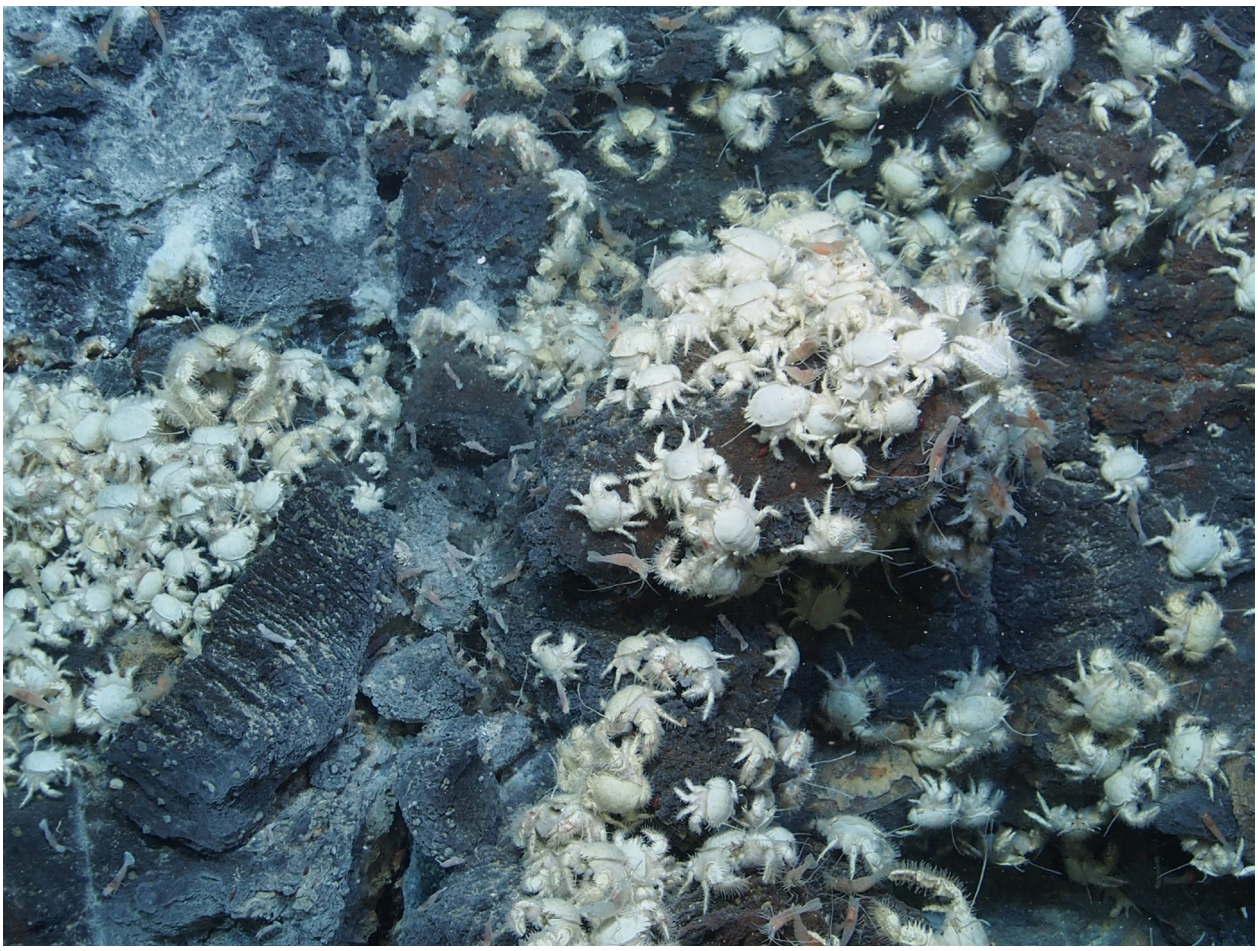

Figure 1. *In situ* observation of the hydrothermal vent community at Sakai Field.

vents in the Sakai hydrothermal field, Okinawa Trough (Nakamura et al. 2015) (Fig. 1). All sampling events were carried out under the Japanese law (no permit number required). Live specimens were fixed in either 70% or 99.5% ethanol im mediately upon recovery of the samples on the research vessel. Preserved specimens were observed with a Nikon SMZ1500 stereomicroscope and an Olympus BX51 compound microscope. All specimens (7 individuals) were deposited in Invertebrate Collection of Hokkaido University Museum (ICHUM). DNA extraction, PCR amplification, and sequencing of the 16S and 28S rRNA genes were carried out following the method of Jimi and Fujiwara (2016). Newly obtained sequences (determined from 1 specimen, ICHUM 5841) were deposited in the DNA Data Bank of Japan (DDBJ). A phylogenetic tree based on 16S sequences was constructed based on maximum likelihood (ML) method by MEGA v. 7 (Kumar et al. 2016). The robustness of the ML tree was evaluated by 1000 bootstrap pseudo-replicates. In addition to newly obtained sequences, existing 16S sequences for the phylogenetic analysis were obtained from GenBank (JX027999, JX028030–35, JX028038, JX028039, JX028047, JX028050, JX028051). Pairwise genetic distances were calculated on the basis of the 16S sequences using the uncorrected *p*-distance by MEGA v. 7. Species identification of the GenBank sequences follows Borda et al. (2013).

Results

Order Amphinomida Lamarck, 1818
Family Amphinomidae Lamarck, 1818
Genus *Archinome* Kudenov, 1991

***Archinome jasoni* Borda et al., 2013**
Figure 2
New Japanese name: nessui-umikemushi,
ネッスイウミケムシ
Archinome jasoni Borda et al. 2013: 1–9, figs 2, 3.

New records. Japan: off Okinawa Island, ROV *Hyper-Dolphin* dive #1860 (27°31.025′N, 126°58.866′E; 1565 m in depth), Chong Chen, 01 Aug. 2015 (3 specimens, sex unknown, ICHUM 5841). Japan: off Okinawa Island, ROV *KAIKO* dive #671 (26°33.4207′N, 126°15.5114′E; 1486 m in depth), Chong Chen, 2 Nov. 2015 (2 specimens, sex unknown, ICHUM 5842). Japan: off Okinawa Island, ROV *KAIKO* dive #676 (27°31.0134′N, 126°58.9595′E; 1559 m in depth), Chong Chen, 13 Nov. 2015 (2 specimens, sex unknown, ICHUM 5843).

Identification. Body short, fusiform, 7–13 mm long, 3–5 mm wide, with mid-ventral groove, 22 chaetigers, metallic blue in life (Fig. 2A), whitish after preservation (Fig. 2B). Body surface smooth. Prostomium triangular; 2 pairs of eyes visible when alive but not seen in ethanol.

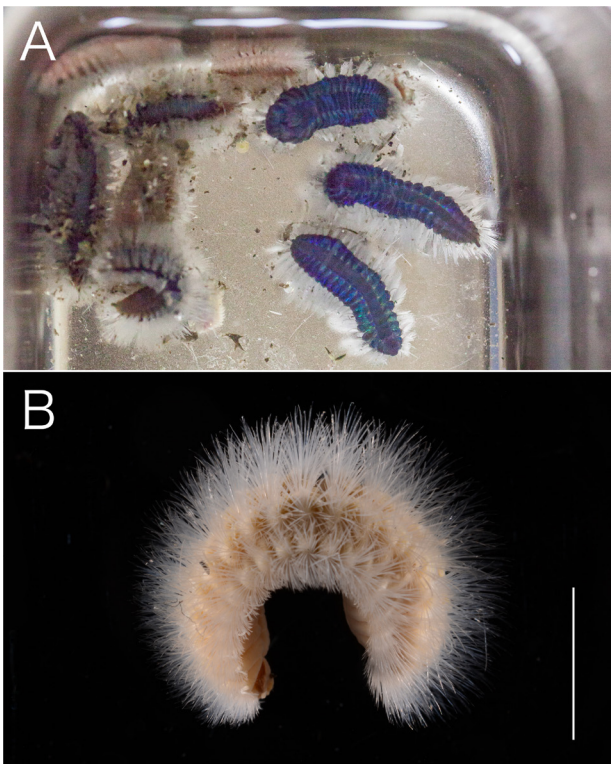

Figure 2. *Archinome jasoni* (ICHUM 5841). **A.** Live specimens. **B.** Preserved specimen, lateral view. Scale bar for B = 5 mm.

Pairs of antennae and palps present, conical; frontal antenna as long as palp. One median antenna present, arising from anterior part of caruncle, conical, very short. Caruncle narrow, elongated and trilobed, fused to body in chaetiger 2; posterior part of caruncle unattached. Segmental lobes large, laterally bursiform. Parapodia biramous; noto- and neuropodia well separated. Two dorsal cirri occur on notopodium and single ventral cirrus occurs on neuropodium, conical, whitish in ethanol. Branchiae present in chaetiger 3 and succeeding posterior chaetigers, branched from base. Noto- and neurochaetae bifurcate. Anus dorsally on one of posterior chaetigers. Pygidium with unpaired median cirrus. DDBJ LC46626 (16S, 447 bp, 1 sequence); LC466627 (28S, 832 bp, 1 sequence), determined from 1 of the specimens (ICHUM 5841).

Morphological features and sequences of the present material are consistent with those given in the original description of *A. jasoni* in Borda et al. (2013).

Discussion

In the resulting tree based on 16S sequences, specimens from the Northwest Pacific and Southwest Pacific formed a clade (BS: 72 %) (Fig. 3). They differed by a mere 0–0.005% in terms of the uncorrected *p*-distance. The value is included in intraspecific variation of *Archinome* species (Borda et al. 2013). In 28S, the sequences did not show any intraspecific variation (data not shown). *Archinome jasoni* has been known previously from a wide range of localities across the Atlantic, Indian, and Southwest Pacific oceans (Borda et al. 2013). Our study represents the first record of the species and genus from the Northwest Pacific. Hutchings and Kupriyanova (2018) speculated that deep ocean currents are responsible for moving larvae between ocean basins in deep-sea polychaete species showing a "cosmopolitan" distribution. The genetic connectivity between the northwestern and southwestern Pacific populations of *A. jasoni* (Fig. 3) corroborates Hutchings and Kupriyanova's (2018) speculation.

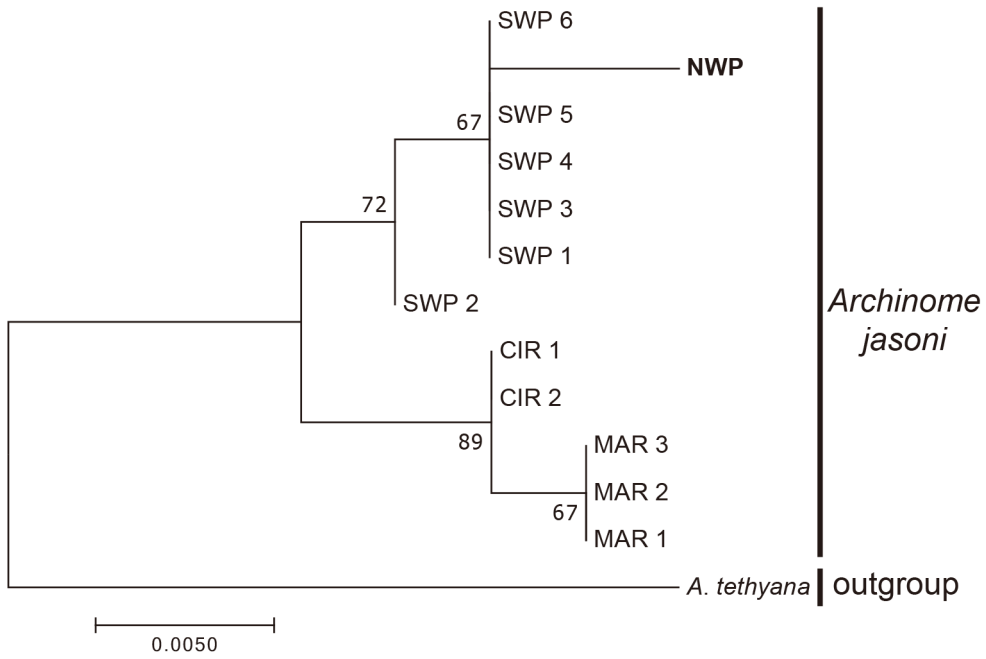

Figure 3. Phylogenetic tree of *Archinome jasoni* based on 16S rRNA gene sequences. *Archinome tethyana* was used as an outgroup. Numbers indicate bootstrap nodal support values. Abbreviations: NWP, Northwest Pacific; SWP, Southwest Pacific; CIR, Central Indian Ridge; MAR, Mid-Atlantic Ridge.

Acknowledgements

We thank the captain and crew of the R/Vs *NATSUSHIMA* and *KAIREI*, the operation teams of the ROVs *Hyper-Dolphin*, ROV *KAIKO*, and the scientific team of the research cruises NT15-13 (PI: Ken Takai, JAMSTEC), KR15-16 (PI: Junichi Miyazaki, JAMSTEC), and KR15-17 (PI: Hiroyuki Yamamoto, JAMSTEC). The research cruises KR15-16 and KR15-17 were supported by Council for Science, Technology, and Innovation (CSTI) as the Cross Ministerial Strategic Innovation Promotion Program (SIP), Next-generation Technology for Ocean Resource Exploration. This study was partly supported by JSPS KAKENHI No. 17J05066 and No. 18K06401.

Authors' Contributions

NJ designed the study and drafted the manuscript. NJ conducted the morphological analysis and performed the molecular experiments. CC collected the samples. CC and HK contributed to and improved the manuscript. All authors read and approved the final manuscript.

References

Borda E, Kudenov JD, Chevaldonné P, Blake JA, Desbruyères D, Fabri M-C, Hourdez S, Pleijel F, Shank TM, Wilson NG, Schulze A, Rouse GW (2013) Cryptic species of *Archinome* (Annelida: Amphinomida) from vents and seeps. Proceedings of the Royal Society B 280 (1770): 20131876. https://doi.org/10.1098/rspb.2013.1876

Hutchings P, Kupriyanova E (2018) Cosmopolitan polychaetes—fact or fiction? Personal and historical perspective. Invertebrate Systematics 32 (1): 1–9. https://doi.org/10.1071/IS17035

Jimi N, Fujiwara Y (2016) New species of *Trophoniella* from Shimoda, Japan (Annelida, Flabelligeridae). ZooKeys 614 (1): 1–13. https://doi.org/10.3897/zookeys.614.8346

Kudenov JD (1991) A new family and genus of the order Amphinomida (Polychaeta) from the Galapagos hydrothermal vents. Ophelia supplement 5: 111–120.

Kumer S, Stecher G, Tamura K (2016) MEGA7: Molecular Evolutionary Genetics Analysis version 7.0 for bigger datasets. Molecular Biology and Evolution 33 (7): 1870–1874. https://doi.org/10.1093/molbev/msw054

Nakamura K, Kawagucci S, Kitada K, Kumagai H, Takai K, Okino K (2015) Water column imaging with multibeam echo-sounding in the mid-Okinawa Trough: Implications for distribution of deep-sea hydrothermal vent sites and the cause of acoustic water column anomaly. Geochemical Journal 49 (6): 579–596. https://doi.org/10.2343/geochemj.2.0387