



## Research article

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# *Amage imajimai* sp. nov., a new species of Ampharetidae (Annelida: Polychaeta) from Japanese waters

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**Abstract.** A new polychaete species of the family Ampharetidae, *Amage imajimai* sp. nov., is described from deep waters of Sagami Bay, Japan. It is characterized by the possession of four pairs of branchiae, twelve thoracic uncinigers, eleven abdominal uncinigers, and the lack of thoracic notopodial cirri. The new species is named in honor of the renowned Japanese polychaetologist Minoru Imajima. An identification key for all *Amage* species from Japanese waters is provided.

**Keywords.** Ampharetidae, *Amage*, new species, Sagami Bay, Japan.

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## Introduction

In a recent study on Ampharetidae from Japan many new species and new records were discovered (Imajima *et al.* 2012, 2013; Reuscher *et al.* 2015a, 2015b). In the last publication of the series (Reuscher *et al.* 2015b), a list of all 58 ampharetid species recorded from Japan was provided. Six of these species known to occur in Japanese waters belong to the genus *Amage* Malmgren, 1866: *A. cf. adspersa* (Grube, 1863), *A. auricula* Malmgren, 1866, *A. delus* (Chamberlin, 1919), *A. ehlersi* Reuscher, Fiege & Imajima, 2015, *A. longitorus* Reuscher, Fiege & Imajima, 2015 and *A. scutata* Moore, 1923. During the examination of material from the National Museum of Nature and Science in Tsukuba (Japan), I was able to identify another new species of *Amage*, which is described here. The new species was collected at a depth of about 1000 m in Sagami Bay off the southeastern Honshu coast.

## Material and methods

The specimens examined in this study were collected in Sagami Bay during a research cruise in July 1966. They were fixed in 7% formaldehyde seawater solution and preserved in 70% ethanol.

Preserved specimens were examined with an Olympus SZX7 stereo microscope and compound microscopes of the models Leica DMLB and Olympus CX41. Pencil drawings were made using a camera lucida, attached to the Leica DMLB.

The drawings were digitized with a Wacom Intuos drawing tablet and Adobe Illustrator, according to the methods of Coleman (2003). Shadings were added in Adobe Photoshop. The “ID card” (Imajima *et al.* 2012) was prepared in Adobe Illustrator.

### Abbreviations

cs = complete specimen

af = anterior fragment

Types and other specimens are deposited in the following institutions:

NSMT = National Museum of Nature and Science, Japan

SMF = Senckenberg Museum Frankfurt, Germany

Full details for the material deposited at Senckenberg can be found at <http://sesam.senckenberg.de/>.

### Results

Phylum Annelida Lamarck, 1809  
Class Polychaeta Grube, 1850  
Order Terebellomorpha Hatschek, 1893  
Family Ampharetidae Malmgren, 1866  
Subfamily Ampharetinae Malmgren, 1866

Genus *Amage* Malmgren, 1866

*Amage* Malmgren, 1866: 370.

*Paramage* Caullery, 1944: 94.

*Egamella* Fauchald, 1972: 295.

*Mexamage* Fauchald, 1972: 309.

### Type species

*Amage auricula* Malmgren, 1866.

### Diagnosis (emended)

Prostomium with middle lobe surrounded by inflated lobe, lacking glandular ridges. Buccal tentacles smooth. Two to four pairs of cirriform branchiae. Segment II usually without chaetae, or exceptionally with minute chaetae. Thorax with 9–14 uncinigers. Modified or intermediate segments absent. Abdomen with rudimentary notopodia.

### Remarks

The diagnosis was emended to accommodate the synonymy of the monotypic genus *Egamella* Fauchald, 1972 by Jirkov (2011). *Egamella* has only two pairs of branchiae and nine thoracic uncinigers. This synonymy needs to be confirmed by the examination of the type specimen of *Egamella quadribanchiata* Fauchald, 1972.

*Amage imajimai* sp. nov.

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Fig. 1A–G

**Diagnosis**

Four pairs of branchiae. Twelve thoracic uncinigers. Notopodia without ventral cirri. Eleven abdominal uncinigers.

**Etymology**

The species is dedicated to the distinguished Japanese polychaete taxonomist Minoru Imajima.

**Specimens examined**

**Holotype**

JAPAN: SMF 24087, Sagami Bay, 35°00.9' N, 139°35.7' E – 35°00.7' N, 139°36.0' E, 990–1060 m, KT-66-12, St. 7, Jul. 1966 (1 cs).

**Paratypes**

JAPAN: SMF 24086, same locality as holotype (3 cs); NSMT-Pol. P-600, same locality as holotype (3 cs, 1 af).

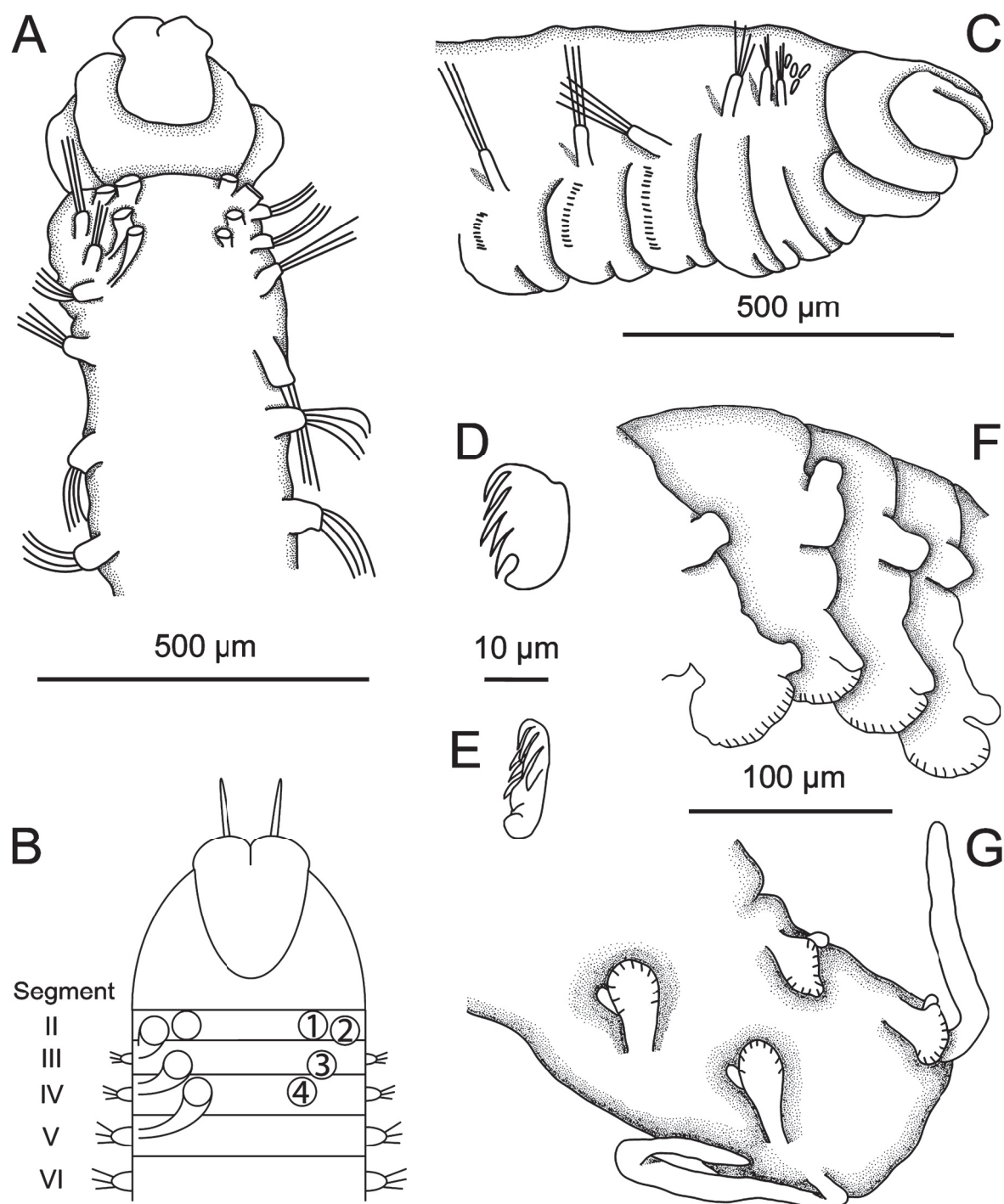
**Description**

Length of holotype 3.2 mm, width 0.4 mm. Prostomium with middle lobe bearing anterolateral frontal horns, delimited by incision from inflated surrounding lobe (Fig. 1A); prostomium without glandular ridges or eyes. Single tip of smooth buccal tentacle visible in buccal cavity. Four pairs of branchiae in L-shaped arrangement in segments II–IV (Fig. 1B), separated by wide median gap; all branchiae detached from specimen, cirriform, without conspicuous ciliation or annulations; innermost branchiae of anterior transverse row (1) originating from segment II, outermost branchiae of anterior transverse row (2) originating from segment III, median branchiae of longitudinal row (3) originating from segment IV, posterior branchiae of longitudinal row (4) originating from segment V (Fig. 1B). Segment II without chaetae. Notopodia with capillary chaetae from segment III, present in 15 chaetigers; first three notopodia in close succession due to shortness of segments and slightly elevated above following notopodia (Fig. 1C); first notopodia small, increasing in size from first to third pair; notopodial cirri absent. Neuropodial tori with uncini from segment VI, present in 12 thoracic uncinigers; tori without cirri. Continuous ventral shields conspicuous from anterior thorax to thoracic unciniger 9. Modified notopodia or segments absent. Intermediate uncinigers absent. Eleven abdominal uncinigers with small tuberculate rudimentary notopodia. Pinnules with minute tuberculate dorsal cirrus. Rudimentary notopodia and pinnules connected by glandular fold. Pygidium with one pair of digitiform, ventrolateral anal cirri. Left anal cirrus broken off. Thoracic uncini with 7 teeth in 2 staggered row over basal prow and rostral tooth (Fig. 1D–E). Abdominal uncini with numerous teeth in several rows over basal prow and rostral tooth. Tube parchment like with needle like spicules embedded.

**Remarks**

In four of the paratypes the buccal tentacles are better visible and clearly smooth. The tuberculate dorsal cirri of the abdominal pinnules are much better developed in the larger paratype specimens (Fig. 1F). The anal cirri are longer and cirriform in the larger paratypes (Fig. 1G). However, they also seem to break off easily as three of the six complete paratypes lack both anal cirri.

The two other *Amage* species with twelve thoracic uncinigers are *A. benhami* Reuscher, Fiege & Wehe, 2009 from the northeast Pacific and the Ross Sea and *A. longitorus* Reuscher, Fiege & Imajima, 2015



**Fig. 1.** *Amage imajimai* sp. nov. **A.** Anterior end of holotype, dorsal view. **B.** “ID card”. **C.** Anterior end of holotype, lateral view. **D.** Thoracic uncinus, lateral view. **E.** Thoracic uncinus, frontal view. **F.** Abdominal uncinigers, lateral view (from paratype SMF 24086). **G.** Posteriormost abdominal uncinigers and pygidium, ventral view (from paratype SMF 24086).

from Japan. The latter species differs from *A. imajimai* sp. nov. by the possession of only three pairs of branchiae, the very long tori in the first two thoracic uncinigers and the larger number of abdominal uncinigers (13). *A. benhami* differs from the new species by the presence of club shaped notopodial cirri and the higher number of abdominal uncinigers (15–16).

Among the other Japanese *Amage* species *A. auricula*, *A. delus*, *A. ehlersi* and *A. scutata* have 11 thoracic uncinigers, *A. cf. adspersa* has 14 thoracic uncinigers. *A. cf. adspersa*, *A. auricula* and *A. delus* differ from *A. imajimai* sp. nov. by the presence of notopodial cirri. *A. scutata* is unusual for the presence of rudimentary notopodia in the anterior segments. *A. imajimai* sp. nov. has a higher count of abdominal uncinigers (11) than *A. auricula* (8) and *A. ehlersi* (10) and a lower count than *A. delus* (12) and *A. longitorus* (13).

### Distribution

Sagami Bay on the Southeastern Pacific coast of Honshu, in 990–1060 m.

### Identification key for *Amage* species from Japanese waters

1. 11 or 12 thoracic uncinigers .....2  
– 14 thoracic uncinigers .....*Amage cf. adspersa* (Grube, 1863)
2. 11 thoracic uncinigers .....3  
– 12 thoracic uncinigers .....6
3. Anterior notopodia with notochaetae .....4  
– Anterior notopodia lacking notochaetae .....*Amage scutata* Moore, 1923
4. Thoracic notopodia with ventral cirri .....5  
– Thoracic notopodia lacking ventral cirri .....*Amage ehlersi* Reuscher, Fiege & Imajima, 2015
5. 8 abdominal uncinigers .....*Amage auricula* Malmgren, 1866  
– 12 abdominal uncinigers .....*Amage delus* (Chamberlin, 1919)
6. 3 pairs of branchiae; anterior neuropodia conspicuously elongated; 13 abdominal uncinigers .....*Amage longitorus* Reuscher, Fiege & Imajima, 2015  
– 4 pairs of branchiae; anterior neuropodia not conspicuously elongated; 11 abdominal uncinigers .....*Amage imajimai* sp. nov.

### Discussion

The variety of habitat types and complex interactions of different environmental gradients in the oceans surrounding the Japanese islands attract a variety of species with different physiological and ecological adaptations and thus form the basis of a diverse polychaete fauna. Japan has a wide variety of habitats that are colonized by polychaetes, including bays, deep-sea trenches, hydrothermal vents, and cold seeps, among others (e.g., Juniper & Sibuet 1987; Horikoshi *et al.* 1990). The northern part of Japan receives cold water from the Oyashio Current, whereas southern Japan is under the influence of the warm Kuroshio Current (Imajima *et al.* 2012). Therefore, Japan's polychaete fauna includes Arctic and sub-Arctic species as well as tropical and subtropical species. In the recent series on Ampharetidae from Japan (Imajima *et al.* 2012, 2013; Reuscher *et al.* 2015a, 2015b), 60% of the examined species were new to science and the number of species known from Japan more than doubled. This shows that the current knowledge of species diversity of ampharetid polychaetes from Japan is far from exhaustive and more sampling effort is needed to complete the picture. *Amage imajimai* sp. nov. is the 59<sup>th</sup> species of the family Ampharetidae and the seventh species of the genus *Amage* recorded from Japan.

Of the other *Amage* species from Japan, *A. delus* and *A. scutata* are known only from northern Honshu, *A. cf. adspersa* and *A. imajimai* sp. nov. have only been recorded from Sagami Bay, whereas *A. auricula*, *A. ehlersi* and *A. longitorus* have a wider distribution within Japanese waters.

Within Ampharetidae *Amage* is probably the most heterogeneous genus as it contains species with two (if the genus *Egamella* is considered a junior synonym), three and four pairs of branchiae, with nine (*Egamella*), eleven, twelve, and fourteen thoracic uncinigers, with and without notopodial cirri. A revision is needed to determine if *Amage* can be upheld as a single genus, or if it should be split into multiple genera.

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