

## THE NEREID WORMS OF TAIWAN<sup>1</sup>

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### ABSTRACT

The present study records 19 species of the polychaetous nereid worms from Taiwan. Only 3 species, *Namalycastis indica*, *Perinereis cultrifera* and *P. brevicirris*, are previously recorded, and the rest are new records to the Taiwan invertebrate fauna. Eleven out of 19 species are of *Perinereis*. The dominant species are *Perinereis formosa* and *P. brevicirris*. The diagnostic key to genera and species are provided and Chinese names are proposed.

The polychaetous nereid worms are well represented along the coast of Taiwan, yet only a few studies have been done. Izuka recorded *Nereis cultrifera* (34) and Takahasi reported a new freshwater nereid, *Lycastis longicirris*, from Tamsui (49), and he further worked on the variability of paragnaths and the epitocous phase of *Perinereis nuntia* var. *brevicirris* of Taiwan (48, 50).

The present study records 19 species in 7 genera of nereids from Taiwan. Only 3 species, *Namalycastis indica* (= *Lycastis longicirris* Takahasi) (49), *Perinereis cultrifera*, and *Perinereis brevicirris* (= *Nereis mictodonta* Marenzeller, *Perinereis nuntia* var. *brevicirris* Grube) (48, 50) are previously recorded, the rest are new records to the Taiwan invertebrate fauna. Eleven out of 19 species are of *Perinereis*. The domi-

nant species are *Perinereis formosa* and *P. brevicirris*.

The specimens used in this study were collected from the intertidal zone of shore line of Taiwan during January 1964 to June 1966. Specimens were relaxed immediately after the collections with 5 to 15% of alcohol until they everted the proboscises. Pressure was added slightly on the ventral side of pharyngeal portion if the proboscis was not everted. Followed with a quickly injection of 5% formalin into the coelomic cavity from posterior toward anterior portion, the specimens were finally fixed in 5% formalin. The above described method, in general, was very successful in obtaining specimens with the proboscis everted for the armatures of proboscis. All the specimens are deposited in the Institute of Zoology, Academia Sinica, Nankang, Taiwan.

The specific characters utilized in this study were primarily based on the prostomial structure (Fig. 1a), the armatures of proboscis (Fig. 1a & 1b), the parapodial structure (Fig. 1c), the setae (Fig. 1d-g), and the body color.

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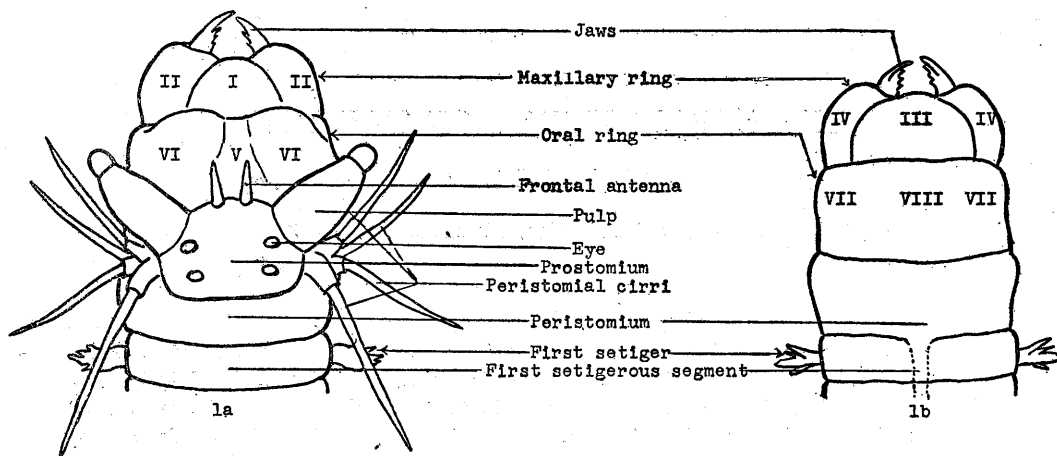


Fig. 1a. Semidiagrammatic figure of the head region, with proboscis everted, dorsal view.

Fig. 1b. Semidiagrammatic figure of the everted proboscis, ventral view.

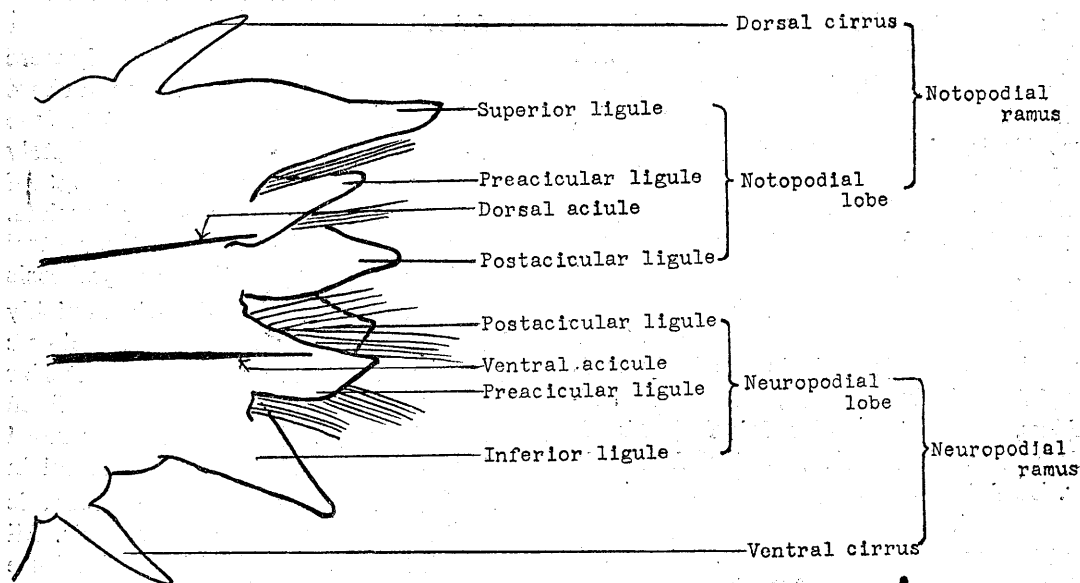


Fig. 1c. Semidiagrammatic figure view of the typical parapodium, anterior view.

The proboscis (Fig. 1a & 1b) is composed of the maxillary and the oral rings. They are divided into 8 numbered areas, of which I to IV are maxillary and V to VIII are oral; odd numbers are median and single, even numbers are lateral and

paired.

The terminology related to the parapodial structure is very confusing in the literature. The following terminology is used throughout in the present paper. Except for the 1st and the 2nd setigerous

segments, each parapodium (Fig. 1c) has 2 rami: dorsal, notopodial ramus and ventral, neuropodial ramus. Notopodial ramus has a dorsal cirrus and a notopodial lobe. The lobe is subdivided into superior, preacicular and postacicular ligules. In the genera *Ceratonereis* and *Neanthes* the notopodial preacicular ligule is usually well-developed in the anterior parapodia, but is indistinct in other genera. Neuro-podial ramus has a ventral cirrus and a neuropodial lobe. The lobe is subdivided into preacicular, postacicular and inferior ligules. Parapodium designated as "anterior parapodium" in the text is consistently taken from left side of the 10th parapodium of the worm; "median parapodium" from left side of parapodium of the middle segment; "posterior parapodium" from left side of the last 10th to 20th segments.

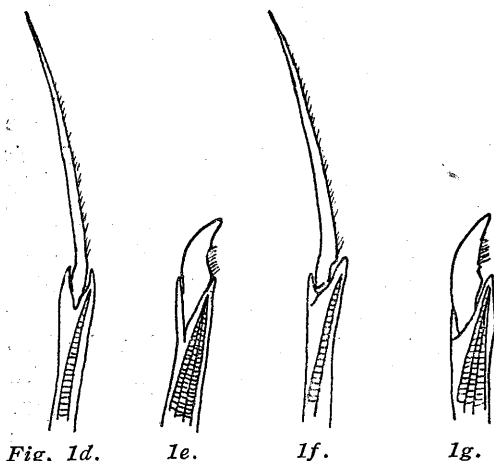


Fig. 1d. Homogomph spiniger  
Fig. 1e. Homogomph falciger  
Fig. 1f. Heterogomph spiniger  
Fig. 1g. Heterogomph falciger

Four kinds of setae are recognized in the text: homogomph spiniger (Fig. 1d), homogomph falciger (Fig. 1e), heterogomph spiniger (Fig. 1f) and heterogomph falciger (Fig. 1g). Setae located dorsal to the acicule (Fig. 1c) is designated as "supraacicular

position" and setae located ventral to the acicule as "subacicular position" throughout the text.

The following list shows the Taiwan nereid worms presented in this study. Each name is followed by the proposed Chinese name.

*Namalycastis indica* (Southern) 印度緣目沙蠶

*Ceratonereis burmensis* Monro 緬甸角沙蠶

*Pseudonereis anomala* Gravier 異型擬沙蠶

*Pseudonereis gallapagensis* Kinderg 加拉班擬沙蠶

*Pseudonereis formosa* Kinberg 美麗擬沙蠶

*Platynereis bicanaliculata* (Baird) 雙管闊沙蠶

*Platynereis dumerilii* (Audouin & Milne-Edwards) 杜氏闊沙蠶

*Nereis heterocirrata* Treadwell 異鬚沙蠶

*Neanthes glandicincta* (Southern) 腺帶沙蠶

*Perinereis novaehollandiae* Kinberg 新荷蘭圍沙蠶

*Perinereis nigropunctata* (Horst) 黑斑圍沙蠶

*Perinereis helleri* (Grube) 錫氏圍沙蠶

*Perinereis cultrifera* (Grube) 獨齒圍沙蠶

*Perinereis singaporiensis* Grube 新加坡圍沙蠶

*Perinereis linea* (Treadwell) 線圍沙蠶

*Perinereis aibuhitensis* Grube 雙齒圍沙蠶

*Perinereis vancaurica* (Ehlers) 鐮顎圍沙蠶

*Perinereis brevicirris* (Grube) 短鬚圍沙蠶

*Perinereis neocaledonica* Pruvot 細齒圍沙蠶

#### KEY TO GENERA AND SPECIES

- 1 Parapodia uniramous ..... Genus *Namalycastis*, *Namalycastis indica*
- 1 Parapodia biramous from third segment ..... 2
- 2 Paragnaths absent from oral ring of proboscis ..... Genus *Ceratonereis*, *Ceratonereis burmensis*
- 2 Paragnaths present on both rings of proboscis ..... 3

3. Paragnaths form pectinated rows on some or all areas .....4
- 3 Paragnaths conical, separated processes .....8
- 4 Maxillary ring with conical, and oral ring with pectinated process .....5  
..... Genus *Pseudonereis*.....5
- 4 Both rings of proboscis with pectinated rows, or areas I, II, and V usually bare.....Genus *Platynereis*.....7
- 5 Area V of proboscis without paragnath and VI with 6 to 9 cones in 1 or 2 irregular transverse rows.....  
.....*Pseudonereis anomala*
- 5 Area V of proboscis with a single cone, and VI with a transverse ridge.....6
- 6 Areas VII and VIII of proboscis with single row of cones.....  
.....*Pseudonereis gallapagensis*
- 6 Areas VII and VIII of proboscis with double rows of cones.....  
.....*Pseudonereis formosa*
- 7 Area IV of proboscis with an apical group of 2 to 4 large cones in addition to 3 to 4 pectinated rows; simple falciger present in notopodia from segment 9 .....*Platynereis bicanaliculata*
- 7 Area IV of proboscis without an apical group; simple notopodial falciger absent .....*Platynereis dumerilii*
- 8 Area VI of proboscis with conical process .....9
- 8 Area VI of proboscis with transverse ridges, or these ridges interrupted into a straight transverse row of paragnaths .....Genus *Perinereis*.....10
- 9 Median and posterior notopodia with falcigers or also spinigers .....  
.....Genus *Nereis*, *Neseis heterocirrata*
- 9 Motopodia with spinigers; falcigers absent .....Genus *Neanthes*, *Neanthes glandicincta*
- 10 Area VI of proboscis with a single ridge on each side .....11
- 10 Area VI of proboscis with 2 or more ridges on each side.....14
- 11 Neuropodia with heterogomph falcigers only in the subacicular position .....  
.....*Perinereis novaehollandiae*
- 11 Neuropodia with heterogomph spinigers and falcigers in the subacicular position.....12
- 12 Area I of proboscis with 2 to 3 cones in longitudinal line.....13
- 12 Area I of proboscis with 5 to 7 cones .....  
.....*Perinereis nigropunctata*
- 13 Area III of proboscis with 8 to 12 cones in 2 transverse rows, and 2 to 3 cones on each side of the central patch; the longest peristomial cirrus reaches 7th setigerous segment.....  
.....*Perinereis helleri*
- 13 Area III of proboscis with 15 to 16 cones in oval patch; the longest peristomial cirrus reaches 4-5th setigerous segments .....*Perinereis cultrifera*
- 14 Area VI of proboscis with 2 ridges on each side .....15
- 14 Area VI of proboscis with 3 or more ridges on each side.....18
- 15 Area V of proboscis with a single cone .....  
.....*Perinereis singaporiensis*
- 15 Area V of proboscis with 3 cones in triangular .....16
- 16 Area I of proboscis with 4 cones in quadrate arrangement; the longest peristomial cirrus reaches 6th setigerous segment .....*Perinereis lineata*
- 16 Area I of proboscis with 2 cones in tandem, the longest peristomial cirrus reaches from 2nd to 5th setigerous segments .....17
- 17 Jaws with teeth along the cutting edge; Area III of proboscis with 2 to 3 cones on each side of central patch; VII and VIII with a double row, the anterior row at the midventral are not connected by smaller cones .....  
.....*Perinereis cibuhitensis*
- 17 Jaws without teeth along the cutting edge; Area III of proboscis with 9 to 10 small cones on each side of central

patch; VII and VIII with a double row, the cones of anterior row at the midventral are connected by smaller cones from each other .....

.....*Perinereis vancaurica*

- 18 Area VI of proboscis with 3 to 9 ridges on each side; the longest peristomial cirrus extends 4 to 9th setigerous segments; jaw with 5 teeth along the cutting edge.....*Perinereis brevicirris*

- 18 Area VI of proboscis with 17 to 19 ridges or paragnaths on each side; the longest peristomial cirrus extends back to 3rd setigerous segment; jaw with out teeth along the cutting edge.....

.....*Perinereis neocaledonica*

#### SYSTEMATIC ACCOUNTS

Genus *Namalycastis* Hartman, 1959

*Namalycastis indica* (Southern, 1921)

Fig. 2, a-c

*Lycastis indica* Southern, 1921: 578-582, pl. 19, figs. 2 A-J, textfigs. 2 a-d; Horst, 1924: 4; Fauvel, 1930: 19; 1932: 82; Aziz, 1938: 27, pl. 5, fig. 14, pl. 6, fig. 25, pl. 8, figs. 96-97.

*Lycastis longicirris* Takahasi, 1933: 42-46, textfigs. 1-6.

*Namalycastis meraukensis* var. *zeylanica* De Silva., 1961: 172-173, textfigs. 5.

*Namalycastis indica*, De Silva., 1965a: 207-209, text-fig. 2; 1965b: 543.

*Namalycastis abiuma*, Wu & Chen, 1963: 20.

**Locality:** Long-sing, Taipei Hsien, beneath stones at the tributary that empties into the Tamsui River (4 specimens).

**Specific character:** The largest specimen measures 110 mm long with 149 setigerous segments. Prostomium (Fig. 2a) subtriangular, midanterior 2/3 with a groove; 2 pairs of eyes with lens are at the posterior margin of prostomium; the outer is larger and slightly anterolateral to the inner eyes. Frontal antennae are widely separated at base and situated just in front of the base of short palp.

The longest peristomial cirrus reaches 2nd setigerous segment.

An anterior parapodium (Fig. 2b) has a truncated preacicular ligule and bilobed postacicular ligules. The ventral cirrus is 1/2 of truncated preacicular ligule. Setae include 4 heterogomph spinigers and 2 heterogomph falcigers at the supraacicular position, and 2 heterogomph spinigers and 9 heterogomph falcigers at the subacicular position.

A posterior parapodium (Fig. 2c) has acicular ligules like those in anterior parapodia but rather small. The dorsal cirrus is enormously expanded; ventral cirrus is 1/2 of truncated preacicular ligule. Setae include 2 heterogomph spinigers and 1 heterogomph falciger at the supraacicular position, and 2 heterogomph spinigers and 3 heterogomph falcigers at the subacicular position.

Color in life is light pinkish or red and the posterior end is relatively dark. The anal ring is chocolate color, a characteristic of the present species. Color after preservation in formalin is light chocolate on the dorsal side.

**Distribution:** Chilka Lake, Tiruchendur, Calcutta, Madras, brackish waters and canal of India; Macassar; Karachchi; Nandu River; Yangtze River; and Tamsui River, Taiwan.

Genus *Ceratonereis* Kinberg, 1866

*Ceratonereis burmensis* Monro, 1937

Fig. 3, a-d.

*Ceratonereis burmensis* Monro, 1937: 532-536, textfigs. 1 a-f.

*Nereis (Ceratonereis) burmensis*, De Silva, 1965a: 214; 1965b: 546.

**Locality:** Koan-tu, Taipei Hsien, 1.5 km NWN to Koan-tu village at the suddy bank of Tamsui River (3 specimens).

**Specific Character:** The largest specimens measures 44 mm long with 74 setigerous segments. Prostomium (Fig. 3a) width larger than length; anterior pair of eyes

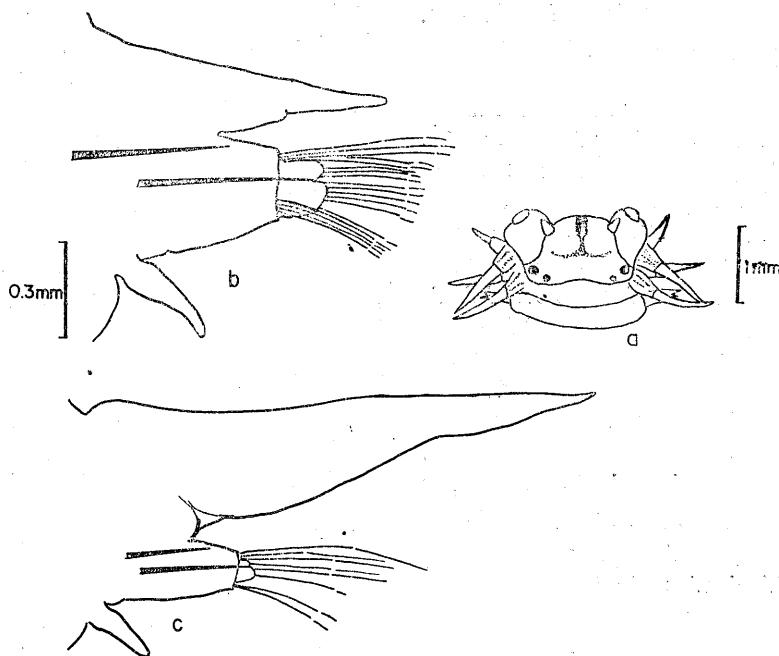


Fig. 2. *Namalycastis indica* (Southern)

a. Head, dorsal view; b. anterior parapodium, anterior view; c. posterior parapodium, anterior view (scale at b).

wider than posterior pair; frontal antenna short,  $1/3$  of prostomial length; palp thick and long. The longest peristomial cirrus extends back to setigerous segment 4. Jaw yellow and translucent, with 7 teeth along inner cutting edge. Paragnaths (Fig. 3a & b) are present only on the maxillary ring: area I none; II has 13 to 15 cones arranged in 2 transverse rows; III has 23 cones in rectangular patch; IV has 15 cones in a half crescent clusters.

Anterior parapodia between 3rd and 10th setigerous segments have neuropodial postacicular ligules elongated, exceeding the length of the preacicular ligule.

Anterior parapodia after 10th setigerous segments (Fig. 3c) have 3 conical notopodial ligules: superior one the largest, postacicular one smaller and

preacicular one the smallest. Neuropodial preacicular ligule conical and low in position; postacicular ligule is divided into 2 equal and conical portions which is posterodorsal relative to preacicular ligule in position; interior ligule conical. Dorsal cirrus shorter than superior ligule; ventral cirrus shorter than inferior ligule. Notosetae have 9 homogomph spiniger in 2 bundles; neurosetae have 11 homogomph spinigers and 9 heterogomph spinigers at the supraacicular position, and 12 heterogomph spinigers at the subacicular position.

A posterior parapodium (Fig. 3d) have only superior and notopodial postacicular ligules. Neuropodial aciculars conical and equal in size. Inferior ligule conical and becomes smaller than acicular ligules in size. Both dorsal and ventral cirri are

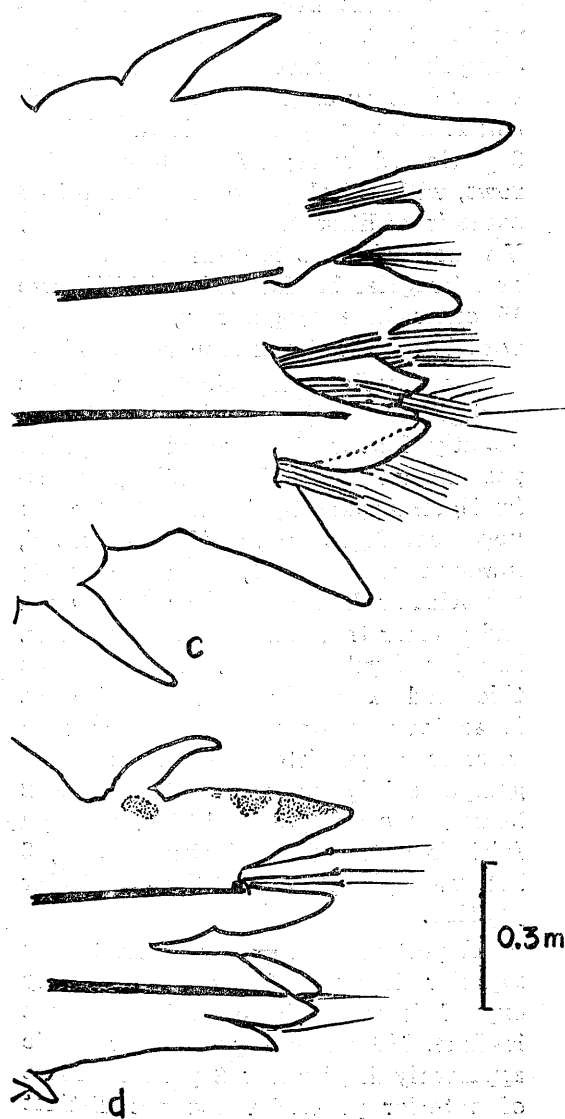
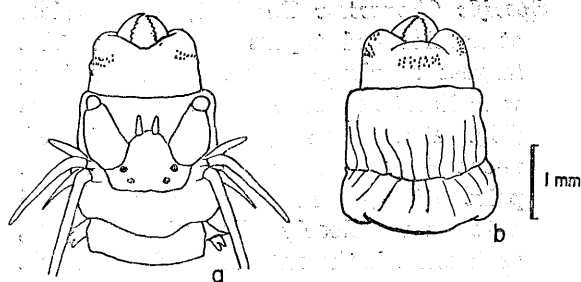


Fig. 3. *Ceratonereis burmensis* Monro

a. anterior end with proboscis everted, dorsal view (scale at b); b. proboscis, ventral view; c. anterior parapodium, anterior view (scale at c); d. posterior parapodium, anterior view.

extremely short. The base of dorsal cirrus and upper edge of superior ligule scattered with fat bodies. Notosetae have 3 homogomph spinigers of which each has an extremely long end piece; neurosetae have only 1 heterogomph spinigers and 1 homogomph spiniger at the subacicular position.

**Remark:** The present specimens agree with those of Burma (39) and Ceylon (9) except the following differences: 1) Eyes with anterior pair slightly wider than posterior pair; 2) The longest peristomial cirrus extends back to setigerous segment 4; 3) Area I of proboscis devoid of paragnaths which agrees with De Silva (9) but differs from that of Monro's (39) with more or less rectangular patch; 4) Falcigers were not observed.

**Distribution:** Maungmagan, Burma; Pitipana, Ceylon. This is the first record of this species from Taiwan.

Genus *Pseudonereis* Kinberg, 1866

*Pseudonereis anomala* Gravier, 1900

Fig. 4, a-c.

*Nereis macropis* Ehlers, 1920: 55-56, pl. 2, figs. 1-5.

*Nereis (Pseudonereis) anomala*, Horst, 1924: 43.

*Pseudonereis anomala* Gravier, 1900: pl. 12, figs. 50-52, 1901: 191-197, text-figs. 194-202; Fauvel, 1911: 395-397; 1919: 421; 1932: 112; Gravelly, 1927: 69-70, pl. 10, fig. 25; Hartman, 1954: 5, 8, 12, 17; De Silva, 1961: 177; 1965a: 215, text-fig. 5.

**Locality:** Cheng-kong, Taitong Hsien, from stones covered with abundance of algae and associated with sipunculid worms (5 specimens); Wan-li, from soft sandstone at low tide (1 specimen); Yeh-liu, Taipei Hsien, from rocks (2 specimens); Pa-chih-men, Chilung City, from sandstone (1 specimen); Che'-ch'eng, Pintung Hsien, from stones at low tide (3 specimens); Pei-fan-ao, Ilan Hsien, from coral stone at low tide (2 specimens).

**Specific Character:** The body is the widest at anterior and tapers posteriorly. The largest specimen measures 64 mm long with 89 setigerous segments. Prostomium (Fig. 4a) has its anterior half indented, about  $\frac{1}{2}$  wide of posteibior half; two pairs of eyes in rectangular; frontal antenna are closely adjoined each other, each exceeds the extremity of palps; palp thick and stout. The longest peristomial cirrus extends back to setigerous segments 4 to 6. Jaws black, with 6 teeth along the inner cutting edge. Paragnaths are as follows: area I has 2 cones in tandem; II has 4 to 5 pectinated rows; III has 5 pectinated rows; IV has 5 pectinated rows, with apical group of about 6 to 8 cones in addition to the pectinated rows; V none; VI has 6 to 9 small cones in 1 or 2 irregular bands; VII and VIII have 15 cones in a single row, alternating with longitudinal and transverse ridges.

An anterior parapodium (Fig. 4b) has a digitiform superior ligule which is slightly longer than round notopodial postacicular ligule. Neuropodial preacicular ligule apparently divides into 3 parts: upper one digitiform, middle one round, lower one the smallest, conical and short; postacicular ligule more or less round and shorter than that of preacicular one. Inferior ligule conical. Dorsal cirrus thick and extremely long; ventral cirrus is as long as or slightly longer than inferior ligule. Notosetae have 2 homogomph spinigers; neurosetae have 2 homogomph spinigers and 1 heterogomph falciger at the supraacicular position, 5 heterogomph falcigers at the subacicular position.

A posterior parapodium (Fig. 4c) has superior ligule and its base greatly expanded; notopodial postacicular ligule leaflike. Neuropodial preacicular ligule apparently divides into 3 parts as those of anterior parapodia but not distinct



inferior ligule conical and smaller than notopodial postacicular ligule. Dorsal cirrus situates near the free portion of superior ligule, same length as that of ligule; ventral cirrus is shorter than inferior ligule. Notosetae have 2 homogomph spinigers; neurosetae have 2 heterogomph falcigers at the supraacicular position; 2 heterogomph spinigers and 4 heterogomph falcigers at the subacicular position.

In general, dorsal cirrus is the longest at the anterior parapodia and gradually decrease in length posteriorly. Superior ligule is small at the anterior parapodia and gradually expands posteriorly. Neuropodial preacicular ligule is longer than postacicular ligule at the anterior parapodia and gradually decreases in size and attains the same size at the posterior parapodia.

Color after preservation is brownish green at the anterior portion; with dark band on the mid-dorsal of each segment in middle and posterior portion of the body. Prostomium and medial sides of palps are brown.

**Distribution:** Red Sea, Gulf of Persia, Madagascar, Ceylon, Gulf of Mannar, Saleyer-anchorage and surroundings, Nordwacher Island, Australia. This is the first cord of the species from Taiwan.

*Pseudonereis gallapagensis* Kinberg, 1866

*Pseudonereis gallapagensis*, Fauvel, 1932: 111; Hartman, 1940: 231; 1949: 68, 69; 1954: 5, 8, 12, 17; Okuda, 1940: 13-14, text-fig. 6; Tebble, 1955: 99, 101-102, text-fig. 15 a-c; De Silva, 1961: 176-177; 1965a: 214; Hartmann-Schroder, 1962: 432-434.

**Locality:** Cheng-kong, Taitong Hsien, from

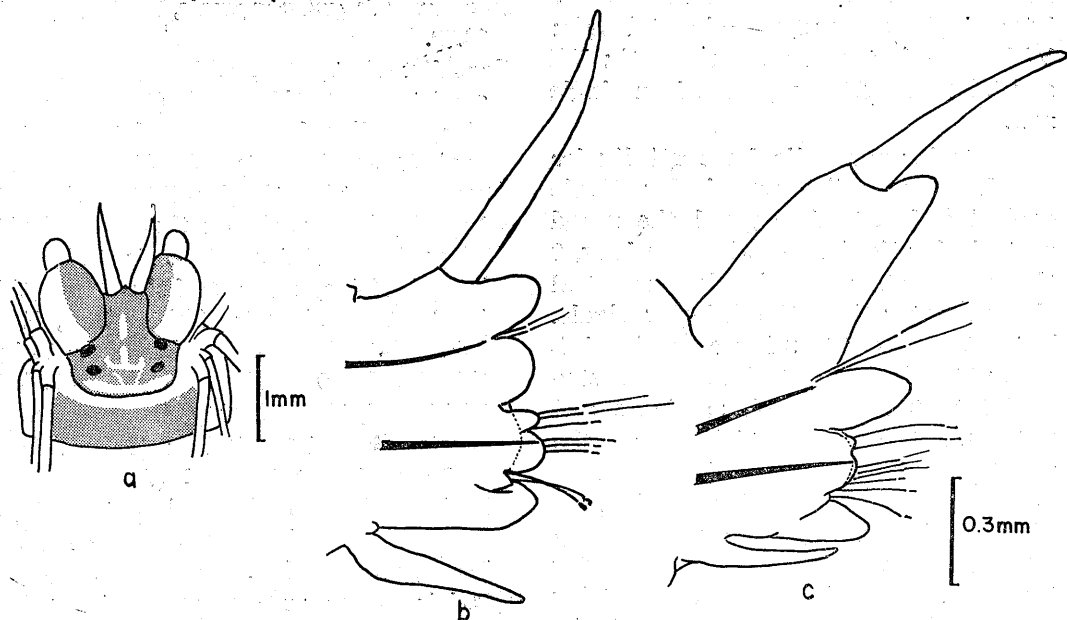


Fig. 4. *Pseudonereis anomala* Gravier.

a. head, dorsal view; b. anterior parapodium, anterior view (scale at c); c. posterior parapodium, anterior view.

stone covered with an abundance of algae, and associated with sipunculid worms (2 specimens); Mei-lun-pi, Hualien City, from rocks and associated with sipunculid worms (13 specimens); Mau-pi-tou, from limestone reef, associated with sipunculid worms (3 specimens); Wan-li-tong, Pingtung Hsien, from stones of tide pool (3 specimens).

**Specific Character:** The largest specimen 81 mm long with 102 setigerous segments. Prostomium same as that of *P. anomala*. Tentacle thick, just reaches the extremity of stout palp. The longest peristomial cirrus extends back to the segments 3 to 5. Jaw black, with 6 teeth at the inner cutting edges. Paragnaths are as follows: area I has a single cone; II has 4 pectinated rows, each row 5 to 10 cones; III has 4 pectinated rows in a triangle shape; IV has 5 pectinated rows and has apical group of strong cones in addition to the pectinated rows; V has a single cone or 3 cones in a triangle; VI has single transverse paragnath; VII and VIII have 22 paragnaths in a single row.

Anterior parapodia have all ligules round. Neuropodial preacicular ligule conical and extends beyond the round postacicular ligule. Dorsal cirrus long, 3 times longer than superior ligule; ventral cirrus shorter than the inferior ligule. Notosetae have 2 to 3 homogomph spinigers with shorter end piece; neurosetae have 2 to 3 homogomph spinigers and 2 to 3 heterogomph falcigers at the supraacicular position and heterogomph falcigers at the subacicular position.

Posterior parapodia have greatly elongated superior ligule which carry the dorsal cirrus distally; the glandular body at the lower edge of the ligule. Notopodial postacicular ligule round and possesses the glandular body as well. Neuropodial acicular ligules are same as

those of anterior parapodia. Inferior ligule short and round. Setae are identical as those in anterior parapodia except 2 additional heterogomph spinigers appear at subacicular position of each neuropodial lobe.

Color after preservation is deep dark green at the prostomium and medial side of palp; a black transverse band between the posterior pair of eye; two greenish transverse bands on the peristomial segment and each segment of first 15 setigerous segments.

**Distribution:** Galapagos, Peru, Chili, Strait of Magellan, Ryukyu, Gulf of Manner, Ceylon, India, Andaman Island, Diamond Isles, Mormugao Bay, Madagascar, Gold coast, Cape of Good Hope, Brazil, Cameroon, San-Thome. This is the first record of this species from Taiwan.

*Pseudonereis formosa* Kinberg, 1865

*Pseudonereis gallapagensis*, Hartman, 1949: 68-69.

**Locality:** Pa-tou-tzu, Chilung City, from sandstone at tide pool (4 specimens); Keng-tzu-liao, from soft sandstone at tide pool (2 specimens); Wan-li, from soft sandstone at low tide level (18 specimens); Yeh-liu, from rocks on the leeward side of peninsula (17 specimens); Shih-men, Taipei Hsien, from rocks at low tide level (1 specimen); Shi-tzu-wan, Kauhsiung City, from rock on sand flat at high tide level (19 specimens and 1 epitoke); Mei-lun-pi, Hualien City, from stones (11 specimens and 1 epitoke); Ta-shi, from rocks at low tide level (7 specimens); Fu-long, from rocks and under oyster shells (11 specimens); Su-au-wan, Ilan Hsien, from rocks (1 specimen).

**Specific Character:** The specimens measure 30 to 116 mm long with 87 to 132 setigerous segments. Prostomium length is larger than width; 2 pairs of eyes in rectangle; frontal antenna shorter than

palp. The longest peristomial cirrus extends back to setigerous segments 3 to 5. Jaws black, with 4 teeth at the inner cutting edge. The paragnaths are as follows: area I has a single cone; II has 3 to 4 pectinated rows; III has 3 pectinated rows in an oval patch; IV has pectinated rows in low triangular patch, and an apical group of cones in addition to pectinated rows; V has a single cone; VI has a single transverse paragnath; VII and VIII are in double rows of alternating longitudinal and transverse paragnaths.

An anterior parapodium has a round superior ligule which is slightly larger than notopodial postacicular ligule. Inferior ligule conical or digitiform. Neuropodial preacicular ligule round; postacicular ligule digitiform. Dorsal cirrus long, about 2.5 times the length of superior ligule; ventral cirrus shorter than inferior ligule. Notoetae have 10 to 12 homogomph spinigers; neuroetae have 5 homogomph spinigers and 5 heterogomph falcigers at the supraacicular position, and 2 heterogomph spinigers and 12 to 14 heterogomph falcigers at the subacicular position.

A posterior parapodium has extremely large superior ligule in quadrate, carrying a short dorsal cirrus near its free end; notopodial postacicular ligule small and digitiform. Neuropodial acicular ligules round; inferior ligule digitiform. Both are short. Dorsal and ventral cirri are  $\frac{1}{2}$  long of superior and inferior ligules respectively. Notoetae have 5 homogomph spinigers with shorter end-piece; Neuroetae have 7 homogomph spinigers and 3 heterogomph falcigers at the supraacicular position, and 4 heterogomph spinigers and 7 heterogomph falcigers at the subacicular position.

Color after preservation is chocolate like: deeper anterior and lighter poster-

ior. Prostomium has a mid-dorsal white line which slightly widens at the center of prostomium.

*Distribution:* Honolulu. This is the first record of the species from Taiwan.

Genus *Platynereis* Kinberg, 1866

*Platynereis bicanaliculata* (Baird, 1863)

Fig. 5, a-b.

*Nereis Dumerilli*, Izuka, 1912: 158-160, pl. 17, figs. 7-8.

*Nereis Agassizi*, Izuka, 1912: 160-162, pl. 1, fig. 9, pl. 7, figs. 9-11.

*Nereis kobeensis*, Izuka, 1912: 162-163, pl. 17, figs. 12-13.

*Platynereis bicanaliculata*, Hartman, 1954: 8, 12, 17, 36-39, text-figs. 38-39; 1956: 281; Imajima & Hartman, 1964: 152-153.

*Locality:* Shih-men, Taipei Hsien, from rocks at low tide level (1 specimen).

*Specific Character:* The specimen measures 62 mm long with 93 setigerous segments. Prostomium pentagonal; anterior pair of eyes larger and more widely separated than the posterior pair; frontal antenna long, but slightly shorter than prostomial length. The longest peristomial cirrus extends back to setigerous segment 5. Jaws amber, with 5 teeth at the inner cutting edge. Paragnaths are as follows: areas I, II and V are bare; III has pectinated teeth in oval patch; IV has 3 to 4 pectinated rows in crescent, with 2 to 4 large cones in front of the pectinated rows; VI has 2 transverse rows of pectinated teeth; VII has 3 groups of pectinated teeth in a transverse line.

First 4 parapodia thin and with blunt conical ligules. Next 6 to 7 parapodia thick and with round ligules. Single simple falciger is present from segment 9 on each parapodium to the end of the body.

A median parapodium (Fig. 5a) has notopodium with 2 almost equal and

digitiform ligules between which is a small, conical preacicular ligule. Inferior ligule digitiform and slightly shorter than notopodial postacicular ligule. Neuro-podial preacicular ligule conical; post-acicular ligule round. Dorsal cirrus exceeds far beyond superior ligule; ventral cirrus shorter than inferior ligule. Notosetae have 12 homogomph spinigers and a simple falciger. The simple falciger is brown at the hooked portion. Neurosetae have 7 homogomph spinigers and 3 heterogomph falcigers at the supraacicular position, and 2 heterogomph spinigers and 6 heterogomph falcigers at the subacicular position.

A posterior parapodium (Fig. 5b) almost identical with the median parapodium except the neuropodial post-acicular ligule is elongated and longer than preacicular ligule. Notosetae have 7 homogomph spinigers and a simple

falciger; neurosetae have 7 homogomph spinigers and 1 heterogomph falciger at the supraacicular position, and 2 heterogomph spinigers and 3 heterogomph falcigers at the subacicular position.

Color after preservation is brown in prostomium, palp and anterior region of body. There is a black arc line at the margin of the posterior pair of eyes. Pinkish bodies are present along the side of body and the base of parapodium of each segment.

**Remark:** The present species differs from Hartman's (24) specimens from Australia in that area VII of proboscis has 3 groups of pectinated teeth in an interrupted transverse line in stead of a continuous band.

**Distribution:** Western Canada to western Mexico, Hawaiian Islands, Australia and Japan. This is the first record of this species from Taiwan.

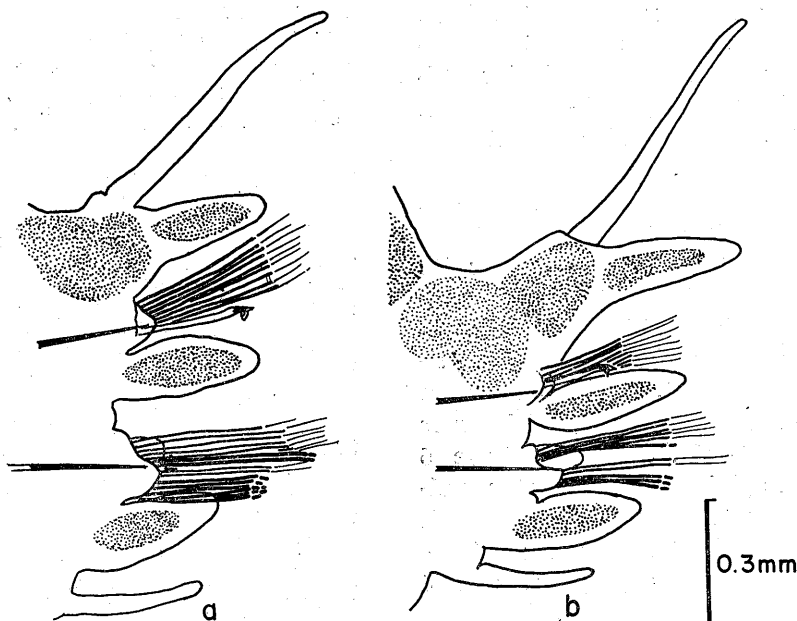


Fig. 5. *Platynereis bicanaliculata* (Baird)

a. median parapodium, anterior view (scale at b); b. posterior parapodium, anterior view.

*Platynereis dumerilii* (Audouin & Milne-Edwards, 1834)

Fig. 6, a-e.

*Nereis Dumerilii*, Fauvel, 1911: 397-402, pl. 20, figs. 26-29, pl. 21, figs. 45-52; 1919: 421-422; Augener, 1926: 450-451.

*Platynereis dumerilii*, Fauvel, 1923: 359-360, fig. 141; 1932: 113; Hartman, 1951: 47; De Silva, 1961: 177; 1965a: 215; Imajima Hartman, 1964: 153-154; Pettibone, 1963: 154-160, figs. 43 a-h.

*Nereis (Platynereis) Dumerilii*, Monro, 1926: 322.

*Platynereis insolita*, Gravely, 1927: 70, pl. 10, fig. 23.

*Platynereis Dumerilii* var. *ocellata* Pruvot, 1930: 63-65, pl. 3, figs. 75-76.

**Locality:** Shih-men, Taipei Hsien, from rocks at low tide (2 specimens); Nan-fan-au, Ilan Hsien; from reef stones at low tide (3 specimens).

**Specific Character:** The largest specimen measures 100 mm long with 114 setigerous segments. Prostomium (Fig. 6a) pentagonal; anterior pair of eye larger and more widely separated than posterior pair; frontal antenna long, almost reaches the extremity of palp. Posterior margin of prostomium has a notch at its middle portion. The longest peristomial cirrus extends back to setigerous segment 8. Peristomial as long as the prostomial. Jaws amber, with 5 teeth along the cutting edge. Paragnaths are as follows: areas I, II and V are bare; III has pectinated paragnaths in 5 groups, each group consists of 3 to 4 transverse rows (Fig. 6b); IV has 7 pectinated rows running parallel of which 3 medial rows are interrupted, resulting in lunar shape (Fig. 6b); VI has 2 transverse pectinated rows; VII and VIII have 5 transverse groups and each group in double pectinated rows (Fig. 6b).

The first 4 parapodia regular (as usual) but the next 6 parapodia thick and with

round ligules which are pinkish in appearance.

An anterior parapodium (Fig. 6c) has blunt conical superior ligule, digitiform notopodial postacicular and inferior ligules. The latter two ligules are widely separated by a short, conical notopodial preacicular ligule between them. Neuro-podial preacicular ligule conical and postacicular ligule round. Dorsal cirrus long and exceeds superior ligule; ventral cirrus shorter than inferior ligule. Noto-setae have 12 homogomph spinigers; neurosetae have 4 homogomph spinigers and 4 heterogomph falcigers at the supraacicular position, and 3 heterogomph spinigers and 7 heterogomph falcigers at the subacicular position.

A median parapodium (Fig. 6d) has the base of dorsal ligule expanded. The free end of ligule curves upwardly. Both notopodial postacicular and inferior ligules more or less pointed. Neuropodial acicular ligules are conical and short, and are widely separated from notopodial ligule. Dorsal and ventral cirri are same as the anterior parapodium and setae are also identical but reduced in their numbers.

A posterior parapodium (Fig. 6e) modifies very much. All ligules are elongated, pointed and curved upwardly. The base of dorsal cirrus has a big pinkish fat bodies. Dorsal cirrus slightly exceeds the elongated superior ligule; ventral cirrus shorter than the inferior ligule. Notoetae have 1 to 2 homogomph spinigers; neurosetae have 2 homogomph spinigers and 1 heterogomph spiniger at the supraacicular position; and 1 heterogomph spiniger and 2 heterogomph falcigers at the subacicular position.

**Distribution:** A cosmopolitan species with wide geographic distribution in warm seas (44). Massachusetts, south of New Foundland to Florida, Puerto Rico, Bar-

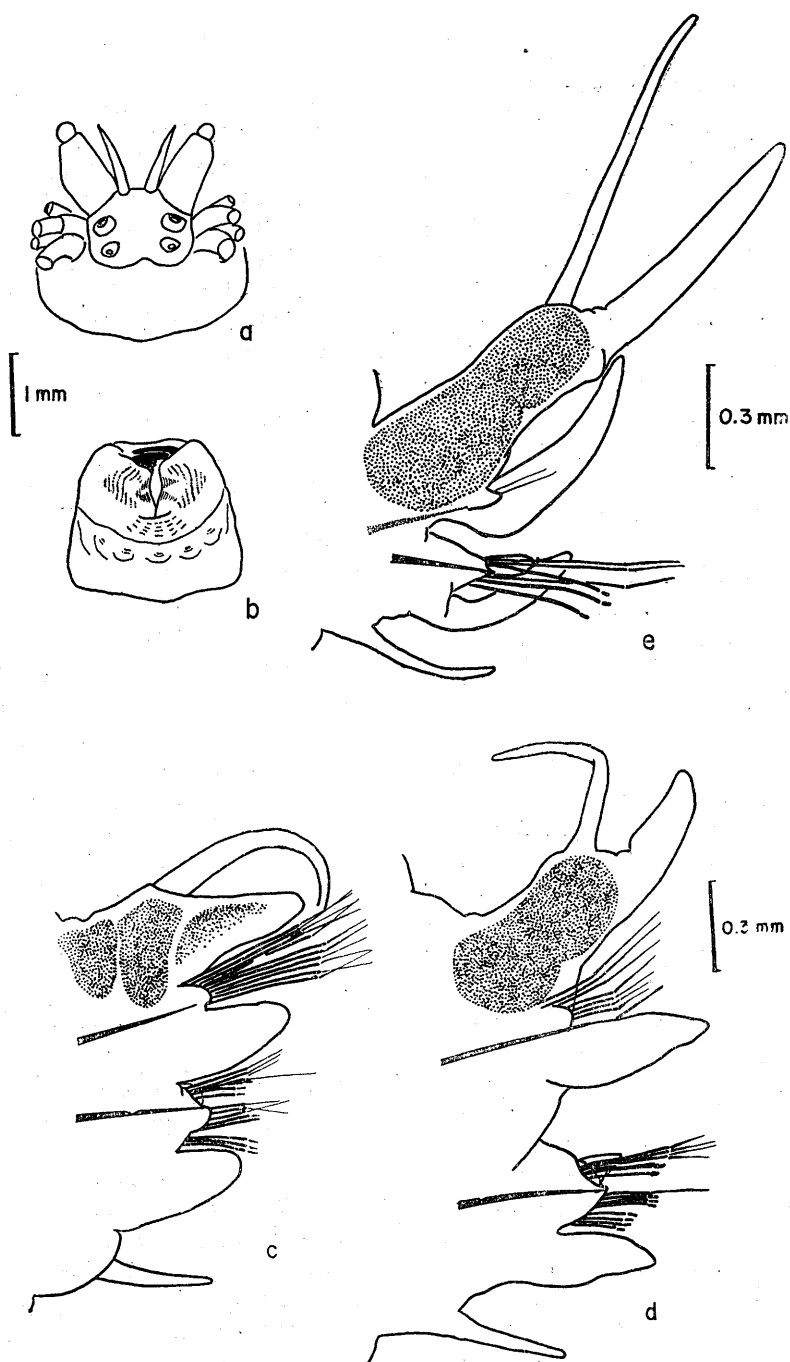


Fig. 6. *Platynereis dumerilii* (Audouin & Milne-Edward)  
 a. anterior end; dorsal view; b. proboscis showing the  
 paragnaths, ventral view; c. anterior parapodium, anterior  
 view; d. median parapodium, anterior view; e. posterior  
 parapodium, anterior view. (The scales of c at d)

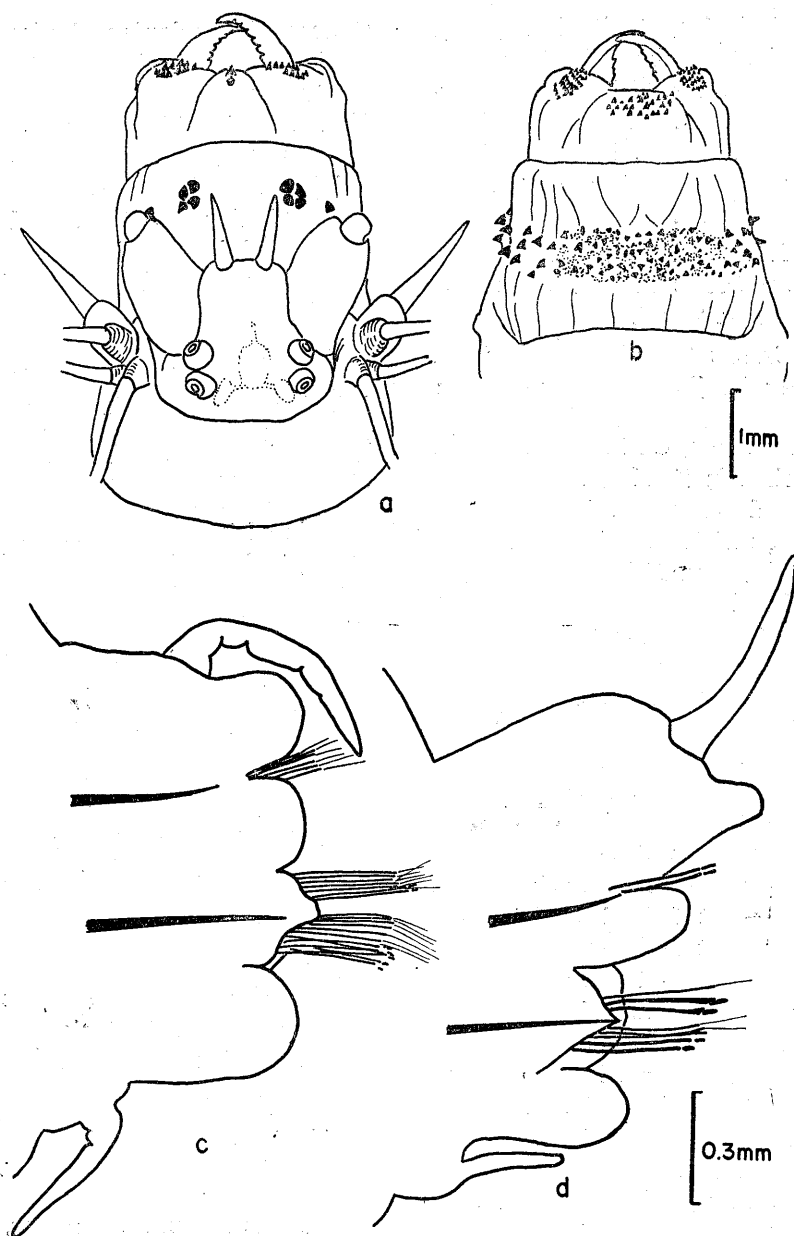


Fig. 7. *Nereis heterocirrata* Treadwell.

a. anterior end with proboscis everted, dorsal view; b. proboscis, ventral view; c. anterior parapodium, anterior view; d. posterior parapodium, anterior view. (The scale of a at b; the scale of c at d)

bados, Gulf of Mexico, Strait of Magellan, South Georgia, Manche, Mediterranean Sea, Gulf of Persia, Djibouti, Obock, Madagascar, Ceylon, Krusadai Island, Shingle Island, Pamban, New Caledonia, Japan. This is the first record of this species from Taiwan.

Genus *Nereis* Linnaeus, 1758

*Nereis heterocirrata* Treadwell, 1931

Fig. 7, a-d.

*Nereis heterocirrata* Treadwell, 1931: 1-2, text-fig. 1 a-e; Imajima & Hartman, 1964: 146-147.

**Locality:** Pa-chih-men, Chilung City, from rocks (1 specimen); Yeh-liu, Taipei Hsien, from rocks and stones on leeward side of peninsula at high tide level (4 specimens); Ta-chih, Ilan Hsien, from stones at low tide level (1 specimen).

**Specific Character:** The largest specimen measures 65 mm long with 69 setigerous segments. Prostomium (Fig. 7a) length longer than width; eyes large; anterior and posterior eyes are located closely; frontal antenna is  $\frac{1}{2}$  of prostomial length. The first ventral peristomial cirrus thick and has a flask shape style. The longest peristomial cirrus extends back to the setigerous segment 1, and is 1.5 times as long as the first setigerous segment. Jaws amber, with 6 teeth along the cutting edge. Paragnaths (Figs. 7a & 7b) are as follows: area I has 2 cones in tandem; II has small and large cones in a crescent cluster; III has about 25 cones in 3 to 4 irregular transverse rows; IV has 36 to 40 cones arranged in 4 oblique rows and has an apical group of 4 to 5 relatively large cones in addition to the oblique rows; V bare; VI has 4 large cones; VII and VIII have continuous band in 2 to 4 irregular rows of large cones, many small cones are scattered on area VII.

All ligules and anterior parapodium (Fig. 7c) are thick and round except

neuropodial acicular ligules which are conical. Dorsal cirrus extremely long; ventral cirrus as long as the inferior ligule. Notoetae have 6 homogomph spinigers; neuroetae have 8 homogomph spinigers and 2 heterogomph at the supraacicular position, and 7 heterogomph spinigers and 7 heterogomph falcigers at the subacicular position.

A posterior parapodium (Fig. 7d) has the superior ligule expanded into quadrate shape, notopodial postacicular and inferior ligules digitiform; neuropodial preacicular ligule conical; postacicular ligule round and longer than the preacicular ligule. Dorsal cirrus long, close to the tip of superior ligule; ventral cirrus short,  $\frac{1}{2}$  of inferior ligule. Notoetae have 2 homogomph falcigers; neuroetae have single homogomph spiniger and 2 heterogomph falcigers at the supraacicular position; and 3 heterogomph spinigers and 2 heterogomph falcigers at the subacicular position.

Color when alive is greenish in general with 2 white oval patches on the medial side of posterior pair of eyes. These 2 patches are connected by a fine transverse line. A trapezoid patch, though not distinct, are present between 2 pairs of eyes (Fig. 7a).

**Remark:** The cirrophore of the first ventral peristomial tentacle is normal instead of thick and swollen as described by Treadwell (54).

**Distribution:** Takami, near Choshi, Japan. This is the first record of this species from Taiwan.

Genus *Neanthes* Kinberg, 1866

*Neanthes glandicincta* (Southern, 1921)

Fig. 8, a-c.

*Nereis* (*Nereis*) *glandicincta* Southern, 1921: 589-593, pl. 23, figs. 9 A-L; text-figs. 5 a-e; Fauvel, 1932: 92-93; Wu & Chen, 1963: 22.

**Locality:** Koan-tu, Taipei Hsien, 1.5 km



NWN to the village, from muddy banks of Tamsui River (2 specimens); Long-sing, Taipei Hsien, from muddy banks of Tamsui River (22 specimens); Tuchuan-tou, Taipei Hsien, from the muddy area of the mouth of Tamsui River (6 specimens); Hsia-shan, Tainan Hsien, from muddy and sand bank of inland canal (2 specimens).

**Specific Character:** The specimens measures 60 mm long with 76 setigerous segments. Prostomium (Fig. 8a) cordiform, width and length are equal 2 pairs of eyes situate at the posterior  $\frac{1}{3}$  of prostomium, anterior pair wider than the posterior pair; frontal antennae locate closely to each other, short, about  $\frac{1}{4}$  of prostomial length; palp thick at base and pointed distally. The longest peristomial cirrus extends back to the setigerous segment 3. Jaws yellow and translucent, with 8 teeth along the cutting edge. Paragnaths are as follows: area I has 5 to 8 cones irregularly scattered; II has 7-8 cones in 2 oblique

rows; III has transverse rows in a transverse band; IV has 11 cones in an oval cluster. There are no paragnaths on the oral ring but usually a few rudiment cones can be seen on area VI.

An anterior parapodium (Fig. 8b) has 3 notopodial ligules: superior one the largest and conical; postaciular one smaller and preacicular one the smallest. Neuropodium blunt conical, equal length of pre-and postacicular ligules and conical inferior ligule. Dorsal cirrus  $\frac{1}{2}$  of superior ligule in length; ventral cirrus small and far apart from inferior ligule. Noto-setae have 10 homogomph spinigers; neurosetae have 10 homogomph and 5 heterogomph spinigers at the supraacicular position, and 6 heterogomph spinigers at the subacicular position.

The posterior parapodium (Fig. 8c) is identical to the anterior parapodia except that the notopodial preacicular ligule is round and smaller in size; inferior ligule small,  $\frac{1}{2}$  of acicular ligules. Noto-setae have 5 homogomph spinigers;

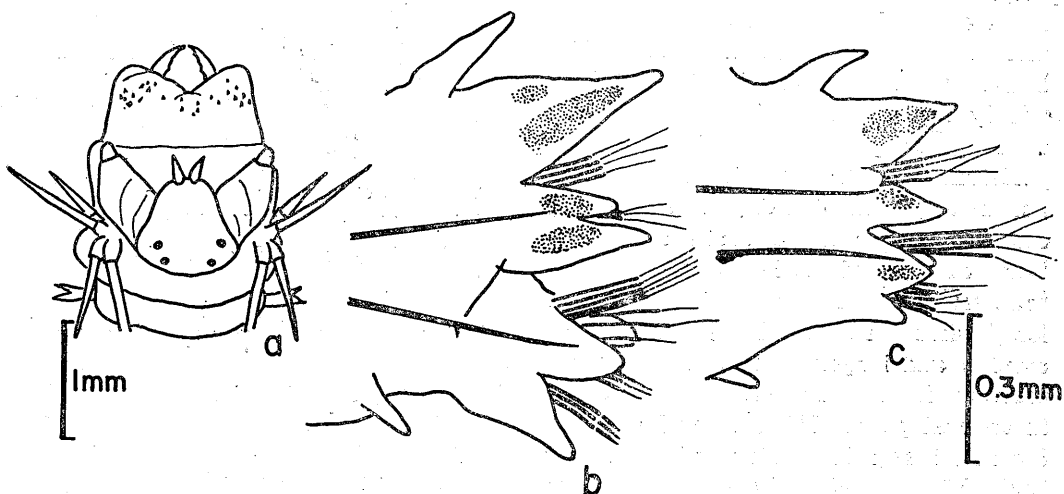


Fig. 8. *Neanthes glandicincta* (Southern)

a. anterior end with proboscis everted, dorsal view; b. anterior parapodium, anterior view (the scale at c); c. posterior parapodium, anterior view.

neurosetae have 4 homogomph and 1 heterogomph spinigers at the supraacicular position, and 5 heterogomph spinigers at the subacicular position.

Color when alive is light green at anterior region of the body. The mid-dorsal of body has a red line due to the dorsal blood vessel. Both sides of the red line are white cream colored, starting from setigerous segment 10 backward to the posterior end of the body. Parapodia are usually reddish due to the distinct blood capillaries distributed in them.

**Distribution:** Chilka Lake, India; Nandu River (Hainan). This is the first record of this species from Taiwan.

Genus *Perinereis* Kinberg, 1866

*Perinereis novaehollandiae* Kinberg, 1866

*Nereis* (*Perinereis*) *Novae-Hollandiae*, Augener, 1927: 347.

*Perinereis novae-hollandiae*, Pruvot, 1930: 56-59, pl. 3, figs. 69-74; Knox, 1951: 221-222, pl. 48, figs. 25-31.

**Locality:** Mei-lun-pi, Hualien City, from rocks (4 specimens).

**Specific Character:** One specimen measures 45 mm long with 95 setigerous segments. Prostomium hexagonal, width larger than length; frontal antenna widely separated. Peristomium is half as long as prostomium. The longest peristomial cirrus extends back to setigerous segments 4 to 6. Jaws are amber colored, each with 4 teeth along the inner cutting edge. Paragnaths are as follows: area I has 6 to 8 cones in 2 longitudinal rows; II has numerous smaller and larger cones in a triangular cluster; III has numerous small cones in an oval patch; IV same as II; V has 5 cones, 1 at midanterior and 4 farther back; VI has a single transverse ridge; VII and VIII occur in 2 rows.

An anterior parapodium has 2 equal, blunt conical notopodial ligules, a digitiform inferior ligule. Neuropodial acicular

ligules point posteriorly and can be subdivided into 3 divisions. Dorsal cirrus about 2.5 times as long as the dorsal ligule; ventral cirrus as long as the inferior ligule. Notosetae have 4 to 5 homogomph spinigers; neurosetae have 2 homogomph spinigers and 2 heterogomph falcigers at the supraacicular position, and 6 heterogomph falcigers at the subacicular position.

A posterior parapodium has 2 subequal, blunt conical notopodial ligules and a round inferior ligule. Neuropodial acicular ligules small. Notopodial portion where postero-medial to the dorsal cirrus is expanded. Dorsal cirrus long, about 2 times the length of superior ligule; ventral cirrus is as long as the inferior ligule. Notosetae has 4 to 5 homogomph spinigers; neurosetae have 2 to 3 homogomph spinigers and 2 heterogomph falcigers at the supraacicular position; and 4 heterogomph falcigers at the subacicular position. All end piece and the base of the articulation of heterogomph falcigers are chocolate colored.

**Remark:** The specimens quite agree with Provot's (46) from Australia except in the proboscidal areas I and V; I has 2 longitudinal rows instead of 1 rows, and V has 4 cones farther back in a transverse row instead of forming an arc with its concavity facing anteriorly.

**Distribution:** Australia, New Zealand. This is the first record of the species from Taiwan.

*Perinereis nigropunctata* Horst, 1889  
Fig. 9, a-d.

*Nereis* (*Perinereis*) *nigaropunctata* Horst, 1889: 171-174, pl. 8, figs. 1-3; 1924: 27.

*Perinereis nigropunctata*, Gravier, 1901: 188-191, Vol. 2, pl. 11, fig. 49 text-figs. 190-193; Fauvel, 1932: 107; Hartman, 1954: 5, 8, 12, 16; De Silva, 1961: 176; 1965a: 214; Ghosh, 1963: 241.

*Peirnerereis marjorii* Southern, 1921: 595-597,

pl. 23, figs. 10 A-G, text-figs. 7, 8 a-c.

**Locality:** Shih-men, Taipei Hsien, from rocks at low tide level (4 specimens); Wan-li-tong, Pintong Hsien, from rocks in tide pool (1 epitoke); Cheng-kong, Taitong Hsien, from rocks with abundance of algae and associated with sipunculid worms (3 specimens).

**Specific Character:** One specimen in 2 fragments contains 84 setigerous segments. Prostomium (Fig. 9a) wider than long; 2 pairs of eyes arranged in rectangle, indistinct due to black band on it; frontal antenna  $\frac{1}{2}$  of prostomial long. The longest peristomial cirrus extends back to setigerous segments 4 to 5. Jaws chocolate in color, with 5 teeth along the inner cutting edge. Paragnaths are follows (Figs. 9a and 9b): area I has 5 to 7, usually with 4 in diamond shape and 1 anterior to the latter; II about 10 cones in 2 transverse rows; III has about 20 cones in rectangular patch, 3 cones on each side; IV has 25 small and

large cones in triangular patch; V has 3 cones in triangle; VI has a single transverse ridge; VII and VIII have about 30 paragnaths in a belt of 2 rows: each row alternates with longitudinal and transverse paragnaths.

An anterior parapodium (Fig. 9c) have blunt conical superior ligule; round notopodial ligule. Neuropodial acicular ligules round; inferior ligule digitiform. Dorsal cirrus slightly longer than superior ligule; ventral cirrus slightly shorter than inferior ligule. Notosetae have 8 homogomph spinigers; neurosetae have 4 homogomph spinigers and 3 heterogomph falcigers at the supraacicular position; and 1 heterogomph spiniger and 9 heterogomph falcigers at the subacicular position.

A posterior parapodium (Fig. 9d) has superior ligule greatly expanded and the free end is finely conical; notopodial preacicular ligule small; postacicular ligule pointed digitiform; much smaller

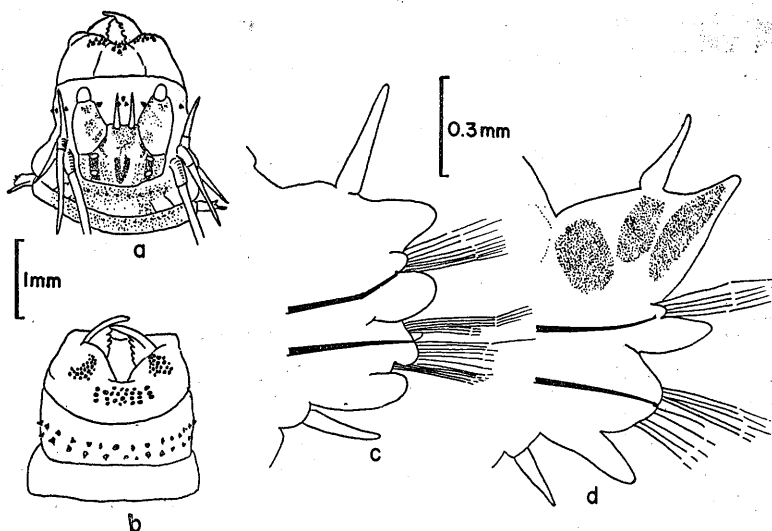


Fig. 9. *Perinereis nigropunctata* Horst.

a. anterior end of the body, with proboscis protruded, dorsal view; b. proboscis, ventral view; c. anterior parapodium, anterior view; d. posterior parapodium, anterior view.

than superior ligule. Neuropodial ligule, blunt conical or round; inferior ligule digitiform. Dorsal cirrus just reaches the extremity of free end of superior ligule; ventral cirrus shorter than inferior ligule. Setae are same as those of anterior parapodia except the numbers of notopodial spinigers and neuropodial falcigers are slightly decreased.

Color in formalin has the head and the anterior 9 segments deep chocolate; prostomium with V-shaped black pattern between the eyes and 2 longitudinal black bands just at the inner side of the eyes (Fig. 9a). Many transverse black lines are visible on each anterior segment but gradually diminished posteriorly. Mid-dorsal chocolate band is visible throughout the body. On the both sides of each segment after segment 10 has a fingerlike pattern.

*Distribution:* Mombasa, Madagascar, Red Sea, Childa Lake, Gulf of Mannar, Ceylon, Malay, North Australia, Great Barrier Reef, Nankauri, Diamond Island, Cape Comorin. This is the first record of this species from Taiwan.

*Perinereis helleri* (Grube, 1878)

*Nereis* (*Perinereis*) *helleri* Grube, 1878: 81-82; Horst, 1924: 172-173, pl. 34, figs. 3-4; Treadwell, 1925: 16.

*Perinereis helleri*, Chamberlin, 1919: 227, pl. 35, fig. 8; Pruvot, 1930: 62-63; Holly, 1935: 25; Hartman, 1954: 5, 8, 12, 16; 1956: 281; Hartmann-Schroder, 1962: 411.

*Perinereis cultrifera* var. *helleri*, Fauvel, 1932: 105-106; Chlebovitsch & Wu, 1962: 39-40, 51.

*Locality:* Wan-li, Chilung Hsien, from the loose slit of sandstones and gravels at low tide (6 specimens).

*Specific Character:* The largest specimen measures 76 mm long with 112 setigerous segments. Prostomium wider than long; anterior pair of eyes wider than posterior pair. The longest peristomial cirrus

extends back to setigerous segment 7. Jaws amber, with 6 teeth along the inner cutting edge. Paragnaths are as follows: area I has 2 cones in tandem, occasionally with additional 1 cone at the side; II has 6 to 9 cones arranged in triangular clusters; III has 8 to 12 cones in 2 transverse rows, with 2 to 3 cones on both sides; IV has 14 to 17 cones in 3 to 4 rows; V has 3 cones in triangle; VI has a single transverse ridge; VII and VIII double rows; anterior row with 7 to 8 cones; posterior row with 16 to 19 cones.

A parapodium has conical superior and notopodial postaciclar ligules, round neuropodial acicular ligules and blunt conical inferior ligule. Dorsal cirrus long, twice the length of superior ligule; ventral cirrus short,  $\frac{1}{2}$  the length of inferior ligule. Notosetae have 4 homogomph spinigers; neurosetae have 4 homogomph spinigers and 2 heterogomph falcigers at supraacicular position; and 1 heterogomph spinigers and 4 to 5 heterogomph falcigers at the subacicular position.

*Distribution:* Great Barrier Reef, Australia, New Caledonia; Ambon anchorage, Paumotu Island, Easter Island, Johnston Island, Hawaii, Philippine, Pamban, Tuticorin, Yellow Sea, Bombay Harbor, Mergui Tor, Sinai Peninsula, Chile, Costa Rica. This is the first record of this species from Taiwan.

*Perinereis cultrifera* (Grube, 1840)

*Nereis cultrifera*, Horst, 1898: 162-163; Elwes, 1909: 352, 358; Izuka, 1912: 151-153, pl. 16, figs. 7-14; Allen, 1915: 619.

*Perinereis cultrifera*, Fauvel, 1919: 410; 1923: 352-354, fig. 137; 1932: 104-105; Gravely, 1927: 69, pl. 10, fig. 26; Aziz, 1938: 29-30, pl. 6, fig. 28, pl. 7, figs. 54-55; Hartman, 1949: 72; Tenerelli, 1961: 247; Chlebovitsch & Wu, 1962: 39-40, 51; Day, 1962: 640; Imaizima & Hartman, 1964: 152.

*Nereis (Perinereis) cultrifera*, Monro, 1926: 315.

**Locality:** Shih-men, from rocks at low tide level (2 specimens); Wan-li, from soft sandstone (1 specimen); Keng-tzu-liao, Chilung Hsien, from soft sandstones in tide pool (1 specimen); Cheng-kong, Taitong Hsien, from rocks with abundance of algae, and associated with sipunculid worms (1 specimen).

**Specific character:** One specimen measures 88 mm long with 87 setigerous segments. Prostomium slightly wider than long; frontal antenna almost reaches the tip of palp. The longest peristomial cirrus extends back to setigerous segments 4 to 5. Jaws black, with 4 teeth along the cutting edge. Paragnaths are as follows: area I has 2 to 3 cones in longitudinal row; II has 15 to 16 cones in 3 irregular rows; III has 15 to 16 cones arranged in an oval patch or 3 irregular transverse rows; IV has about 22 cones in 4 irregular oblique rows; V has 3 cones in triangle; VI has a single transverse ridge; VII and VIII have 38 cones in double rows, to only 1 row at the sides.

An anterior parapodium has blunt conical superior ligule, quadrate notopodial postacicular ligule, round preacicular ligule which separates the latter 2 ligules. Inferior ligule digitiform; neuropodial acicular ligules round and  $\frac{1}{2}$  the length of interior ligule. Dorsal cirrus longer than superior ligule; ventral cirrus shorter than inferior ligule, about  $\frac{2}{3}$  of the latter. Notoetae have 8 to 9 homogomph spinigers; neurosetae have 5 homogomph spinigers and 3 heterogomph falcigers at the supraacicular position, and 2 heterogomph spinigers and 7 to 9 heterogomph falcigers at the subacicular position.

A posterior parapodium has a superior ligule greatly expanded, a digitiform notopodial postacicular and inferior ligu-

les. Neuropodial acicular ligules are greatly reduce in length, just at the base of inferior ligules. Dorsal cirrus is as long as superior ligule; ventral cirrus is about  $\frac{2}{3}$  the length of inferior ligule. Setae are identical as those of anterior parapodia but decrease in their numbers.

Color in formalin: prostomium with 2 characteristic longitudinal black bands at level between anterior pair of eyes. Anterior few segments have large trapezoid white pattern at mid-dorsal of posterior margin of each segment. Transverse black line is also visible at anterior margin of each segments.

**Distribution:** Cosmopolitan species. Mediterranean, Natal, Mombasa, Madagascar, Krusadai Island (Gulf of Mannar), Karachi, Singapore, Yellow Sea, China coast, Portugal coast, Torquay, Plymouth, Salcombe, Exmouth, Japan, Camorta Island, Andamans, Cape Comorin, Diamond Harbor, Rock-Pool Reef, Nord Sea, Manche.

*Perinereis singaporiensis* (Grube, 1878)

*Nereis (Perinereis) singaporiensis* Grube, 1878: 84-85; Horst, 1924: 25-26, pl. 34; figs. 1-2.

*Perinereis singaporiensis*, Monro, 1931: 36-38, text-figs. 1 a-c; Fuuvel, 1932: 103.

**Locality:** Keng-tsu-liao, Chilung Hsien, from sandstones in tide pool (1 specimen); Mei-lun-pi, Hualien city, from rocks (3 specimens).

**Specific Character:** The largest specimen measures 102 mm long with 117 setigerous segments. Prostomium slightly wider than long; frontal antenna short, less than  $\frac{1}{3}$  of prostomial long. The longest peristomial cirrus extends back to setigerous segments 3 to 4. Jaws black, with 6 teeth along the cutting edge. Paragnaths are as follows: area I has 2 cones in tandem or 4 in diamond shape, occasional with 1 additional cone on side; II has 3 to 14 cone in triangular clusters;

III has a rectangular patch and 2 to 4 cones on both sides; IV has about 25 cones in triangular clusters; V has a single cone, far behind group VI; VI has 2 transverse ridges, sometimes the ridges broken up into points; VII and VIII are in double rows: anterior row with 14 and posterior row with 27 cones.

An anterior parapodium has all notopodial ligules digitiform; inferior ligule digitiform, smaller than notopodial ligules. Neuropodial preacicular ligule truncate; postacicular ligule round. Dorsal cirrus is same or slightly shorter than superior ligule; ventral cirrus is  $\frac{1}{2}$  the length of inferior ligule. Notoetae have 4 homogomph spinigers; neuroetae have 6 homogomph spinigers and 4 heterogomph falcigers at the supraacicular position; and 1 heterogomph spinigers and 12 heterogomph falcigers at the subacicular position.

A posterior parapodium has all ligules blunt conical; the superior one is the largest, notopodial postacicular next and inferior the smallest. Both neuropodial pre and postacicular ligules round. Both dorsal and ventral cirri are identical as those of anterior parapodia. The base of dorsal cirrus and superior ligule has a large mass of fat body. Notoetae have 4 homogomph spinigers; neuroetae have 4 homogomph spinigers and 3 heterogomph falcigers at supraacicular position, and a single heterogomph spiniger and 6 heterogomph falcigers at the subacicular position.

Color in formalin: Each segment has a beautiful fingerprint-like pattern on the both dorsal sides. Posterior  $\frac{2}{3}$  of body is iridescent.

**Distribution:** Pajunga Island, Ceylon, Singapore, Jack and Una Islands, Diamond Island. This is the first record of this species from Taiwan.

*Perinereis linea* (Treadwell, 1936)

Fig. 10, a-d.

*Nereis (Neanthes) linea* Treadwell, 1936: 268-270, text-figs. 19 a-e.

**Locality:** Wu-ch'i, Taichung Hsien, from sand beach, 1 to 10 cm depth under thin muddy surface layer (1 specimen).

**Specific Character:** The specimen measures 165 mm long with 156 setigerous segments. Prostomium (Fig. 10a) subpentagonal in shape, long equal wide; anterior pair of eyes slightly wider than posterior pair; frontal antenna short, about  $\frac{1}{4}$  of prostomial long. The longest cirrus extends back to setigerous segment 6. Jaws black, with 3 to 4 teeth along the inner cutting edge. Paragnaths (Figs. 10a & 10b) are as follows: area I has 4 cones in diamond; II has about 14 cones in 2 irregular oblique rows; III has numerous (about 60) cones which is smaller than those of areas I and II and forms either transverse band or with division of central patch and few cones on sides; IV has 22 to 24 cones in 3 rows of crescentic clusters; V has 3 cones in triangle; VI has 2 transverse ridges; VII and VIII in double rows: anterior row with 24, posterior with 36, each row alternate with longitudinal and transverse ridges.

An anterior parapodium (Fig. 10c) has an elongated, conical, equal-sized superior and notopodial postacicular ligules. Inferior ligule elongated conical and smaller in size than notopodial ligules; neuropodial acicular ligules are  $\frac{1}{2}$  the length of inferior ligule; preacicular ligule vertical or truncated above and below the ventral acicule; postacicular ligule divide into 2 round portions. Dorsal cirrus slightly shorter than superior ligule; ventral cirrus is  $\frac{1}{2}$  the length of inferior ligule. Notoetae have 7 to 8 homogomph spinigers; neuroetae have 7 homogomph spinigers and 5 to 6 het-

erogomph falcigers at the supraacicular position, and 4 heterogomph spinigers and 10 heterogomph falcigers at the subacicular position. Falciger has an elongated end-piece which is saw-edged and ciliated at its basal portion.

A posterior parapodium (Fig. 10d) is identical as those of anterior parapodia except the superior ligule with fat bodies, the numbers of setae decreased, both neuropodial pre- and postacicular ligules

round.

**Remark:** This species quite agrees to Treadwell's species from Amoy, China (55). The author believes that the figure 19b of Treadwell (55) is up side down. His inversed figure of 19b also agrees Figure 10c of this species from Taiwan.

**Distribution:** Amoy (China coast). This is the first record of this species from Taiwan.

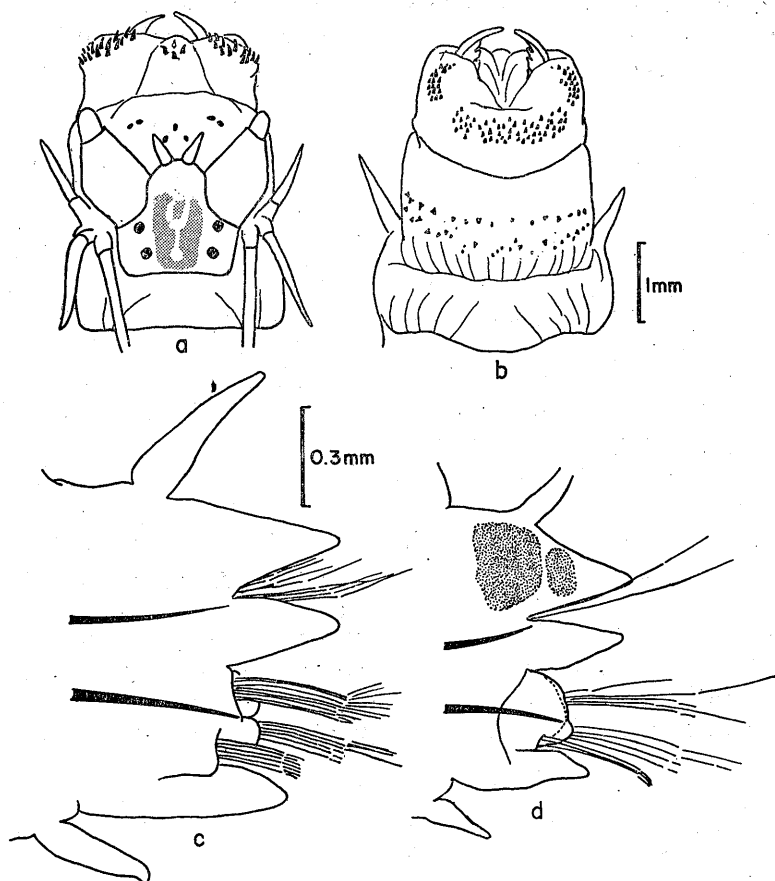


Fig. 10. *Perinereis linea* (Treadwell)

a. anterior end of the body, with proboscis everted, dorsal view; b. proboscis, ventral view; c. anterior parapodium, anterior view; d. posterior parapodium, anterior view. (The scale of a at b, the scale of d at c).

*Perineis aibuhitensis* Grube, 1878

*Pereis* (*Perinereis*) *aibuhitensis* Grube, 1878: 89-90, pl. 5, fig. 3; Horst, 1924: 168-169, pl. 33, figs. 4-6.

*Perinereis aibuhitensis*, Fauvel, 1932: 106; Chlebovitch & Wu, 1962: 39, 50-51, pl. 1, figs. 3-4; Wu & Chen, 1963: 23.

*Nereis aibuhitensis*, Monro, 1934: 361-362.

**Locality:** Koan-tu, Taipei Hsien, from muddy banks of Tamsui River (4 specimens).

**Specific Character:** The largest specimen measures 120 mm with 135 setigerous segments. Prostomium long equal wide; frontal antenna short,  $\frac{1}{4}$  of the prostomial long. The longest peristomial cirrus extends back to setigerous segments 2 to 5. Peristomial long is  $\frac{1}{4}$  of prostomial long. Jaws black, with 5 teeth along the cutting edge. Paragnaths are as follows: area I has a single or 2 cones in tandem (larger one at posterior position); II has 8 to 9 cones in triangular clusters; III has 10 to 15 cones in 3 irregular transverse rows, with 2 to 3 cones on both sides; IV has 13 to 20 cones in crescent clusters; V has 3 cones in triangle; VI has 2 cones; VII and VIII have double rows but only one row at the sides; anterior row with 9 to 10, posterior row with 15 to 20 paragnaths. In general, maxillary cones are smaller than those of oral cones.

An anterior parapodium has a conical superior ligule; a blunt conical notopodial postacicular ligule; an elongated digitiform inferior ligule which almost 2 times the long of neuropodial acicular ligule. Neuropodial acicular ligules are blunt conical. Dorsal cirrus shorter than superior ligule; ventral cirrus shorter than  $\frac{1}{4}$  the length of inferior ligule. Notosetae have 5 homogomph spinigers; neurosetae have 3 homogomph spinigers and 5 heterogomph falcigers at the supraacicular position; 2 heterogomph spinigers

and 14 heterogomph falcigers at the subacicular position.

A posterior parapodium has conical superior and notopodial postacicular ligule. Inferior ligule small; neuropodial acicular ligules round. Dorsal cirrus as long as superior ligule; ventral cirrus  $\frac{1}{4}$  the length of inferior ligule. Fat bodies present at the base of superior ligule. Notosetae have 3 homogomph spinigers; neurosetae have 3 homogomph spinigers and 4 heterogomph falcigers at the subacicular position and 1 heterogomph spinigers and 7 heterogomph falcigers at the subacicular position.

Color when alive has the parapodia with a white spot on the first 10 parapodia. A green mid-dorsal line appears at 10th segment, and another green line along both sides of the latter appear about 35th segment which become very distinct at the posterior end of the body. White elliptical patch along both side of segment appear at the 9th segment and continue to the posterior end of the body.

**Distribution:** Philippine, Batavis, Macassar, Mormugao Bay, Kowlong River (Amoy), Min River (Foochow), Pai Ho (Tientsin, Taku). This is the first record of this species from Taiwan.

*Perinereis vancaurica* (Ehlers, 1868)

*Nereis* (*Perinereis*) *vancaurica*, Grube, 1878: 83-84.

*Nereis vancaurica*, Ehlers, 1905:

*Perinereis nancaurica*, Monro, 1931: 38-41, text-figs. 2 a-f.

*Perinereis vancaurica*, Fauvel, 1932: 103; Aziz, 1938: 30; Hartman, 1954: 5, 8, 12, 16.

**Locality:** Kan-hua, from stones at low tide level (5 specimens); Shih-men, from rocks at low tide level (12 specimens); Wan-li, from soft sandstones or under stones (12 specimens); Yeh-liu, from rocks (4 specimens); Keng-tsu-liao, Chilung Hsien, from soft sandstone in tide pool (6 specimens); Pa-tou-tzu, Chilung city,



from rocks in tide pool (1 specimen); Fu-long, Ilan Hsien, from rock or under the oyster shells (1 specimen); Mei-lun-pi, Hualien city, from rocks (2 specimens).

*Specific Character:* The largest specimen measures 155 mm long with 127 setigerous segments. Prostomium wider than long; 2 pairs of eyes arranged in rectangle; frontal antenna shorter than  $\frac{1}{2}$  of prostomial long. The longest peristomial cirrus extends back to setigerous segments 2 to 3. Jaws black, without teeth along the cutting. Paragnaths are as follows: area I has 2 cones in tandem, usually with 1 or 2 additional cones; II has about 30 cones in 2 to 3 irregular transverse rows; III has 38 cones in an oval patch, with 9 to 10 cones on both sides; IV has numerous cones arranged in L-shaped; V has 3 cones in transverse or low triangle; VI has 2 ridges; VII and VIII have 2 rows: anterior row with 14 larger cones of which the mid-ventral cones are connected with smaller cones; posterior row with 23 larger cones.

An anterior parapodium has 2 blunt conical notopodial ligules. Neuropodial acicular ligules round; inferior ligule digitiform. A round fat body presents at the base of superior ligule. Dorsal cirrus slightly longer than superior ligule; ventral cirrus slightly shorter than inferior ligule. Notosetae have 5 homogomph spinigers; neurosetae have 2 homogomph spinigers and 4 heterogomph falcigers at the supraacicular position, 1 heterogomph spiniger and 9 heterogomph falcigers at the subacicular position.

A posterior parapodium is identical as those in anterior portion but the fat bodies are scattered along the bases of notopodium and dorsolateral portion of each segment of which the latter gives a white line on each segment. Notosetae have 5 homogomph spinigers; neurosetae

have 2 homogomph spinigers and 3 heterogomph falcigers at the supraacicular position; 1 heterogomph and 5 heterogomph falcigers at the subacicular position.

Color in formalin is greenish anteriorly, light pink for next  $\frac{1}{4}$  and then fades away from the middle portion of the body to the end of body. Each segment provides with fingerprintlike patterns on the dorsal and 2 white blotches at the base of notopodium.

*Distribution:* Great Barrier Reef, New Zealand, Australia, Singapore, Nicobar Island, Jack and Una Island, Philippine. This is the first record of this species from Taiwan.

*Perinereis brevicirris* (Grube, 1869)

Fig. 11 a-d.

*Nereis mictodonta*, Izuka, 1912: 148-151, pl. 16, figs. 1-6.

*Perinereis nuntia* var. *brevicirris*, Monro, 1926: 315; 1931: 41; Fauvel, 1932: 110; Takahasi, 1933: 35-40, text-figs. 1-3; 1933: 203-209, pl. 9, figs. 1-10; Okuda & Ishikawa, 1936: 1704-1705; figs. 10-11; Okuda, 1938: 92; 1939: 231; 1940: 12-13; Knox, 1951: 219-220, pl. 46, figs. 14-18; De Silva, 1961: 175; Chleboritsch & Wu, 1962: 40, 51-52, pl. 3, fig. 3; Ghosh, 1963: 240-241.

*Perinereis brevicirris*, Hartman, 1954: 4, 7, 11, 15; Imajima & 1964: 151-152.

*Locality:* Wai-mu-shan, under the stones on sand beach (39 specimens and 6 epitokes); Pa-chih-men, Chilung city, from muddy and gravel portion of rocky flat (38 specimens); Keng-tzu-liao, under the soft sandstones (2 specimens); Shih-men, from rocks (6 specimens); Wan-li, Chilung Hsien, under or wedge between the slit of soft sandstone and gravels (2 specimens and 4 epitokes); Koan-tu, Taipei Hsien, muddy banks of Tamsui River (1 specimen); Ho-liao, muddy bottom of inland canal (29 specimens); Ching-kun-

shen, under the oyster shell from muddy oyster beds (14 specimens); Hsia-shan, Tainan Hsien, from muddy bottom of inland canal (1 specimen); Hai-pu, Changhua Hsien, from muddy inland beach (1 specimen and 3 epitokes); Koan-tu, Taipei Hsien, from buddy banks of Tamsui River, (2 specimens).

**Specific Character:** The body usually consists of 92 to 100 segments. Prostomium (Fig. 11a) wider than long; frontal antenna shorter,  $\frac{1}{2}$  of prostomial long. The longest peristomial cirrus extends back to setigerous segment 4 to 9. Jaws black, with 5 teeth along the cutting edge. Paragnaths (Fig. 11a & b) are as follows; area I has 1 to 3 cones or more, when 3 in triangle; II has 13 to 17 cones in triangular clusters; III has rectangular patch, with 2 to 4 cones on the sides; IV has 25 to 30 cones in triangular clusters; V has a single cone, or 2 cones in tandem, or 3 cones either triangle or transverse; VI has 3 to 9 flattened ridges; VII and VIII have 3 irregular rows of cones.

An anterior parapodium (Fig. 11c) has 3 conical ligules; neuropodial preacicular ligule conic and postacicular ligule round. Dorsal cirrus longer than superior ligule; ventral ligule slightly shorter than inferior ligule. Notosetae have 6 to 10 homogomph spinigers; neurosetae have 8 homogomph spinigers and 5 heterogomph falcigers at the supraacicular position; and 3 heterogomph spinigers and 10 to 12 heterogomph falcigers at the subacicular position.

A posterior parapodium (Fig. 11d) is identical as those of anterior portion except inferior ligule is digitiform. The base of superior ligule has a white fat body which appear between 42nd to 55th segments and continuous posteriorly. Setae are same as those of anterior parapodium but decrease in their num-

bers.

Color in formalin is dark greenish anteriorly and fades away posteriorly.

**Distribution:** Saint Paul Island, Australia, New Zealand; New Caledonia, Japan; Yellow Sea, Ryukyu, Malay Archipelago, Gulf of Manner, Ceylon, Nicobar Island, Tuticorin, Cape Comorin, Bombay, Red Sea.

*Perinereis neocaledonica* Pruvot, 1930

Fig. 12 a-d.

*Nereis (Heteronereis) caeruleis* Hoagland, 1920: 608-610, pl. 47, figs. 13-16, pl. 48, figs. 1-4.

*Perinereis neocaledonica* Pruvot, 1930: 50-54, pl. 3, figs. 77-79, text-figs. 4 a-c; Fauvel, 1932: 107-108.

**Locality:** Mei-lun-pi, Hualien city, from rocks (1 specimen).

**Specific Character:** The specimen measures 132 mm long with 274 setigerous segments. Prostomium (Fig. 12a) hexagonal; anterior pair of eyes widely separated than posterior pair; frontal antenna about  $\frac{1}{3}$  of prostomial long, widely separated each other; palp stout and short. Jaws black, without teeth along the inner cutting edge. The longest peristomial cirrus extends back to setigerous segment 3. Paragnaths (Fig. 12a & b) are as follows: areas I and II are missing; III has fine cones in rectangular patch, with fine cones at both sides; IV has numerous fine cones in foot-shape; V has a single cone followed by the numerous fine cones in pentagonal patch; VI has 17 to 19 cones of which it medial cone followed by the numerous fine cones in equilateral triangular patches; VII and VIII have numerous fine cones forming a continuous band.

An anterior parapodium (Fig. 12c) has all ligules round and thick. Dorsal cirrus longer than superior ligule; ventral cirrus slightly shorter than inferior ligule. Notosetae have 8 homogomph

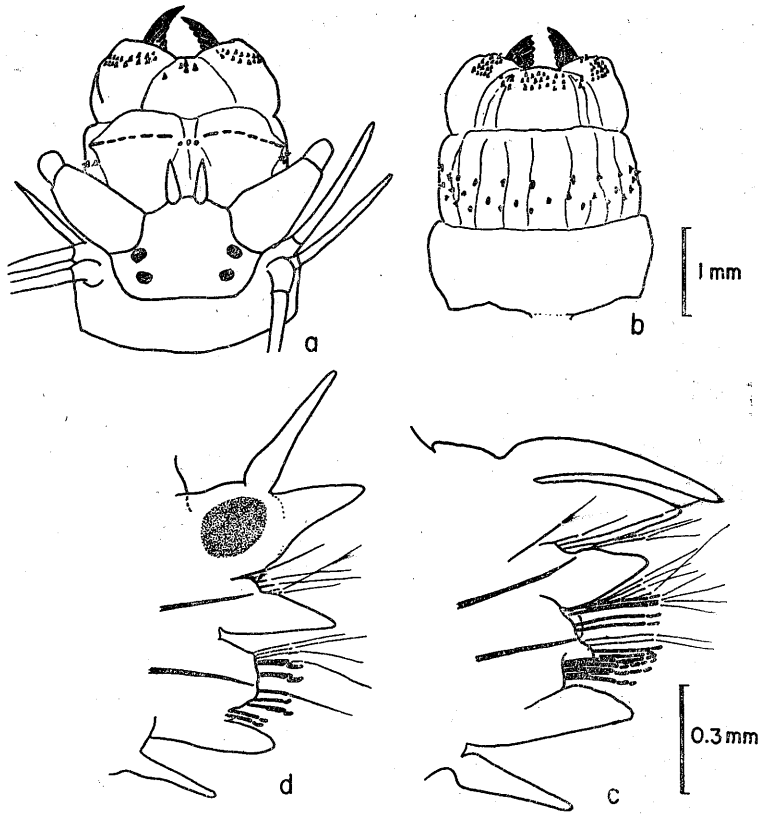


Fig. 11. *Perinereis brevicirris* (Grube)

a. anterior end of the body, with proboscis everted, dorsal view (scale at b); b. proboscis ventral view; c. anterior parapodium, anterior view; d. posterior parapodium, anterior view (scale at c).

spinigers; neurosetae have 3 homogomph spinigers and 3 heterogomph falcigers at the supraacicular position; and 12 heterogomph falcigers at the subacicular position.

A posterior parapodium (Fig. 12d) has greatly expanded superior ligule; notopodial preacicular ligule triangular and small; postacicular ligule truncated digitiform. Neuropodial acicular and inferior ligules are coalesced. Dorsal cirrus short, at the summit of superior ligule; ventral cirrus is slightly shorter than the inferior ligule. Notoetae have

4 homogomph spinigers; neurosetae have 3 homogomph spinigers and 2 heterogomph falcigers at the supraacicular position; and 6 heterogomph falcigers at the subacicular position.

Color in formalin is pale grey with black line on the mid-dorsal. Each segment possess a pair of elliptical white spot between segment line on the lateral side of segment and at the base of parapodium.

*Distribution:* Arabian Sea, Australia, Philippine. This is the first record of this species from Taiwan,

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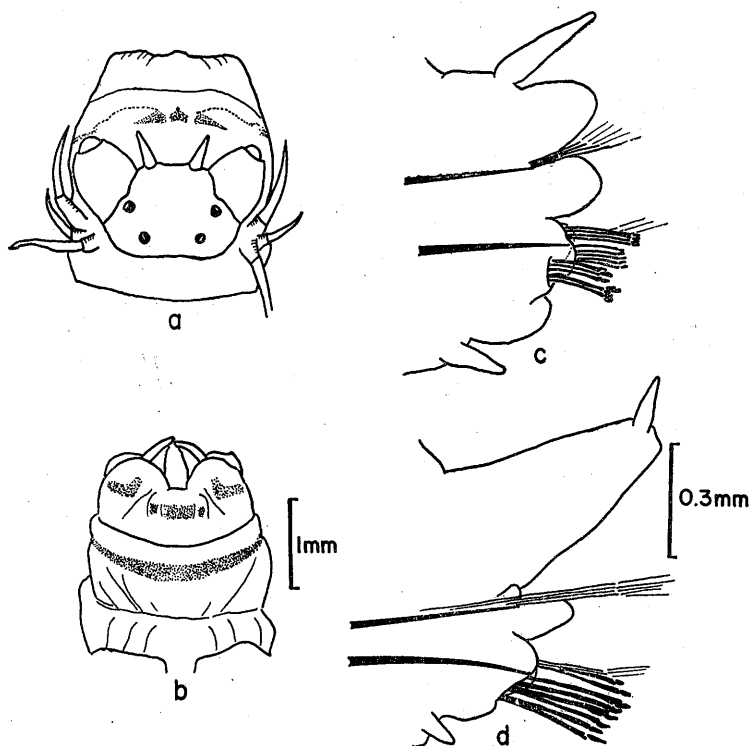


Fig. 12. *Perinereis neocaledonica* Pruvot

a. anterior end of the body, with proboscis everted, dorsal view (scale at b); b. proboscis, ventrol view; c. anterior parapodium, anterior view (scale at d); d. posterior parapodium, anterior view.

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