

SYNONYMY OF THE GENUS *NECTONEANTHES*
IMAJIMA, 1972, WITH *NEANTHES* KINBERG, 1866
(POLYCHAETA: NEREIDIDAE)

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Abstract.—*Nectoneanthes oxypoda* (Marenzeller, 1879) and *N. alatopalpis* (Wesenberg-Lund, 1949) are synonymized with *Neanthes succinea* Leuckart, 1847. *Nectoneanthes* Imajima, 1972, with type species *Nereis (Alitta) oxypoda* Marenzeller, thus becomes a junior synonym of *Neanthes* Kinberg, 1866. An undescribed species of *Neanthes* is recognized. *Nectoneanthes ijimai* (Izuka, 1912) is once more referred to *Neanthes*, and *Nectoneanthes latipoda* Paik, 1973 and *N. multignatha* Wu, Sun & Yang, 1981 are referred to *Neanthes* for the first time.

The genus *Nectoneanthes* was erected by Imajima (1972) for two species of *Neanthes* Kinberg, 1866, which lack falcigers in all neuropodia: *N. oxypoda* (Marenzeller, 1879) (type species by original designation) and *N. ijimai* (Izuka, 1912). Three additional species have subsequently been placed in the genus: *Nectoneanthes latipoda* Paik, 1973; *N. multignatha* Wu, Sun & Yang, 1981; and *N. alatopalpis* (Wesenberg-Lund, 1949) which was transferred from *Neanthes* to *Nectoneanthes* by Wu, Sun & Yang, 1981.

In a previous paper (Wilson 1984) I examined all Australian material of *N. oxypoda* and synonymized these records with *Neanthes succinea* (Leuckart, 1847). I have now been able to examine type material of *Nereis (Alitta) oxypoda* Marenzeller and *Nereis alatopalpis* Wesenberg-Lund, which are here shown to be junior synonyms of *Neanthes succinea*. *Nectoneanthes* Imajima, 1972 thus falls into synonymy with *Neanthes* Kinberg, 1866.

Loss and breakage of atokous setae occurs prior to metamorphosis in epitokous nereidids (Clark 1961), hence absence or apparent absence of neuropodial falcigers should not be accepted as a valid taxonomic character unless undamaged specimens encompassing a wide size range and thus age

are available for study. The specimens examined in this study and all literature records represent large specimens with expanded parapodial lobes which are probably approaching epitoky.

The three remaining species that have been referred to the genus *Nectoneanthes* and an undescribed form previously confused with *N. oxypoda* appear to be valid species and are here referred to the genus *Neanthes*. This determination can only be confirmed when atokous material of these species becomes available for study; however, it has not been possible to obtain material of these three oriental species. These taxa are discussed below.

All species discussed here are adequately figured in the original descriptions or in subsequent publications; these figures are referred to in the relevant descriptions below and no new figures are presented here.

The specimens examined in this paper are deposited in the following institutions: British Museum (Natural History), London (BMNH); National Science Museum, Tokyo (NSMT); Zoological Museum, Copenhagen (ZMK); Naturhistorisches Museum, Vienna (ZMV) and National Museum of Natural History, Smithsonian Institution, Washington (USNM).

Neanthes Kinberg, 1866

Neanthes Kinberg, 1866. Type species: *N. vaalii* Kinberg, 1866 (designated by Hartman, 1959:249).—Hartman, 1940:219 (generic definition emended); 1959:249 (for additional synonymies).

Nectoneanthes Imajima, 1972. Type species: *Nereis (Alitta) oxypoda* Marenzeller, 1879 (by original designation). New synonymy.

Definition.—Eversible pharynx with conical paragnaths on both rings. Four pairs of tentacular cirri. Parapodia biramous. Notosetae homogomph spinigers; neurosetae including homogomph and heterogomph spinigers (emended after Fauchald 1977:89).

Remarks.—As a consequence of the new synonymies made in this paper, several species previously placed in *Nectoneanthes* Imajima have been referred to *Neanthes* Kinberg. These species are not presently known to possess neuropodial falcigers and thus violate the widely used definition of *Neanthes* provided by Fauchald (1977). Wilson (1984:221) however noted that three species of *Neanthes* belonging to Group I in Fauchald's (1972) subdivision of the genus are already known to lack neuropodial falcigers: *N. agnesiae* (Augener, 1918); *N. chingrighattensis* (Fauvel, 1932) and *N. mexicana* Fauchald, 1972. In view of the incomplete material presently available of these species, and the loss and replacement of setae which is known to occur in ageing nereidids, the presence of neuropodial falcigers should no longer be included in the generic definition of *Neanthes* and the generic definition of Fauchald (above) is emended accordingly.

Additional comments on the synonymy of *Nectoneanthes* with *Neanthes* are included in the *Neanthes succinea* Remarks section (below).

Neanthes succinea (Leuckart, 1847)

Nereis succinea Leuckart, 1847:154, pl. 2, figs. 9, 11.

Nereis (Alitta) oxypoda Marenzeller, 1879: 120–122, pl. 2, fig. 3. New synonymy.

Nereis oxypoda.—Monro, 1934:362–363 (in part, specimen collected by Chen).

Nereis (Neanthes) oxypoda.—Ibáñez, 1972: 24–26, fig. 1.

Nereis alatopalpis Wesenberg-Lund, 1949: 281–283, figs. 15–17. New synonymy.

Nectoneanthes alatopalpis.—Wu, Sun & Yang, 1981:152–153, fig. 94A–F; 1985: 168–170, fig. 94A–F.

Neanthes succinea.—Wilson, 1984:218–221, fig. 4A–F (includes additional synonymies).

Material examined.—JAPAN: (“wahrscheinlich bei Yokohama” Marenzeller, 1879:122) coll. Roretz 1876, 2 syntypes of *Nereis oxypoda*, ZMV 2140. Tokyo Bay, coll. Döderlein, 1 specimen of *Nereis oxypoda*, ZMV 781.

CHINA: Amoy, coll. T. Y. Chen, No. 27, 1 specimen of *Nereis oxypoda*, BMNH ZK 1933.3.2.40.

IRAN: Gulf of Oman, Sta 72C, 12 km von Yask, coll. G. Thorson, 20.4.1937, holotype (by monotypy) of *Nereis alatopalpis*, ZMK.

Description.—Two syntypes of *Nereis oxypoda*: larger syntype with pharynx partly extended, consisting of anterior fragment of 169 setigers, about 260 mm long, 9 mm wide anteriorly (excluding parapodia), decreasing to 7 mm wide in middle setigers and 3.5 mm wide in posteriormost setigers; smaller syntype with pharynx fully everted, consisting of anterior fragment of 103 setigers, about 100 mm long, 5 mm wide anteriorly decreasing to 2.5 mm wide in posteriormost setigers. Color pale yellow. Prostomium dorsoventrally flattened, with 1 pair of triangular palps with very small palpostyles, 1 pair of antennae about ¼ as long as prostomium. Four pairs of tentacular cirri, longest extending back 3–4 setigers, with cylindrical cirrophores basally; cirrophores of 2 dorsal pairs longer than ventral pairs, forming ⅓–¼ of length of cir-

rus. Jaws amber, with 11–12 small lateral teeth on smaller syntype; larger syntype with darker, stouter jaws with indistinct teeth. Pharynx with pale amber paragnaths, pointed cones on area VI, low domes on all other areas. Larger syntype with many maxillary ring paragnaths indistinct or lost, area I = 0; II = 3–4; III = 4; IV = about 6; V = 0; VI = 10 in circular group on left, 0 on right side; VII–VIII = about 50 small paragnaths in 2 irregular rows. Smaller syntype with I = 0; II = 14/16; III = 5; IV = 14/17; V = 1; VI = 10, 10; VII–VIII = 56 in 2 irregular rows. Notopodia and neuropodia each with 3 triangular lobes throughout, posterior parapodia with dorsal notopodial lobe becoming greatly expanded and enclosing dorsal cirrus in large notch (Marenzeller 1879: pl. 2, fig. 3). Dorsal and ventral cirri approximately equal to length of neuropodial lobes throughout. Both syntypes with most setae shed or broken; few notopodial homogomph spinigers present and homogomph and heterogomph setae with appendages missing remain in many neuropodia.

Specimen from Japan (ZMV 781) consisting of anterior fragment of 81 setigers, about 100 mm long, 6 mm wide anteriorly; only 25 anterior setigers in good condition. Agrees with description of syntypes except as follows: pharynx everted, area I = 4 in longitudinal series; II = 19/21; III = 6; IV = 16/17; V = 3; VI = 11/12; VII–VIII = 77 in 2–3 rows, including single evenly spaced anterior row of larger cones. Setae of anterior setigers mostly intact, homogomph spinigers in notopodia, homogomph and heterogomph spinigers in both neuropodial fascicles.

Specimen from China (BMNH ZK 1933.3.2.40) immature female epitoke with coelomic gametes, entire but regenerating posteriorly, 80 setigers, about 75 mm long, 5 mm wide (part of material examined by Monro 1934 and Wilson 1984). This specimen also agrees with the above descriptions and apparently lacks neuropodial falcigers.

Holotype of *Nereis alatopalpis* (ZMK) incomplete posteriorly, broken into 3 pieces: an anterior fragment with pharynx everted, 46 setigers, 25 mm long, 2.5 mm wide; fragment of 16 setigers, 7 mm long and fragment of 10 setigers, 4 mm long. Prostomium strongly flattened, triangular, with small palpostyles, antennae $\frac{1}{4}$ as long as prostomium; 4 pairs of tentacular cirri, longest extending back 4 setigers, 2 dorsal pairs with cirrophores accounting for about $\frac{1}{5}$ of length of cirri. Jaws translucent amber, smooth distally, with 5–6 indistinct teeth basally. Paragnaths pale amber domes, arranged as follows: area I = 1; II = 11/9; III = 0; IV = 8/9; V = 0; VI = 8/11 in circular groups; VII–VIII = about 32 in 2 widely spaced irregular rows. Notopodia and neuropodia each with 3 acutely triangular lobes, dorsal and ventral cirri about as long as parapodial lobes. Dorsal notopodial lobe greatly expanded posteriorly, enclosing dorsal cirrus in large notch (Wesenberg-Lund 1949:fig. 16a–d). Notosetae homogomph spinigers, neurosetae homogomph and heterogomph spinigers in both fascicles.

Remarks.—Marenzeller's original description of *Nereis oxypoda* was very detailed and agrees with that of the two syntypes re-examined in this study. There are no significant differences in the form of the paragnaths and parapodia between this material and epitokes and sub-epitokes of *Neanthes succinea* (Leuckart) as described by Pettibone (1963:165) and Wilson (1984:218). *Nereis alatopalpis* Wesenberg-Lund was also found to be identical to previous descriptions of *N. succinea*. *Nereis oxypoda* and *N. alatopalpis* are thus formally synonymized with *Neanthes succinea* and *Nectoneanthes* Imajima, 1972 (of which *N. oxypoda* is the type species) becomes a junior synonym of *Neanthes* Kinberg, 1866.

Imajima (1972) gave absence of neuropodial falcigers and expansion of the dorsal notopodial lobe as distinguishing characters of *Nectoneanthes*; however, these are characters associated with the development of

epitoky. All material previously referred to *Nectoneanthes* represents large (100–300 mm long) specimens and it is probable that even the “atokes” described by Izuka (1912) and Imajima (1972) are in fact epitokes at varying stages of development. Several smaller specimens of *N. succinea* and the holotype of *N. alatopalpis* examined here apparently lack neuropodial falcigers; however, in the absence of a detailed study of the ontogeny of *N. succinea* this character alone is insufficient to form the basis of a new taxon.

Other nereidid species can apparently achieve sexual maturity in either their second or third year (e.g., *Hediste diversicolor* (Müller) and *Nereis pelagica* Linnaeus as indicated by Olive & Garwood (1981), Mettam et al. (1982), and Möller (1985)), hence sexual maturity and epitokal modifications may also occur in *N. succinea* at different sizes and ages. It is possible that different populations differ in this respect: e.g., Reish (1977) noted that a population of *N. succinea* introduced into the Salton Sea, California, differed from nearby natural populations only in reaching a larger size.

This paper does not address the possibility that sibling species may be present within what is now known as *Neanthes succinea*. Examples already exist of widely distributed nereidid species complexes which are morphologically similar but exhibit distinct reproductive patterns (reviewed by Smith 1958): *Hediste*¹ *diversicolor* (Müller)/*Neanthes japonica* (Izuka)/*N. limnicola* (Johnston) and *Platynereis dumerilii* (Audouin & Milne Edwards)/*P. megalops* (Verrill)/*P. massiliensis* (Moquin-Tandon). *Neanthes succinea* may also be shown to represent such a complex; however, large numbers of specimens and knowledge of life histories of populations from widespread

localities will be needed to detect sibling species if they exist.

The present study shows that the taxa *Nectoneanthes*, *N. oxypoda*, and *N. alatopalpis* (recorded only from within the range of *Neanthes succinea*) can no longer be retained.

Distribution.—*Neanthes succinea* is widely distributed in the Northern and Southern Hemispheres (Pettibone 1963, Day 1967). It is likely that some of the more recent records are the result of introductions by humans, both intentional and accidental (Smith 1963, Reish 1977, Proskurina 1979).

Neanthes sp.

Nereis oxypoda.—Okuda, 1933:247, pl. 13, figs. f–h (not Marenzeller 1879).

Nereis oxypoda var.—Monro, 1934:362–363 (in part, 2 specimens collected by Ping) (not Marenzeller 1879).

Nereis (Neanthes) oxypoda.—Treadwell, 1936:268 (not Marenzeller 1879).

Nectoneanthes oxypoda.—Imajima, 1972:113–117, figs. 35–37.—Paik, 1972:135, fig. 4a–h; 1973:82, figs. 1k, l, 2, table 1 (not Marenzeller 1879).

Neanthes (Nectoneanthes) oxypoda var.—Wilson, 1984:220–221 (not Marenzeller 1879).

Material examined.—JAPAN: Kojima Bay, Okayama Prefecture, coll. K. Izuka, 17 Dec 1906, 3 specimens labelled *Nectoneanthes oxypoda*, NSMT 5290–5292.

CHINA: Amoy, Outer Harbour, coll. Prof. C. Ping, 6 Apr 1923, No. 3, 2 specimens identified by Monro, 1934 as *Nereis oxypoda* var., BMNH ZK 1926.4.27.22–23. Amoy, No. 27, coll. T. Y. Chen, 1 gravid female identified as *Nereis (Neanthes) oxypoda* by Treadwell, 1936, USNM 22240.

Description.—Six specimens: smallest 104 setigers, 80 mm long, 4.5 mm wide (anterior fragment); largest 160 setigers, 260 mm long, 6 mm wide (complete). Prostomium flattened, wider than long, 1 pair of triangular palps with small palpostyles, 1 pair of an-

¹ *Hediste* is currently held to be a monotypic genus (Hartmann-Schröder 1971, Fauchald 1977); a review of this group is required since obviously closely related species are presently placed in separate genera.

tennae about $\frac{1}{4}$ as long as prostomium. Four pairs of tentacular cirri, longest extending back to setiger 3, 2 dorsal pairs with short indistinct cirrophores. Two pairs of dark red subdermal eyes. Jaws translucent amber with 6–12 distinct lateral teeth. Paragnaths amber, consisting of pointed cones on areas VI and maxillary ring, low domes elsewhere, arranged as follows: area I = 2–4 in longitudinal series; II = 16–30; III = 4–15 in triangular patch; IV = 24–32; VI = 8–13 in circular group; V–VIII = continuous band of 100–200 paragnaths, 6–8 rows deep dorsally and ventrally, tapering to 2–3 rows deep laterally (Imajima 1972:fig. 35b, c). Notopodia and neuropodia each with 3 acutely triangular lobes throughout and with dorsal and ventral cirri of about equal length to that of each parapodial lobe. Parapodial lobes of similar proportions throughout, excepting dorsal notopodial lobe greatly expanded posteriorly, enclosing dorsal cirrus in large notch (Imajima 1972:fig. 35d–h). Notosetae homogomph spinigers, neurosetae homogomph and heterogomph spinigers in dorsal and ventral fascicles. Anal cirri extending back over posteriormost 12–13 setigers.

Remarks.—Imajima (1972) apparently did not examine the syntypes of *Nereis (Alitta) oxyopoda* Marenzeller, 1879, in designating that species as the type species of *Nectoneanthes*. Imajima's detailed description of new material from several Japanese localities agrees with that given above for *Neanthes* sp. but differs significantly from *Neanthes succinea* in the arrangement of paragnaths on the oral ring: *N. succinea* has a ventral band of up to about 80 paragnaths tapering to a narrower band laterally and absent dorsally; *Neanthes* sp. has 100–200 oral ring paragnaths forming a continuous band 6–8 rows deep dorsally and ventrally and tapering to 2–3 rows laterally, exactly as figured by Imajima (1972:fig. 35b, c). In all other respects these specimens agree with the description of large specimens of *N. succinea* but in view of the substantial differences noted above this material is here con-

sidered to represent a separate species. *Neanthes* sp. is not formally described and named here since all specimens examined are large and lack neuropodial falcigers; as with *N. succinea* (see above), smaller specimens of this form may be found to possess neuropodial falcigers but in any case it is desirable that a formal description of this taxon be based on a wider size range of material than is currently available.

The above discussion shows that Imajima (1972) misidentified his specimens as *Nereis (Alitta) oxyopoda* Marenzeller, 1879, when designating that species as the type species of *Nectoneanthes*. Under Article 70 (b) of the International Code of Zoological Nomenclature (3rd edition), the case must then be referred to the International Commission on Zoological Nomenclature to designate a type species for the genus *Nectoneanthes*; in the interest of stability I shall be proposing to the Commission that *Nereis (Alitta) oxyopoda* Marenzeller, 1879, be so designated.

Distribution.—Recorded from China, Japan and Korea.

Neanthes ijimai (Izuka, 1912)

Nereis ijimai Izuka, 1912:174–176, pl. 2, fig. 1, pl. 19, figs. 1–9.

Neanthes ijimai.—Imajima and Hartman, 1964:144–145.

Nectoneanthes ijimai.—Imajima, 1972: 117.—Wu, Sun & Yang 1981:146–148, fig. 90A–H; 1985:161–163, fig. 90A–H.—Srinivasa Rao & Sarma, 1982:447, figs. 6, 7.

Nectoneanthes imajimai (sic.).—Wilson, 1984:220 (demonic typographical error for *Nectoneanthes ijimai*).

Remarks.—Izuka's original description referred to a very large specimen (390 mm long for 215 segments); however, the only subsequent reports of new material relate to smaller specimens (40 mm long by Srinivasa Rao & Sarma 1982; up to 12 mm long, 3.5 mm wide for 25 anterior setigers by Wu et al. 1981). These smaller specimens were

reported to lack neuropodial falcigers; however, as noted above in the *Neanthes succinea* Remarks section, this character alone should not form the basis of a new genus. *Neanthes ijimai* is distinguished from other similar species discussed here by the absence of paragnaths on areas I, III and V of the pharynx.

Distribution.—Recorded from China, Japan and India.

Neanthes latipoda (Paik, 1973),
new combination

Nectoneanthes latipoda Paik, 1973:81–84,
figs. 1, 2.

Remarks.—The description of *Neanthes latipoda* by Paik (1973) was apparently based on larger specimens (163 mm long for 127 segments, 15 mm wide). As with the species of *Nectoneanthes* discussed above, the distinguishing characters of *N. latipoda* can probably be attributed to the large size and approaching epitoky of the specimens examined. The description and figures by Paik show that *N. latipoda* is very similar to epitokes of *N. succinea* but differs in the arrangement of paragnaths: the band of paragnaths of the maxillary ring are continuous through the dorsal region as a single scattered band. As noted above, the maxillary ring band is not continuous dorsally in *N. succinea*. *Neanthes latipoda* appears to be intermediate between *Neanthes* sp. (above) and *Neanthes succinea* and is retained here as a separate species.

Distribution.—Korea.

Neanthes multignatha
(Wu, Sun & Yang, 1981),
new combination

Nectoneanthes multignatha Wu, Sun &
Yang, 1981:148–149, fig. 91A–H; 1985:
163–164, fig. 91A–H.

Remarks.—The figures of *N. multignatha* in the original description by Wu, Sun & Yang 1981 indicate that this species is very close to *N. succinea*, perhaps differing in the

reduced numbers of paragnaths on areas III and IV of the pharynx.

Distribution.—China.

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