ASED http://e-ASED.org
Animal Systematics, Evolution and Diversity

Anim. Syst. Evol. Divers. Vol. 37, No. 3: 235-241, July 2021
https://doi.org/10.5635/ASED.2021.37.3.020

Short communication

DNA Barcoding of Benthic Ragworms of the Genus *Nectoneanthes* (Polychaeta: Nereididae) Collected in Korean Waters

Taeseo Park

National institute of Biological Resources, Incheon 22689, Korea

ABSTRACT

To provide better taxonomic information of the genus *Nectoneanthes*, the two DNA barcode regions of mitochondrial cytochrome c oxidase subunit I (*COI*) and 16S ribosomal DNA (rDNA) sequences of *Nectoneanthes oxypoda* and *N. uchiwa* were determined. In addition, the respective sequences of four nereidid species closely related to *Nectoneanthes* were retrieved from GenBank for comparison and to estimate intra- and inter-specific genetic distances. The aligned sequence lengths of *COI* and 16S rDNA were 570 bp and 419 bp long, respectively. The mean intraspecific variation in both markers was less than 1% in all species except for that in *COI* of *H. diadroma* (1.87%). The mean interspecific variation between *N. oxypoda* and *N. uchiwa* was 12.02% regarding *COI* and 1.85% regarding 16S rDNA. In contrast, the mean interspecific variation between species of other genera was comparably higher (i.e., genus *Perinereis*: 20.5% in *COI* and 8.3% in 16S rDNA; genus *Hediste*: 13.18% in *COI* and 2.64% in 16S rDNA), compared with that between the two *Nectoneanthes* species. This result indicated that these *Nectoneanthes* species are genetically more closely related than other congeneric species of different genera. The DNA barcoding information on *Nectoneanthes* species generated in this study provides valuable insights for further biodiversity studies on nereidid species.

Keywords: Nereididae, *Nectoneanthes*, *COI*, 16S rDNA, DNA barcode

INTRODUCTION

The genus *Nectoneanthes* Imajima, 1972, belonging to the family Nereididae de Blainville, 1818, currently comprises two species, *N. oxypoda* (Marenzeller, 1879) and *N. uchiwa* Sato, 2013. These species inhabit the sandy or muddy bottom of intertidal and subtidal areas; *N. oxypoda* is widely distributed in the Indo-Pacific region, including East Asian coasts (China, Japan, and Korea), whereas *N. uchiwa* occurs more sparsely along the East Asian coast (China, Japan, Korea, and Taiwan) (Sato, 2013; Hsueh, 2018). The taxonomic history of the genus *Nectoneanthes* is complicated. Imajima (1972) established this genus based on *Nereis* (*Alitta*) *oxypoda* Marenzeller, 1879 (the type species) and *Nereis ijimai* Izuka (1912), with their characteristics of enlarged notopodia and lack of falcigers. According to the subsequent taxonomic treatment of its type species, *Nectoneanthes* was previously considered a junior synonym of *Neanthes* Kinberg, 1865 and *Alitta* Kinberg, 1865 by Wilson (1988), and Bakken and Wilson (2005), respectively. Thereafter, the genus *Nectoneanthes* was re-established by Sato (2013) based on clearly distinguishable characteristics such as the shape of parapodia and composition of chaetae in *Neanthes* and *Alitta*. Sato (2013) also revised several nominal species previously referred to as *Nectoneanthes*, and only two species, *N. oxypoda* and *N. uchiwa* (Fig. 1), were considered valid. In Korea, these two species had been misidentified as *N. latipoda* and *N. oxypoda* in the earliest taxonomic studies (Paik, 1972, 1973), and they are currently referred to as *N. oxypoda* and *N. uchiwa*, respectively (see Sato, 2013).

In recent taxonomic studies, DNA sequences of the mitochondrial cytochrome c oxidase subunit I (*COI*) and 16S ribosomal DNA (rDNA) regions have been used for DNA barcoding to facilitate reliable species discrimination among closely related nereidids, in addition to morphological analyses (Park and Kim, 2017; Tosuji et al., 2019; Sampieri et al., 2021;

*To whom correspondence should be addressed
Tel: 82-32-590-7083, Fax: 82-32-590-7223
E-mail: polychaeta@gmail.com

eISSN 2234-8190

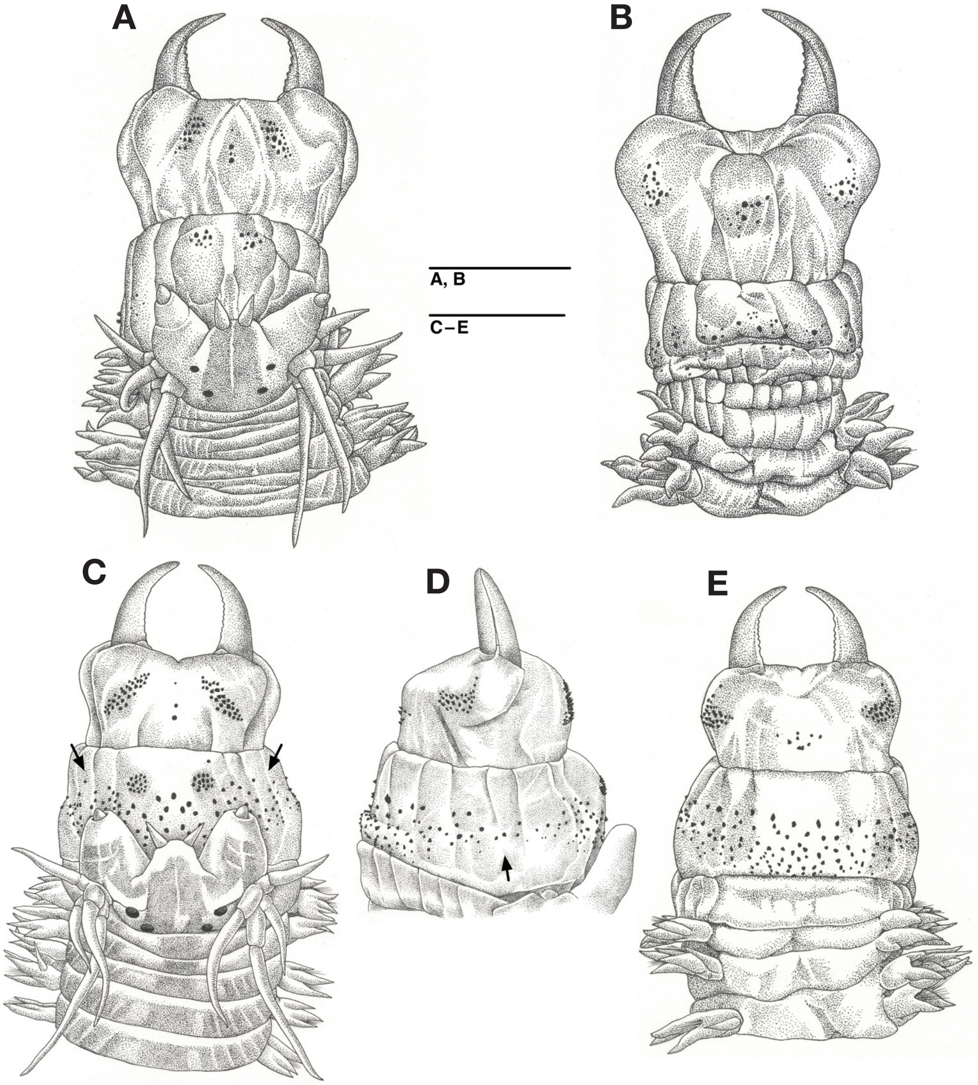

Fig. 1. *Nectoneanthes oxypoda* (Marenzeller, 1879) and *N. uchiwa* Sato, 2013. A, B, *N. oxypoda*: dorsal and ventral views of the anterior end with the protruded proboscis (NIBRIV0000787923). C–E, *N. uchiwa*: dorsal, lateral, and ventral views of the anterior end with the protruded proboscis (NIBRIV0000787900). Arrows indicate continuous paragnaths in the oral ring. Scale bars: A, B=5 mm, C–E=2 mm.

Villalobos-Guerrero et al., 2021). However, DNA barcoding information is still poor for species identification of nereidid species. Thus, the two DNA barcode regions of *COI* and 16S rDNA of *Nectoneanthes* species were determined based on specimens collected on the coast of Korea. In addition, morphological observations of the two species were made, and illustrations are provided herein.

SYSTEMATIC ACCOUNTS

Order Phyllodocida Dales, 1962

Family Nereididae de Blainville, 1818

Genus *Nectoneanthes* Imajima, 1972

***Nectoneanthes oxypoda* (Marenzeller, 1879) (Fig. 1A, B)**

Nereis (*Alitta*) *oxypoda* Marenzeller, 1879: 120–122, Pl. 2, fig. 3.

Nectoneanthes latipoda Paik, 1973: 81–84, figs. 1a–j, 2; Lee et al., 2003: 191; Choi et al., 2005: 387.

Nectoneanthes oxypoda: Sato, 2013: 4–24, figs. 1, 2, 3A–C, 4A, 5–8.

(see Sato, 2013 for full synonymy)

Material examined. Korea: 1 ind., intertidal mud flat, Jeollanam-do: Goheung-gun, Podu-myeon, Ochwi-ri, Chwido Island, 34°33′54″N, 127°24′16″E, 28 Apr 2013, Hong SS, Kim SH, NIBRIV0000787923; 1 ind., Gyeongsangnam-do: Geoje-si, Irun-myeon, Gujora-ri, intertidal mud flat, 34°48′34″N, 128°40′59″E, 24 May 2015, Park T, NIBRIV0000829796; 1 ind., Incheon-si: Ongjin-gun, Daecheong-myeon, 12 m depth, subtidal soft bottom, 37°49′23″N, 124°43′23″E, 16 May 2017, Park T, Kim KS, NIBRIV0000787898.

Diagnosis. Paragnaths present in all areas; relatively small number of paragnaths present in the maxillary ring (areas II, IV), compared with *N. uchiwa*; two or three rows of transverse paragnath band present in areas VII–VIII, paragnaths in distal single row relatively larger than proximal ones; proximal rows consist of large and small paragnaths, paragnath band in area VII–VIII extending to lateral and often to dorsal part of oral ring, but not reaching area V (Fig. 1A, B).

***Nectoneanthes uchiwa* Sato, 2013 (Fig. 1C–E)**

Nectoneanthes oxypoda: Paik, 1972: 135, fig. 4; 1973: 82–84, figs. 1k–l, 2.
Nectoneanthes uchiwa Sato, 2013: 24–34, figs. 4A, 9–14.
(see Sato, 2013 for full synonymy)

Material examined. NIBRIV0000787900, Korea: 3 inds., Chungcheongnam-do: Taean-gun, Nam-myeon, Mongsan-ri, intertidal mud flat, 36°40′19″N, 126°16′26″E, 11 Apr 2013, Park T, Yi S.

Diagnosis. Paragnaths present in all areas; relatively large number of paragnaths present in maxillary ring (areas II, IV), compared with *N. oxypoda*; many rows of continuous transverse broad paragnath band present in oral ring covering areas VII–VIII and V, transverse paragnath band in lateral region narrower than in ventral and dorsal regions; paragnaths in area VI consisting of separate clusters (Fig. 1C–E).

RESULTS AND DISCUSSION

Specimens used in this study were collected from intertidal and subtidal muddy bottoms of Korean waters (Fig. 2) from 2013 to 2017. Three *N. uchiwa* individuals and two *N. oxypoda* individuals were collected from intertidal mud flats on the western and southern coasts using a knife to dig during low tide. A single *N. oxypoda* specimen was collected from the subtidal muddy bottom (12 m depth) on Daecheongdo Island using a grab sampler.

Specimens were observed using a stereomicroscope (SZX10; Olympus, Tokyo, Japan). Species were identified based on the references of Paik (1972, 1973) and Sato (2013). The observed morphological characteristics were in agreement with the redescription and original description of each species (see Sato, 2013). All voucher specimens were deposited in the invertebrate storage room of the National Institute of Biological Resources, Republic of Korea (Table 1).

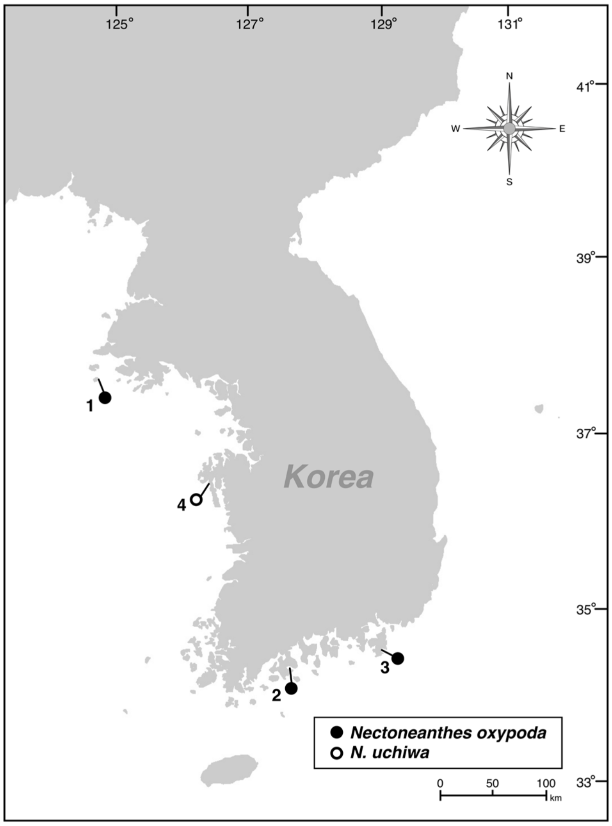

Fig. 2. Collection sites of *Nectoneanthes* Imajima, 1972 species in Korea. 1, Daecheongdo Island, Daecheong-myeon, Ongjin-gun, Incheon-si; 2, Chwido Island, Ochwi-ri, Podu-myeon, Goheung-gun, Jeollanam-do; 3, Gujora-ri, Irun-myeon, Geoje-si, Gyeongsangnam-do; 4, Mongsanpo Port, Mongsan-ri, Nam-myeon, Taean-gun, Chungcheongnam-do.

Partial sequences of two DNA barcoding regions (*COI* and 16S rDNA) were produced from all collected specimens. Genomic DNA was extracted from the parapodium of each specimen using a DNeasy Blood and Tissue Kit (Qiagen, Hilden, Germany) according to the manufacturer's instructions. The 658 bp of *COI* and 468–469 bp of 16S rDNA sequences from three individuals of each species were produced using the specific primer pairs polyLCO (forward; 5′-GAYTATWTTCAACAAATCATAAAGATATTGG-3′) and polyHCO (reverse; 5′-TAMACTTCWGGGTGACCAAARAATCA-3′ (Carr et al., 2011) as well as 16sarL (forward; 5′-CGCCTGTTTATCAAAAACAT-3′) and 16sbrH (reverse;

Table 1. Information of taxa and sequences used to determine genetic distances and to construct neighbor-joining trees

Species	Abbreviation	Voucher No.	Collecting locality	Reference	GenBank accession No.	
					COI	16S rDNA
Nectoneanthes oxypoda (Marenzeller, 1879)	NecoxyG1	NIBRIV0000787923	Goheung-gun, Korea	Present study	MZ475885	MZ478251
	NecoGeo	NIBRIV0000796665	Geojedo Island, Korea		MZ475886	MZ478252
	NecoDae	NIBRIV0000787898	Daecheongdo Island, Korea		MZ475887	MZ478253
	NecoCn1	–	Taiwan Strait, China	Xing and Zhang (unpublished)	MN256614	–
	NecoCn2	–			MN256615	–
	NecoCn3	–			MN256616	–
Nectoneanthes uchiwa Sato, 2013	NecuM1	NIBRIV0000787900-NecuM1	Mongsanpo Port, Korea	Present study	MZ475888	MZ478254
	NecuM2	NIBRIV0000787900-NecuM2			MZ475889	MZ478255
	NecuM3	NIBRIV0000787900-NecuM3			MZ475890	MZ478256
Hediste japonica (Izuka, 1908)	Hjaponica1	–	Incheon, Korea	Tosuji et al. (2019)	LC323024	–
	Hjaponica2	–	Higashiyoga, Japan		LC323025	–
	Hjaponica3	–	Yongyudo Island, Korea		LC323026	–
	Hjaponica4	–	Omutagawa River, Japan		–	LC323064
	Hjaponica5	–	Yongyudo Island, Korea		–	LC323066
	Hjaponica6	–	Suncheon Bay, Korea		–	LC323067
Hediste diadroma Sato and Nakashima, 2003	Hdiadroma1	–	Kaminokawa River, Japan	Tosuji et al. (2019)	AB996702	AB703097
	Hdiadroma2	–	Omoigawa River, Japan		AB996695	AB703098
	Hdiadroma3	–	Kaminokawa River, Japan		AB996701	AB703100
Perinereis linea (Treadwell, 1936)	Pljeongok2	NIBRIV0000810291	Jeongok Port, Korea	Villalobos-Guerrero et al. (2021)	MT511711	MT540476
	Pljeongok3	NIBRIV0000810291			MT511712	MT540477
	Paja1	NIBRIV0000810299	Possibly Korea or China		MT511713	MT540478
Perinereis euiini Park and Kim, 2017	Peuiini1	NIBRIV0000502105-Pcgeoje1	Geojedo Island, Korea	Park and Kim (2017) for COI, Villalobos-Guerrero et al. (2021) for 16S rDNA	KY249122	MT540486
	Peuiini2	NIBRIV0000502105-Pcgeoje2			KY249123	MT540487
	Peuiini3	NIBRIV0000502105-Pcgeoje3			KY249124	–
Alitta succinea (Leuckart, 1847)[a]	Asuccinea	AUM45691	Florida, USA	Alves et al. (2020)	MN812981	MN812981

COI, cytochrome c oxidase subunit I; 16S rDNA, 16S ribosomal DNA; NIBR, National Institute of Biological Resources; AUM, Auburn University Museum of Natural History.

[a] Taxon used as outgroup for rooting the tree.

Table 2. Pairwise genetic distance (%; p-distance) ranges of partial *COI* (below diagonal) and 16S rDNA (above diagonal) sequences between six nereidid species

Species	*N. oxypoda*, n=3 0.24–0.48 (0.32)^b	*N. uchiwa*, n=3 0^b	*H. japonica*, n=3 0.24–0.48 (0.32)^b	*H. diadroma*, n=3 0.24–0.48 (0.32)^b	*P. linea*, n=3 0^b	*P. euiini*, n=2 0^b
Nectoneanthes oxypoda, n=6 0–0.7 (0.43)^a	–	1.69–1.93 (1.85)	12.32–13.04 (12.64)	12.32–12.8 (12.48)	14.73	16.67
Nectoneanthes uchiwa, n=3 0^a	11.75–12.3 (12.02)	–	12.56–13.04 (12.8)	12.08–12.32 (12.16)	14.25	15.94
Hediste japonica, n=3 0.18–0.53 (0.35)^a	21.58–22.14 (21.91)	21.58–21.93 (21.75)	–	2.4–2.88 (2.64)	11.3–11.54 (11.46)	13.7–13.94 (13.78)
Hediste diadroma, n=3 1.4–2.11 (1.87)^a	19.12–20.18 (19.6)	21.4–22.11 (21.75)	12.46–14.04 (13.18)	–	10.58–10.82 (10.74)	13.22–13.46 (13.3)
Perinereis linea, n=3 0.53–0.7 (0.58)^a	23.02–23.51 (23.37)	22.98–23.16 (23.1)	21.4–21.75 (21.64)	21.23–22.11 (21.72)	–	8.37
Perinereis euiini, n=3 0–0.18 (0.12)^a	22.14–22.63 (22.37)	21.05–21.23 (21.11)	21.05–21.4 (21.17)	22.63–22.98 (22.81)	20.35–20.7 (20.53)	–

COI, cytochrome c oxidase subunit I; 16S rDNA, 16S ribosomal DNA; n, number of specimens; numbers in parentheses indicate averages.
^{a}Intraspecific distance of *COI* gene.
^{b}Intraspecific distance of 16S rDNA.

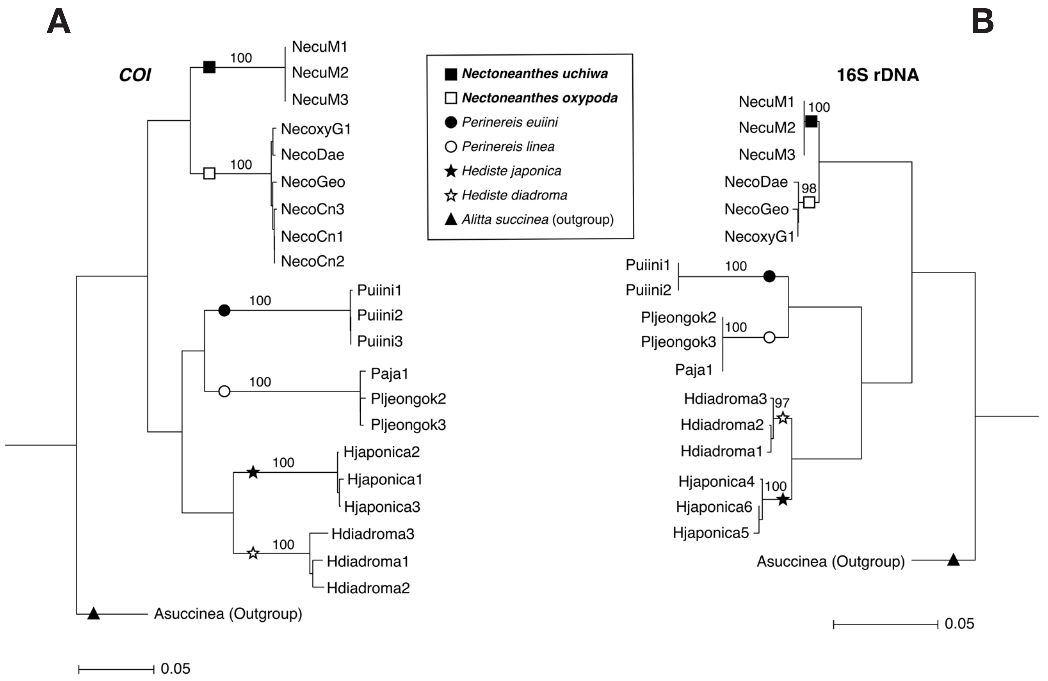

Fig. 3. Neighbor-joining trees constructed using partial sequences of *COI* (A) and 16S rDNA (B) genes of six nereidid species. *Alitta succinea* was used as an outgroup for rooting the trees. Numbers on each clade indicate the bootstrap values with 1,000 replications.

5′-CCGGTCTGAACTCAGATCACGT-3′) (Palumbi, 1996), respectively. PCR amplification conditions were as described by Park and Kim (2017) for *COI* and by Tosuji et al. (2019) for 16S rDNA. In addition, *COI* and 16S rDNA sequences of species closely related to *Nectoneanthes* (*Perinereis euiini* Park and Kim, 2017; *P. linea* (Treadwell, 1936), *Hediste* *japonica* (Izuka, 1908), *H. diadroma* Sato and Nakashima, 2003) within the family Nereididae, and additional *COI* sequences of *N. oxypoda* were retrieved from GenBank (Sayers et al., 2020) to estimate intra- and inter-specific genetic distances. The sequence of *Alitta succinea* (Leuckart, 1847) was also retrieved and was used as an outgroup to root the phylogenetic trees (Table 1). The produced sequences were aligned using Geneious Prime software 2021.1.1 (Biomatters, Auckland, New Zealand). Genetic distances were calculated based on a p-distance model, and phylogenetic trees were produced using the neighbor-joining method with 1,000 bootstrap resamplings to visualize genetic distance in MEGA ver. 10.1.8. for macOS (Stecher et al., 2020).

The produced sequences were made available in GenBank (Sayers et al., 2020) under accession numbers MZ475885–MZ475890 (*COI*) and MZ478251–MZ478256 (16S rDNA) (Table 1). The lengths of the aligned sequences were 570 bp (*COI*) and 419 bp (16S rDNA). The mean intraspecific variation in both genes did not exceed 1% in all species, except for that in *COI* of *H. diadroma* (1.87%). Interspecific variation among the species pairs ranged from 11.75% to 23.51% regarding *COI* and from 1.69% to 16.67% regarding 16S rDNA (Table 2). The mean interspecific variation between *N. oxypoda* and *N. uchiwa* was 12.02% (*COI*) and 1.85% (16S rDNA). In contrast, mean interspecific variation between species in other genera was comparably higher (i.e., genus *Perinereis*: 20.5% in *COI* and 8.3% in 16S rDNA; genus *Hediste*: 13.18% in *COI* and 2.64% in 16S rDNA), compared to that of the two *Nectoneanthes* species. Moreover, according to previous studies, the mean pairwise distance between nereidid species ranged from 20% to 27% in *COI* and from 8% to 15% in 16S rDNA (Park and Kim, 2007, 2017; Villalobos-Guerrero et al., 2021). This result suggests that *Nectoneanthes* species are genetically more closely related than other congeneric species (Fig. 3).

The DNA barcoding results of the *Nectoneanthes* species presented in this study along with morphological observations and registered voucher specimens will be valuable information for further taxonomic or phylogenetic studies of this taxon, as well as for biodiversity studies on nereidid species.

ORCID

Taeseo Park: https://orcid.org/0000-0003-2057-9411

CONFLICTS OF INTEREST

Taeseo Park, a contributing editor of the Animal Systematics, Evolution and Diversity, was not involved in the editorial evaluation or decision to publish this article.

ACKNOWLEDGMENTS

The author would like to thank Ms. Sunghee Jung for producing raw sequence data for the present study. The author is also grateful to Ms. Yun Kyoung Kim for her assistance with the drawings. This work was supported by a grant (NIBR202010102) from the National Institute of Biological Resources (NIBR), Ministry of Environment of the Republic of Korea.

REFERENCES

Alves PR, Halanych KM, Santos CSG, 2020. The phylogeny of Nereididae (Annelida) based on mitochondrial genomes. Zoologica Scripta, 49:366-378. https://doi.org/10.1111/zsc.12413

Bakken T, Wilson RS, 2005. Phylogeny of nereidids (Polychaeta, Nereididae) with paragnaths. Zoologica Scripta, 34:507-547. https://doi.org/10.1111/j.1463-6409.2005.00200.x

Carr CM, Hardy SM, Brown TM, Macdonald TA, Hebert PDN, 2011. Tri-oceanic perspective: DNA barcoding reveals geographic structure and cryptic diversity in Canadian polychaetes. PLoS ONE, 6:e22232. https://doi.org/10.1371/journal.pone.0022232

Choi JW, Seo JY, Lee CH, Ryu TK, Sung CG, Han GM, Hyun S, 2005. Spatial distribution patterns of macrobenthic communities during winter and summer in the Masan Bay special management area, southern coast of Korea. Ocean and Polar Research, 27:381-395 (in Korean, English summary). https://doi.org/10.4217/OPR.2005.27.4.381

Dales RP, 1962. The polychaete stomodeum and the inter-relationships of the families of Polychaeta. Proceedings of the Zoological Society London, 139:389-428.

de Blainville HMD, 1818. Mémoire sur la classe des Sétipodes, partie des Vers à sang rouge de M. Cuvier, et des Annélides de M. de Lamarck. Bulletin des Sciences, par la Société Philomatique de Paris, 1818:78-85.

Hsueh PW, 2018. First records of *Composetia*, *Eunereis* and *Nectoneanthes* (Annelida: Nereididae) from Taiwan, with descriptions of two new species. Zootaxa, 4531:211-224. http://doi.org/10.11646/zootaxa.4531.2.3

Imajima M, 1972. Review of the annelid worms of the family Nereidae of Japan, with descriptions of five new species or subspecies. Bulletin of the National Science Museum, Tokyo, 15:37-153.

Izuka A, 1908. On the breeding habit and development of *Nereis japonica* n. sp. Annotationes Zoologicae Japonenses, 6:295-305.

Izuka A, 1912. The errantiate polychaeta of Japan. Journal of the College of Science, Imperial University of Tokyo, 30:1-

262.

Kinberg JGH, 1865. Annulata nova. [Continuatio.]. Öfversigt af Königlich Vetenskapsakademiens Förhandlingar, Stockholm, 22:167-179.

Lee JH, Park JY, Lee HG, Park HS, Kim D, 2003. Environmental assessment of the Shihwa Lake by using the benthic pollution index. Ocean and Polar Research, 25:183-200 (in Korean, English summary). https://doi.org/10.4217/OPR.2003.25.2.183

Leuckart R, 1847. Verzeichniss der zur Fauna Helgoland's gehörenden wirbellosen Seethiere. In: Beiträge zur Kenntniss wirbelloser Thiere (Eds., Frey H, Leuckart R). Friedrich Vieweg und Sohn, Braunschweig, pp. 136-168.

Marenzeller E, 1879. Südjapanische Anneliden I. Amphinomea, Aphroditea, Lycoridea, Phyllodocea, Hesionea, Syllidea, Eunicea, Glycerea, Sternaspidea, Chaetopterea, Cirratulea, Amphictenea. Denkschriften der Mathematisch-naturwissenschaftlichen Classe der Kaiserliche Akademie der Wissenschaften, 41:109-154 (in German).

Paik EI, 1972. The polychaetous annelids in Korea (I). Bulletin of the Korean Fisheries Society, 5:128-136.

Paik EI, 1973. The polychaetous annelids in Korea (II). Description of *Nectoneanthes latipoda* sp. nov. Bulletin of the Korean Fisheries Society, 6:81-84.

Palumbi SR, 1996. Nucleic acids II: the polymerase chain reaction. In: Molecular systematics (Eds., Hillis DM, Moritz C, Mable BK). Sinauer Associates, Sunderland, MA, pp. 205-247.

Park TS, Kim W, 2007. A taxonomic study on *Perinereis nuntia* species group (Polychaeta: Nereididae) of Korea. Korean Journal of Systematic Zoology, 23:75-85. https://doi.org/10.5635/KJSZ.2007.23.1.075

Park T, Kim W, 2017. Description of a new species for Asian populations of the "Cosmopolitan" *Perinereis cultrifera* (Annelida: Nereididae). Zoological Science, 34:252-260. https://doi.org/10.2108/zs160154

Sampieri BR, Vieira PE, Teixeira MAL, Seixas VC, Pagliosa PR, Amaral ACZ, Costa FO, 2021. Molecular diversity within the genus *Laeonereis* (Annelida, Nereididae) along the west Atlantic coast: paving the way for integrative taxonomy. PeerJ, 9:e11364. https://doi.org/10.7717/peerj.11364

Sato M, 2013. Resurrection of the genus *Nectoneanthes* Imajima, 1972 (Nereididae: Polychaeta), with redescription of *Nectoneanthes oxypoda* (Marenzeller, 1879) and description of a new species, comparing them to *Neanthes succinea* (Leuckart, 1847). Journal of Natural History, 47:1-50. https://doi.org/10.1080/00222933.2012.743609

Sato M, Nakashima A, 2003. A review of Asian *Hediste* species complex (Nereididae, Polychaeta) with descriptions of two new species and a redescription of *Hediste japonica* (Izuka, 1908). Zoological Journal of the Linnean Society, 137:403-445. https://doi.org/10.1046/j.1096-3642.2003.00059.x

Sayers EW, Cavanaugh M, Clark K, Ostell J, Pruitt KD, Karsch-Mizrachi I, 2020. GenBank. Nucleic Acids Research, 48:D84-D86. https://doi.org/10.1093/nar/gkz956

Stecher G, Tamura K, Kumar S, 2020. Molecular evolutionary genetics analysis (MEGA) for macOS. Molecular Biology and Evolution, 37:1237-1239. https://doi.org/10.1093/molbev/msz312

Tosuji H, Nishinosono K, Hiseh HL, Glasby CJ, Sakaguchi T, Sato M, 2019. Molecular evidence of cryptic species diversity in the *Perinereis nuntia* species group (Annelida: Nereididae) with first records of *P. nuntia* and *P. shikueii* in southern Japan. Plankton and Benthos Research, 14:287-302. https://doi.org/10.3800/pbr.14.287

Treadwell AL, 1936. Polychaetous annelids from Amoy, China. Proceedings of the United States National Museum, 83:261-279. https://doi.org/10.5479/si.00963801.83-2984.261

Villalobos-Guerrero TF, Park T, Idris I, 2021. Review of some *Perinereis* Kinberg, 1865 (Annelida: Nereididae) species of Group 2 sensu Hutchings, Reid & Wilson, 1991 from the Eastern and South-eastern Asian seas. Journal of the Marine Biological Association of the United Kingdom, 101:279-307. https://doi.org/10.1017/S0025315421000126

Wilson RS. 1988. Synonymy of the genus *Nectoneanthes* Imajima, 1972, with *Neanthes* Kinberg, 1866 (Polychaeta: Nereididae). Proceedings of the Biological Society of Washington, 101:4-10.

Received July 3, 2021
Revised July 7, 2021
Accepted July 7, 2021