



## A new species of *Pisione* (Annelida: Polychaeta: Pisionidae) from circalittoral soft bottoms (SE Bay of Biscay, Basque coast)

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**Abstract:** *Pisione inkoi* sp. nov. (Annelida: Polychaeta: Pisionidae) is described from the continental shelf of Basque coast (SE Bay of Biscay). The new species is characterized by having notoacacula whose distal end projects outwards piercing the body wall, globular dorsal cirri, ventral cirri piriform, and parapodia having each long-, elongated- and short-bladed compound chaetae. A comparison with the pisionids also occurring in the study area and with other similar species is done. In addition, an identification key is provided for all known *Pisione* species.

**Résumé :** Une nouvelle espèce de *Pisione* (Annelida : Polychaeta : Pisionidae) des substrats meubles circalittoraux (SE du Golfe de Gascogne, côte basque). *Pisione inkoi* sp. nov. (Annelida: Polychaeta: Pisionidae) est décrite dans les sédiments meubles du plateau continental de la côte basque (SE du Golfe de Gascogne). La nouvelle espèce est caractérisée par des notoacicules dont la partie distale saillit de la surface corporelle, des cirres dorsaux globuleux, ventraux piriformes, et des parapodes portant à la fois des soies composées longues, très allongées et courtes. Les différences morphologiques entre la nouvelle espèce et les autres espèces du genre vivant dans la même région sont examinées. En complément, une clé d'identification est fournie pour toutes les espèces de *Pisione* connues.

**Keywords:** New species • Polychaeta • *Pisione inkoi* • Basque coast • Bay of Biscay • Identification key

### Introduction

About forty-four species and subspecies of *Pisione* Grube, 1857 (Polychaeta: Pisionidae) are known world-wide, mainly from warm to tropical seas (De Wilde & Govaere, 1995; Westheide, 1995; San Martín et al., 1998 & 1999; Wu

et al., 1998; Yamanishi, 1998; Moreira et al., 2000; Aguado & San Martín, 2003). Although one species occurs in fresh-water (San Martín et al., 1998), most *Pisione* species are typical marine interstitial organisms inhabiting sub-littoral and intertidal coarse sands or shell sediments, preferably non-polluted.

So far, only three species have been described in European coasts: *Pisione remota* (Southern, 1914) a cosmopolitan species (Chambers & Muir, 1997), *Pisione*

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*puzae* Siewing, 1953 in the Mediterranean, and more recently *Pisione parapari* Moreira, Quintas & Troncoso, 2000 from Galicia (North-West Spain). During several studies of macrofaunal soft bottom communities in the Basque coast, a new species of the genus was found. In this paper, the new species is described, illustrated and compared with the currently known species of the genus. Moreover, data on its ecology and habitat preferences are provided.

### Material and Methods

The specimens were found in circalittoral soft bottom of the continental shelf of the SE Bay of Biscay (Basque coast) between 50 m and 120 m depth (Fig. 1, Table 1). Samples were collected with a Smtih-McIntyre (December 2001, March 2003 and August 2005) and a Van Veen (May 2005 and April 2006) grabs. The sediments were washed through a 1 mm mesh sieve and fixed with a 10% formaldehyde/seawater solution. Then, the macrofauna was sorted and transferred to 70% ethanol.

Observations and measurements were made using a microscope with interference contrast optics (Nomarsky). Body measurements do not include palpi, anal cirri and parapodial lobes. Drawings were made with a camera lucida. Scanning Electron Microscope (SEM) micrographs were made after critical-point drying and coating with 0.03  $\mu\text{m}$  gold. The Types were deposited in the collections of the Museo Nacional de Ciencias Naturales of Madrid (MNCNM), Spain.

### Systematics

#### ANNELIDA POLYCHAETA FAMILY Pisionidae Ehlers, 1901

Genus *Pisione* Grube, 1857

*Pisione inkoi* sp. nov.

(Figs 2-6)

#### Material examined

Holotype (16.01/11214), 1 female, Elantxobe, station 8 (43°30'800N, 02°38'833W), coarse sand, 117 m depth, 18/04/2006. Allotype (16.01/11215), 1 male, Armintza, station 2 (43°29'098N, 02°53'915W), coarse sand, 97 m depth, 30/07/2003. Paratype (16.01/11216), 1 female, Bakio, station 5 (43°28'302N, 2°48'000W), coarse sand, 80 m depth, 08/03/2003. Paratypes (16.01/11217), 2 sexually indeterminate individuals, Elantxobe, station 8 (43°30'800N, 02°38'833W), coarse sand, 117 m depth, 18/04/2006.

Additional material. Bermeo, station 6 (43°30'330N, 2°41'364W), 1 incomplete male, stones and shell gravel, 95 m depth, 4/12/2001; Bermeo, station 7 (43°30'285N, 2°41'197W), 1 sexually indeterminate individual, coarse sand, 100 m depth, 4/12/2001; Armintza, station 1 (43°29'125N, 02°53'938W), 1 female and 1 sexually indeterminate individual, coarse sand, 97 m depth, 30/07/2003; Bakio, station 3 (43°30'330N, 2°47'892W), 1 incomplete male, coarse sand, 103 m depth, 05/08/2005; Deba, station 9 (43°20'052N, 2°20'112W), 1 sexually indeterminate individual, coarse sand, 56 m depth,

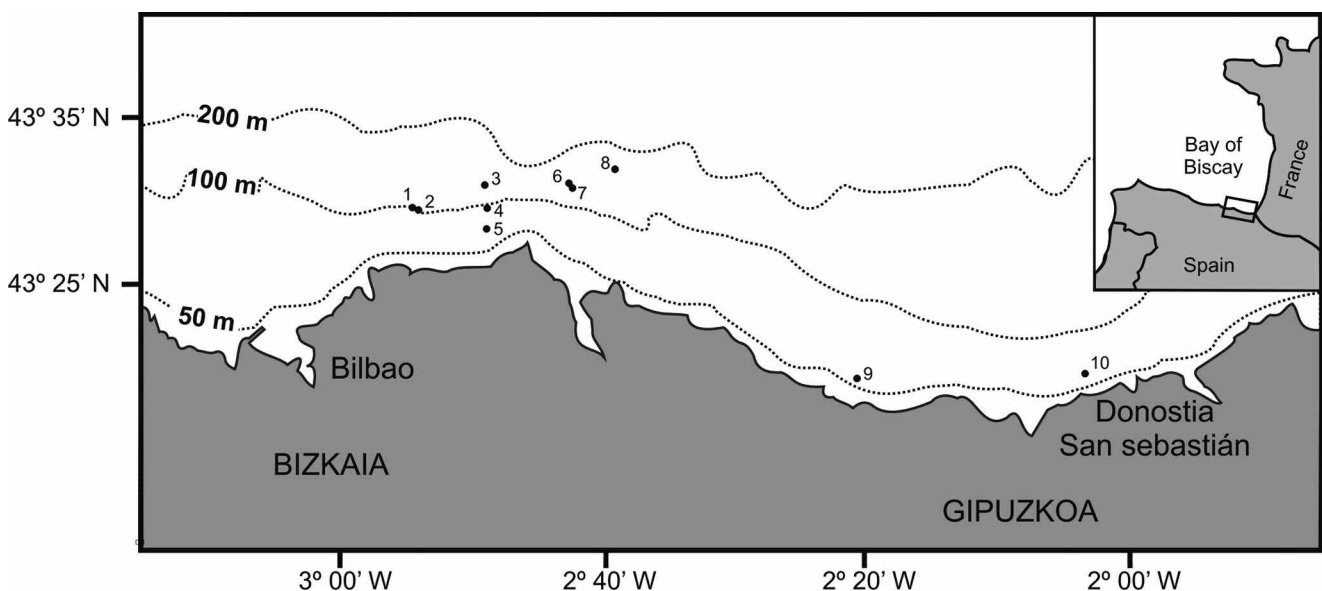


Figure 1. *Pisione inkoi* sp.nov. Study area and locations of sampling stations.

Figure 1. *Pisione inkoi* sp.nov. Zone d'étude et localisation des stations d'échantillonnage.

**Table 1.** *Pisone inko* sp.nov. Position, date, depth, sedimentary characteristics and density at the collecting stations.**Tableau 1.** *Pisone inko* sp.nov. Position, date, profondeur, caractéristiques des sédiments et densité aux stations de prélèvement.

Station	Date	Position	Depth (m)	Type sediment	Density (ind.m <sup>-2</sup> )
1	30/07/2003	43°29'125 N – 02°53'938 W	97	Coarse sand	8.0
2	30/07/2003	43°29'098 N – 02°53'915 W	97	Coarse sand	4.0
3	5/08/2005	43°30'330 N – 02°47'892 W	103	Coarse sand	10.7
4	18/04/2006	43°29'300 N – 02°47'875 W	90	Coarse sand	6.0
5	8/03/2003	43°28'302 N – 02°48'000 W	80	Coarse sand	5.3
6	4/12/2001	43°30'330 N – 02°41'364 W	95	Stones and shell gravel	5.3
7	4/12/2001	43°30'285 N – 02°41'197 W	100	Medium sand	2.7
8	18/04/2006	43°30'800 N – 02°38'833 W	117	Coarse sand	39.0
9	4/08/2005	43°20'052 N – 02°20'112 W	56	Coarse sand	5.3
10	15/05/2005	43°20'204 N – 02°04'070 W	65	Coarse sand	3.0

04/08/2005; Bakio, station 4 (43°29'300N, 02°47'875W), 1 sexually indeterminable individual, coarse sand, 90 m depth, 18/04/2006; Elantxobe, station 8 (43°30'800N, 02°38'833W), 1 female and 9 sexually indeterminable individuals, coarse sand, 117 m depth, 18/04/2006; Igeldo, station 10 (43°20'204N, 2°04'070W), 2 sexually indeterminable individuals, coarse sand, 65 m depth, 15/05/2005.

#### Etymology

The species is named in honour of Inko Martínez, son of the first and third authors.

#### Diagnosis

Body length up to 12.68 mm for up to 53 chaetigers. Buccal segment characteristic of the genus. Buccal acicula developed projecting through the skin. Ventral cirri of chaetiger 1 elongated. All dorsal cirri small, globular to ovate. Prechaetal lobes bilobed anteriorly and single posteriorly. One notoacicula projecting through skin. One supra-acicular simple chaeta and four or five infra-acicular compound chaetae (some with long blades) on each parapodium. Male genitalia with at least three pairs of non-successive copulatory organs. One pair of elongated anal cirri.

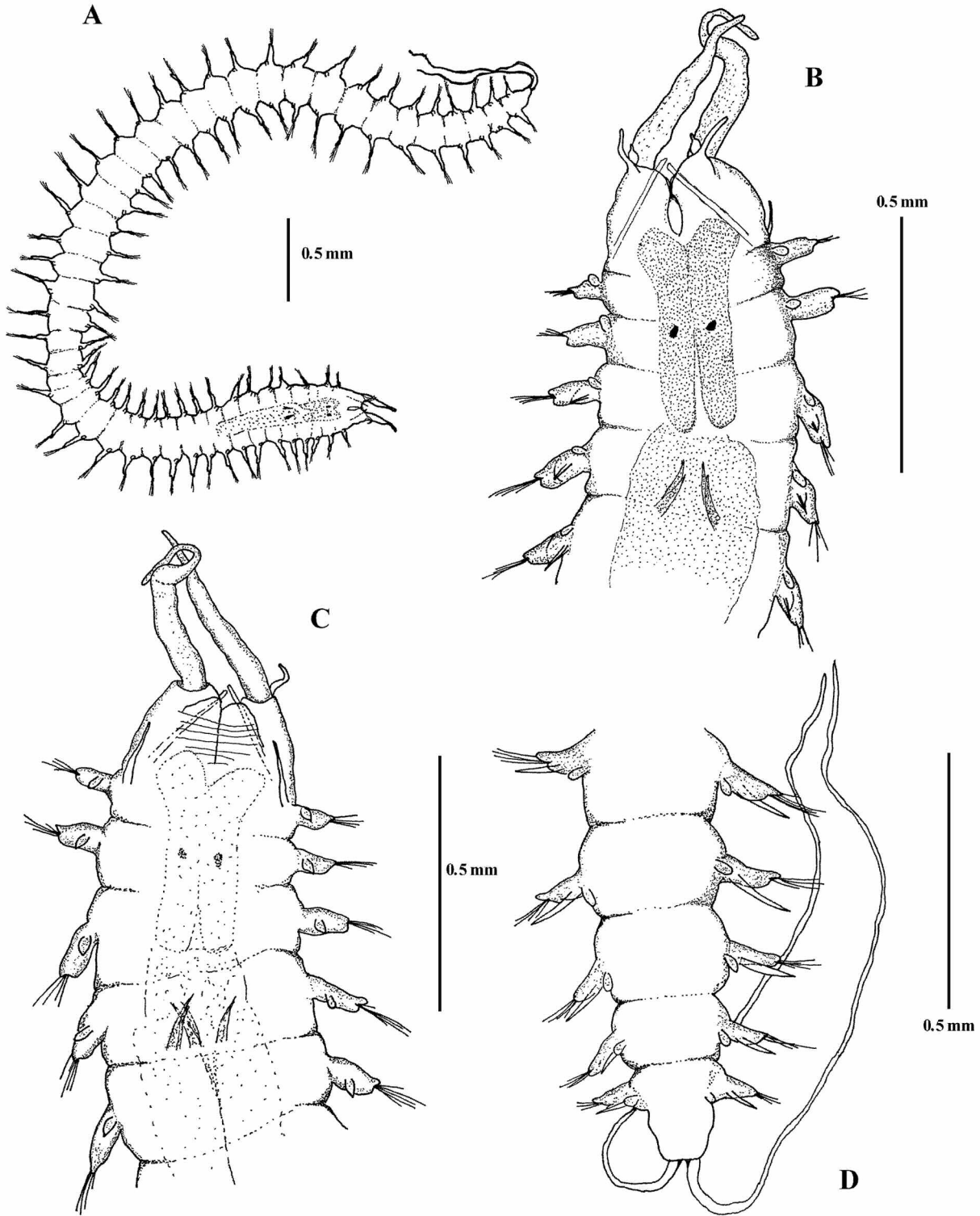
#### Description

Body relatively long and thin, with buccal segment, anal segment, and numerous chaetigerous segments (Figs 2A & 5A); widest at chaetigers 4-8, tapering posteriorly. Largest specimen 12.68 mm long, 0.41 mm wide, for 50 chaetigers. Holotype a complete female, 8.34 mm long, 0.45 mm wide, and 43 chaetigers (Table 2). Allotype complete but fragmented male, 7.81 mm long, 0.39 mm wide, for 45 chaetigers. Dorsal and ventral surfaces smooth. Parapodia well-developed.

Prostomium degenerated, small, sub-rhomboidal, surrounded by the buccal segment. Two smooth palpi, projecting anteriorly, very long, about five times as long as the dorsal cirri of the buccal segment in adult specimens. Buccal segment with two lobes projecting anteriorly (Fig. 2C), each one supported by one buccal acicula, obliquely orientated; an additional smaller acicula occasionally present. Buccal acicula well-developed projecting anteriorly through the skin, with slightly constricted distal ends subdistally and a subrounded distal margin (Fig. 3A), not surpassing the level of chaetiger 1. Brain bilobed posteriorly, extending back to about chaetiger 3. One pair of conspicuous dorsal eyes, either between chaetigers 1 and 2 or on chaetiger 2. One pair of dorsal tentacular cirri elongated, narrow and cirriform; ventral tentacular cirri small, flask-shaped (Fig. 2B). Pharynx extending over

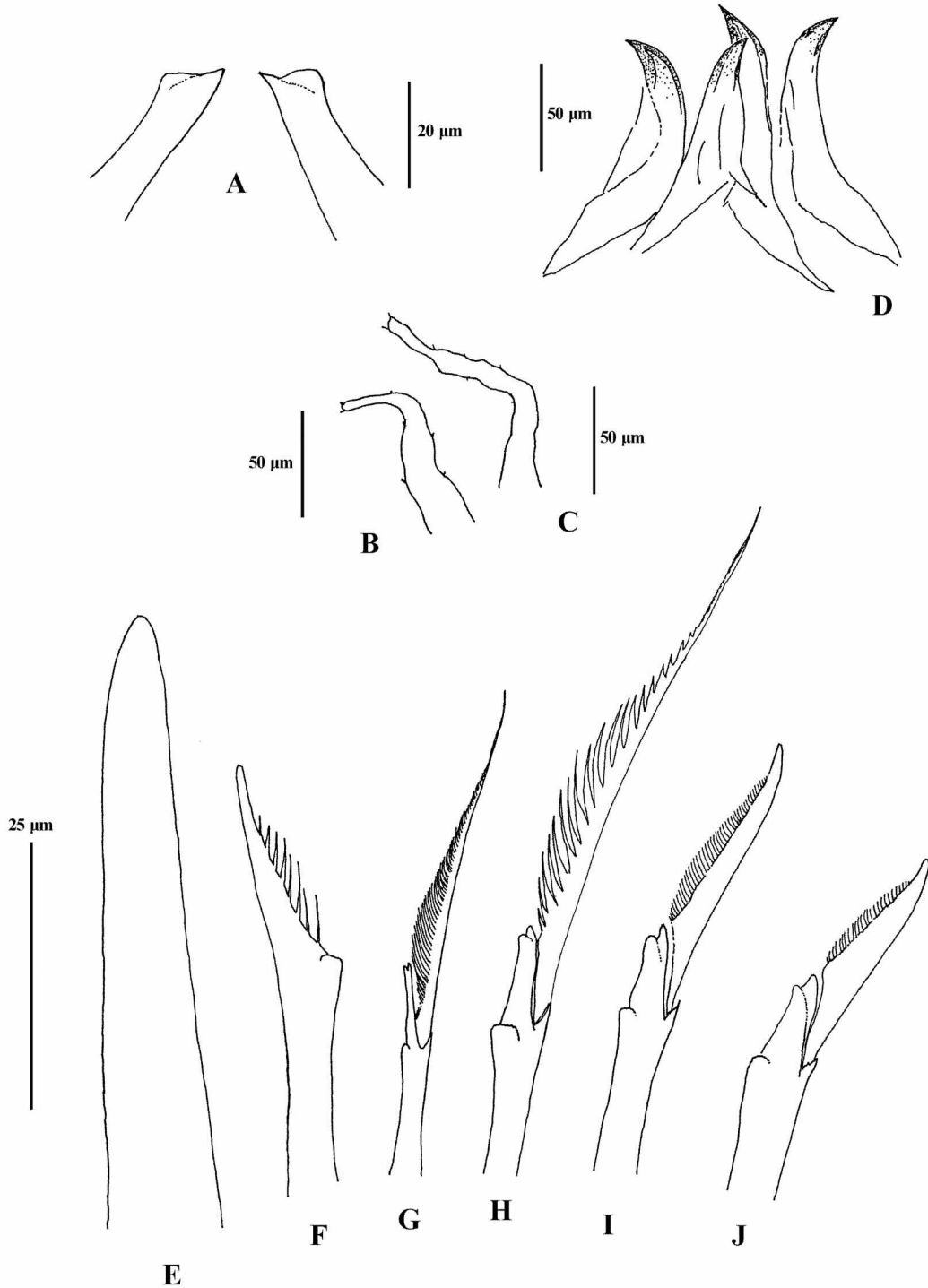
**Table 2.** *Pisone inko* sp.nov. Morphometric data of holotype (1) Excluding palpi and anal cirri, (2) excluding parapodia.**Tableau 2.** *Pisone inko* sp.nov. Mesures morphométriques de l'holotype (1) Palpes et cirres anaux exclus, (2) Parapodes exclus.

	Length
Length of body (1) (mm)	8.34
Wide of body (2) (mm)	0.45
Dorsal cirrus of buccal segment (mm)	0.12
Ventral cirrus of buccal segment (mm)	0.05
Buccal acicula (mm)	0.23
Palp (mm)	0.32
Dorsal cirrus of chaetiger 1 (mm)	0.04
Ventral cirrus of chaetiger 1 (mm)	0.11
Dorsal cirrus of chaetiger 2 (mm)	0.04
Ventral cirrus of chaetiger 2 (mm)	0.03
Blades of dorsal-most long-bladed compound chaetae (µm)	25 - 34
Blades of longest long-bladed compound chaetae (µm)	32 - 50
Blades of elongate-bladed falciger (µm)	18 - 26
Blades of short-bladed falciger (µm)	9 - 18
Anal cirrus (mm)	1.37



**Figure 2.** *Pistone inkoi* sp. nov. **A.** Entire worm, dorsal view. **B.** Anterior end, dorsal view. **C.** Anterior end, ventral view. **D.** Posterior end, dorsal view.

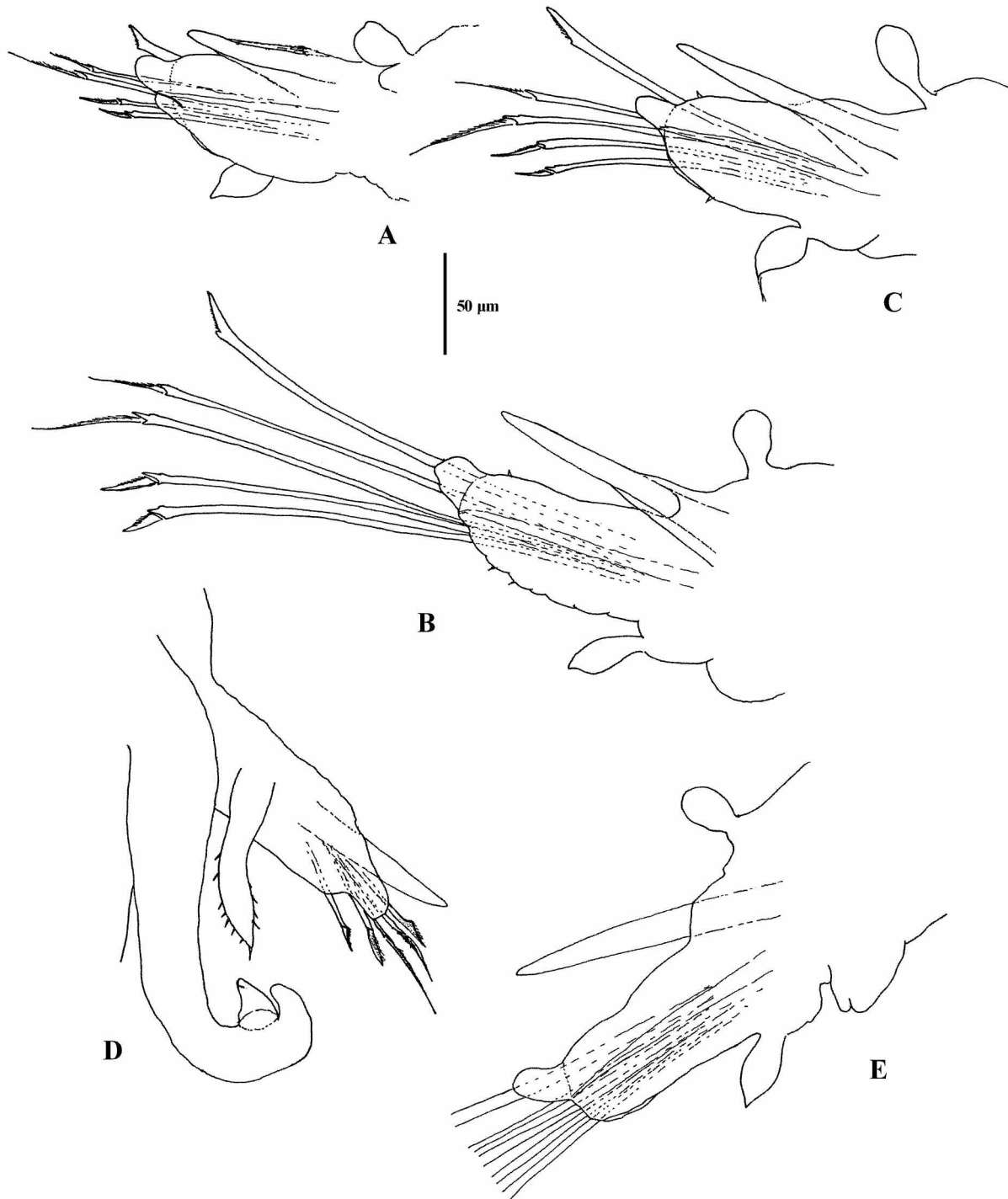
**Figure 2.** *Pistone inkoi* sp. nov. **A.** Animal entier, vue dorsale. **B.** Région antérieure, vue dorsale. **C.** Région antérieure, vue ventrale. **D.** Région postérieure, vue dorsale.



**Figure 3.** *Pisione inkoi* sp. nov. **A.** Buccal aciculae. **B.** Ventral cirrus of chaetiger 1. **C.** Dorsal cirrus of the buccal segment. **D.** Jaws. **E-J.** Order dorso-ventral of chaetae on a normal parapodium: **E.** Notoacacula. **F.** Supra-acicular simple chaeta. **G.** Dorsal-most long-bladed compound chaeta. **H.** Longest long-bladed compound chaeta. **I.** Falciger with elongated blade. **J.** Short-bladed falciger.

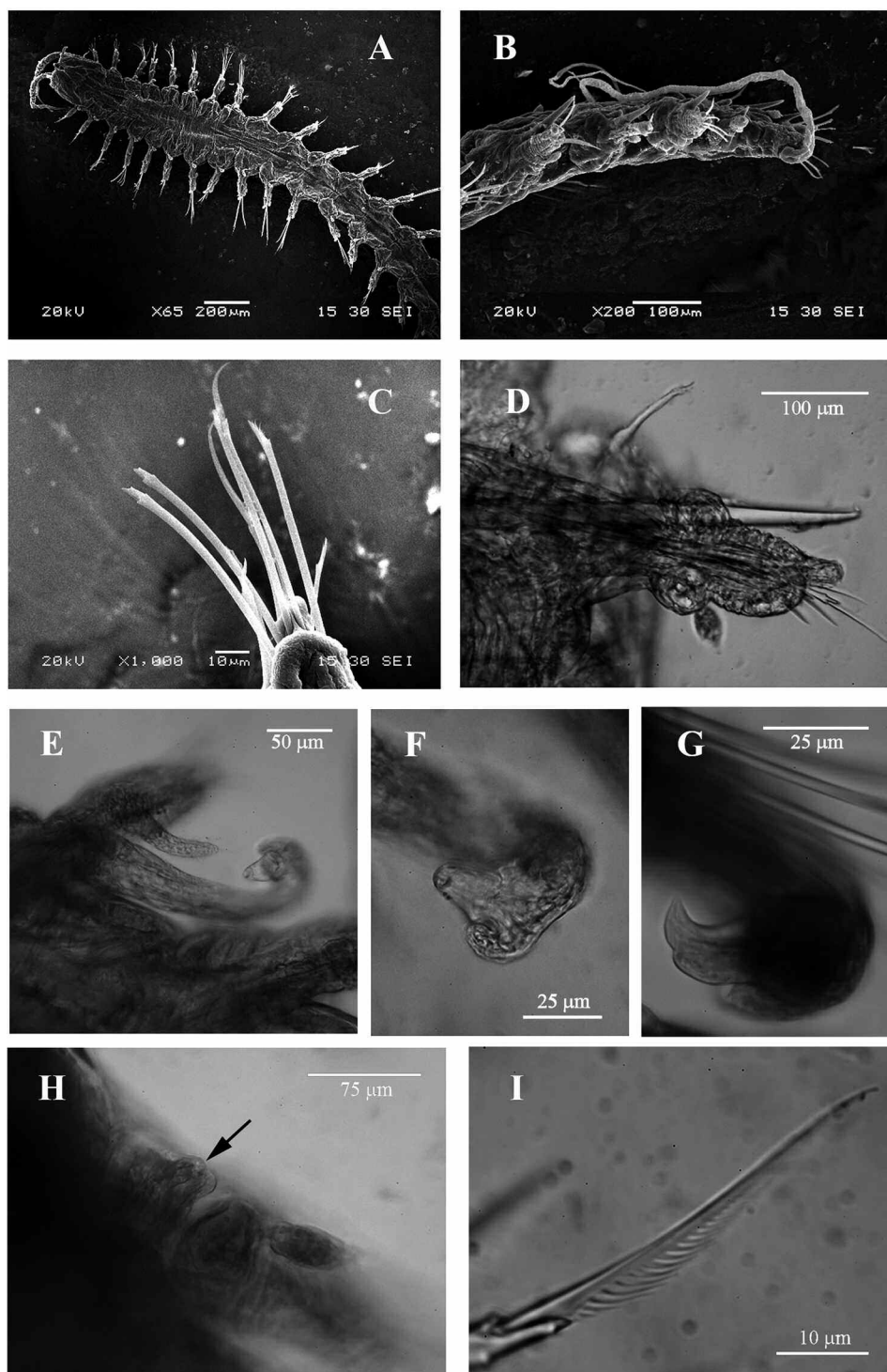
**Figure 3.** *Pisione inkoi* sp. nov. **A.** Acicules buccaux. **B.** Cirre ventral du sétigère 1. **C.** Cirre dorsal du segment buccal. **D.** Mâchoires. **E-J.** arrangement dorso-ventral des soies sur un parapode normal. **E.** Notoacicule. **F.** Soie simple supra-aciculaire. **G.** Soie composée à serpe longue la plus dorsale. **H.** Soie composée à serpe la plus longue. **I.** Soie falcigère à serpe allongée. **J.** Soie falcigère à serpe courte.





**Figure 4.** *Pisione inkoi* sp. nov. **A.** Anterior parapodium, anterior view. **B.** Middle parapodium, anterior view. **C.** Posterior parapodium, anterior view. **D.** Posterior view of a male copulatory organ and elongated ventral cirrus on chaetiger 28 (allotype). **E.** Ventral view of a female sexual organ on chaetiger 32 (holotype).

**Figure 4.** *Pisione inkoi* sp. nov. **A.** Parapode antérieure, vue antérieure. **B.** Parapode moyen, vue antérieure. **C.** Parapode postérieur, vue antérieure. **D.** Vue postérieure d'un organe copulateur mâle et du cirre ventral allongé sur le sétigère 28 (allotype). **E.** Vue ventrale d'un organe sexuel féminin sur le sétigère 32 (holotype).



**Figure 5.** *Pisione inkoï* sp. nov. Microphotographs. **A.** Anterior end, dorsal view. **B.** Posterior end, lateral view. **C.** Posterior view of 1st chaetiger. **D.** Posterior view of midbody chaetiger. **E.** Posterior view of a male copulatory organ on chaetiger 28 (allotype). **F-G.** Tip of the male copulatory organ in different views (allotype). **H.** Detail of a female copulatory organ on chaetiger 33 in ventral view (paratype). **I.** Blade of longest long-bladed compound chaeta.

**Figure 5.** *Pisione inkoï* sp. nov. Microphotographies. **A.** Région antérieure, vue dorsale. **B.** Région postérieure, vue latérale. **C.** Vue postérieure du sétigère 1. **D.** Vue postérieure d'un sétigère moyen. **E.** Vue postérieure d'un organe copulateur mâle et du cirre ventral allongé sur le sétigère 28 (allotype). **F-G.** Vues différentes de l'extrémité d'un organe copulateur mâle (allotype). **H.** Détail d'un organe copulateur femelle sur le sétigère 33 en vue ventrale (paratype). **I.** Serpe de la soie composée à serpe la plus longue.

chaetigers 4-8, with two pairs of curved jaws, dorsally visible at level of chaetigers 4-5, amber coloured distally (Fig. 3D).

All segments with truncated parapodia. Parapodial lobe of chaetiger 1 small, gradually enlarging on anterior segments, decreasing on posterior-most segments; each with rounded prechaetal lobe and two aciculae. Ventral cirri of chaetiger 1 similar in length to dorsal cirri of the buccal segment (Fig. 3B, C); the remaining ones small and piriform. Dorsal cirri of chaetiger 2 similar in shape and size to the following ones; all small, more or less globular. Notopodium reduced, without chaetae, with a single notoacicula (Figs 3E & 5D), straight, stout, emerging dorsally from the body wall of the parapodial lobe except on the first 3-5 chaetigers. Neuropodium much more developed, supported by an internal neuroacicula, and bearing a chaetal bundle. Prechaetal lobes bilobed in anterior-most segments, unilobed from middle region (Fig. 4A-C). Postchaetal lobes single and rounded (Fig. 5C). Several palpocils on the parapodial lobe surface.

Neuropodial chaetal bundles with 5 chaetae of 4 kinds (Fig. 6A-C), arranged dorso-ventrally as: one supra-acicular simple chaeta, stout, with distal part obliquely truncate and serrated (Figs 3F & 6D); one (occasionally two) long-bladed compound heterogomph chaeta with an extremely fine blade, densely serrated with long spines (Figs 3G & 6E); one compound heterogomph chaeta with longer blade (Fig. 3H), bearing less spines (also long) (Fig. 5I), more stout on the convex side (Fig. 6F); one falciger chaeta with relatively elongated, finely-serrated blade (Figs 3I & 6H); and one (occasionally two) short-bladed finely-serrated falciger chaeta (Figs 3J & 6G). Blades shorter in anterior- and posterior-most body regions. All shafts distally bifid, with a subdistal knob.

A single, complete male adult (allotype), fragmented into two parts, with three pairs of copulatory organs in non-successive segments, appearing on chaetigers 20, 28 and 37. Copulatory parapodia modified (Figs 4D & 5E), with normal dorsal cirri, prechaetal lobes and chaetae, but very enlarged ventral cirri, similar in length to parapodial lobe, with disperse spines in distal half. Copulatory organ rather simple, cylindrical, spiral subterminally, ends in a cuticular penis with a digitiform papilla in subdistal region (Fig. 5F, G).

Mature females with ventral, paired simple cirriform processes (genital papillae) at the parapodial base, from mid-body (chaetigers 20-26) to the end in successive segments (Fig. 4E), sometimes lacking in last segments (Fig. 5H).

Pygidium sub-rounded, with terminal anus and one pair of very and slender long cirri (Figs 2D & 5B).

Colour white in alcohol preserved specimens.

#### Remarks

Two other species of *Pisione* occur in the Bay of Biscay: *P. remota* and *P. parapari*. *P. inkoï* sp. nov. can be distinguished from these species by notoaciculae position, morphology of chaetae, number and position of sexual organs, and other aspects. A summary of distinguishing features of the three species is given in Table 3.

*Pisione inkoï* sp. nov. most closely resembles *P. primitiva* De Wilde & Govaere, 1995 from Papua, New Guinea (Yamanishi, 1998) in having ventral cirri of chaetiger 1 elongated, bilobed anterior prechaetal lobes, all dorsal cirri similar in shape and size, long-bladed compound chaetae, and a notoacicula projecting through skin. However, both species differ in the number of male copulatory apparatus (one in *P. primitiva*, at least three in *P. inkoï* sp. nov.), and the morphology of dorsal cirri (flask-shaped in *P. primitiva*, globular in *P. inkoï* sp. nov.).

Besides *Pisione inkoï* sp. nov. and *P. primitiva*, only five among all known *Pisione* species, show a notoacicula emerging postero-dorsally from the body wall: *P. guanche* San Martín, López & Núñez, 1999, *P. hainensis* Wu, Ding & Huang, 1998, *P. mista* Yaminishi, 1998, *P. subulata* Yamanishi, 1992, and *P. ungulata* De Wilde & Govaere, 1995.

*Pisione guanche*, *P. hainensis*, *P. mista* and *P. ungulata* are distinguished from *P. inkoï* sp. nov. by having the dorsal cirri of chaetiger 2 elongated, while in the case of the new species has all dorsal cirri are similar in shape and size. Furthermore, the prechaetal lobes are bilobed in *P. guanche*, *P. mista* and *P. ungulata*; single in *P. hainensis*; and divided in anterior-most segments in *P. inkoï* sp. nov.

On the other hand, all compound chaetae of the *Pisione guanche* are short-bladed falciger (one or more long-bladed compound chaetae in the others ones); whereas *P. subulata* has one infra-acicular simple chaetae on the posterior segments (absent in *P. inkoï* sp. nov.).

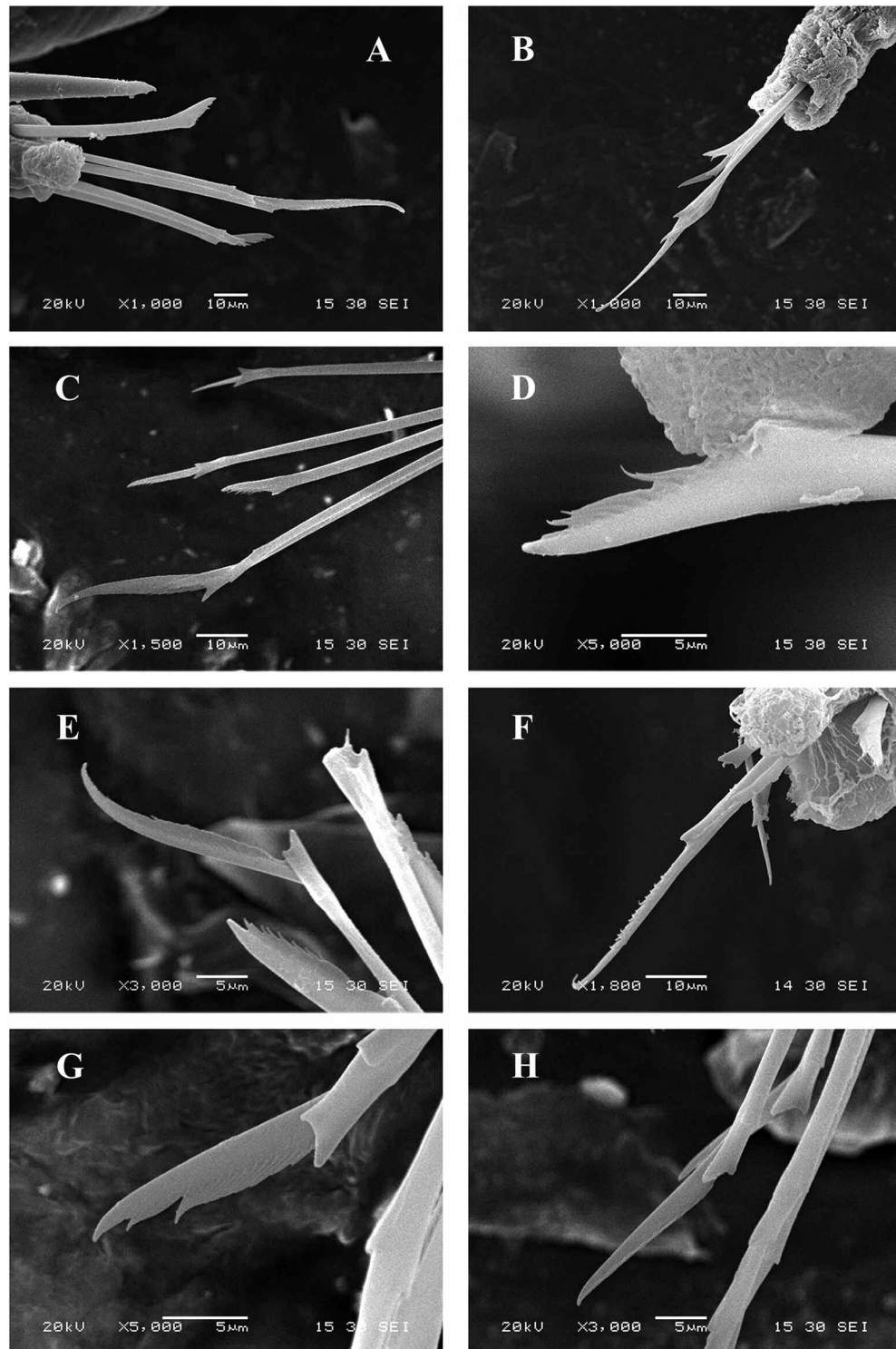
Moreover, *Pisione guanche*, *P. subulata* and *P. ungulata* differs from the new species in having copulatory successive organs, instead of non-successive organs as it happens in *P. inkoï* sp. nov. In *P. hainensis* and *P. mista* this character is unknown.

*Pisione inkoï* sp. nov. further differs from all previously described species of *Pisione* provided with long-bladed compound chaetae in having the longest long-bladed compound chaetae among other long-bladed compound chaeta and one elongated-bladed falciger; in the other species such chaeta appears in a dorsal-most position (next to supra-acicular simple chaeta in the others ones).

#### Key to all known *Pisione* species

The last key of the genus dates back to 1998 (San Martín et al., 1998; Yamanishi, 1998). Since then, several species





**Figure 6.** *Pisione inkoï* sp. nov. Microphotographs. **A-C.** Bundle of chaetae on anterior, middle and posterior chaetigers respectively. **D.** Mid-body supra-acicular simple chaeta. **E.** Mid-body dorsal-most long-bladed compound chaeta. **F.** Mid-body longest long-bladed compound chaeta. **G.** Mid-body short-bladed falciger. **H.** Mid-body elongated-bladed falciger.

**Figure 6.** *Pisione inkoï* sp. nov. Microphotographies. **A-C.** Faisceau des soies d'un sétigère antérieur, moyen and postérieur. **D.** Soie simple supra-aciculaire de la région moyenne. **E.** Soie composée à serpe longue la plus dorsale de la région moyenne. **F.** Soie composée à serpe la plus longue de la région moyenne. **G.** Soie falcigère à serpe courte de la région moyenne. **H.** Soie falcigère à serpe allongée de la région moyenne.

**Table 3.** *Pisione inkoï* sp.nov. Distinguishing characters of the three *Pisione* species present in the Bay of Biscay.**Tableau 3.** *Pisione inkoï* sp.nov. Caractéristiques des trois espèces du *Pisione* présents dans le Golfe de Gascogne.

	<i>Pisione remota</i> (Southern, 1914)	<i>Pisione parapari</i> Moreira, Quintas and Troncoso, 2000	<i>Pisione inkoï</i> sp. nov.
<b>Size of the largest specimen</b>			
Length (mm)	22.0	7.0	12.68
Wide (mm)	1.0	0.17	0.41
Number of chaetigers	85	51	50
<b>Parapodia</b>			
Prechaetal lobe	Bilobed anteriorly, single posteriorly	All single prechaetal lobe	Bilobed anteriorly, single from mid-body
Dorsal cirri of chaetiger 2	Similar in shape and size as the others	Slightly longer than the others	Similar in shape and size as the others
Notoaciculae	Embedded throughout the body	Embedded throughout the body	Projecting through the skin
<b>Chaetae</b>			
Simple chaetae	One supra-acicular simple chaeta distally unidentate Infra-acicular simple chaetae present	One supra-acicular simple chaeta distally bidentate Infra-acicular simple chaetae absent	One supra-acicular simple chaeta distally unidentate Infra-acicular simple chaetae absent
Compound chaetae	Long-bladed compound chaetae absent	One (sometimes two similar) long-bladed compound chaetae	Two (sometimes three) different long-bladed com-
<b>Sexual organs</b>			
Males	Male genitalia with 4-18 pairs of successive copulatory organs	Male genitalia with 1-4 pairs of non-successive copulatory organs	Male genitalia with at least 3 pairs of non-successive copulatory organs
Females	Female genital segments with a simple cirriform process developed ventrally at the base of the parapodium	Female sexual organs not visible externally	Female genital segments with a simple cirriform process developed ventrally at the base of the parapodium

were described. In the work, we give an updated key to *Pisione* genus.

- 1 Dorsal cirri of chaetiger 2 elongated.....2
- All dorsal cirri similar in shape and size.....16
- 2 Parapodia with long-bladed compound chaetae.....3
- Parapodia without long-bladed compound chaetae .....14
- 3 Parapodia with infra-acicular simple chaetae .....4
- Parapodia without infra-acicular simple chaetae .....6
- 4 Notoacicula projecting through the skin .....  
.....*P. mista* Yamanishi, 1998
- Notoacicula embedded throughout the body.....5
- 5 Dorsal buccal cirri with a clear constriction; copulatory parapodia provided with chaetae .....*P. africana* Day, 1963
- Dorsal buccal cirri smooth; copulatory parapodia without chaetae; long-bladed compound chaetae with bifid tip .....  
.....*P. tortuosa* Hartmann-Shröder & Parker, 1990
- 6 Prechaetal lobe divided.....7
- Prechaetal lobe not divided .....9

- 7 Buccal acicula present; distinct prostomium.....8
- Buccal acicula absent; indistinct prostomium.....  
.....*P. pulla* Westheide, 1974
- 8 Notoacicula projecting through the skin; males with more than eleven pairs of copulatory organs .....  
.....*P. ungulata* De Wilde & Govaere, 1995
- Notoacicula embedded throughout the body; males with a single pair of copulatory organs ....*P. papillata* Yamanishi, 1976
- 9 Ventral cirri of chaetiger 1 elongated ( $\geq 2x$  longer than remaining) .....10
- Ventral cirri of chaetiger 1 similar to the remaining ventral cirri .....  
.....*P. garciavaldecasasi* San Martín, López & Camacho, 1998
- 10 Notoacicula projecting through the skin .....  
.....*P. hainensis* Wu, Ding & Huang, 1998
- Notoacicula embedded throughout the body .....11
- 11 Compound chaetae with short and coarse spinulation.....  
.....*P. papuensis papuensis* Govaere & De Wilde, 1993
- Compound chaetae with fine spinulation .....12

- 12 Distinct prostomium .....13  
 - Indistinct prostomium .....*P. oerstedii* Grube, 1857
- 13 Supra-acicular simple chaetae distally unidentate; modified ventral cirri of copulatory parapodia bifid; consecutive copulatory organs .....*P. hartmannschroederiae* Westheide, 1995  
 - Supra-acicular simple chaetae distally bidentate; modified ventral cirri of copulatory parapodia digitiform, not bifid; non-consecutive copulatory organs .....  
 .....*P. parapari* Moreira, Quintas & Troncoso, 2000
- 14 Notoacicula protruding from parapodial lobe .....  
 .....*P. guanche* San Martín, López & Núñez, 1999  
 - Notoacicula not protruding from parapodial lobe.....15
- 15 Buccal acicula protruding through cuticle and provided with serration on the tips.....*P. hermansi* Gradek, 1991  
 - Buccal acicula not protruding through cuticle and without dentation on the tips .....*P. crassa* Yamanishi, 1976
- 16 Notoacicula projecting through skin .....17  
 - Notoacicula embedded throughout the body.....19
- 17 First prechaetal lobes divided .....18  
 - Prechaetal lobes not divided ...*P. subulata* Yamanishi, 1992
- 18 Males with one pair of copulatory organs.....  
 .....*P. primitiva* De Wilde & Govaere, 1995  
 - Males with at least three pairs of non-successive copulatory organs.....*P. inkoi* sp. nov.
- 19 Buccal acicula present .....20  
 - Buccal acicula absent .....*P. koepkei* Siewing, 1954
- 20 Ventral cirri of chaetiger 1 clearly elongated .....21  
 - Ventral cirri of chaetiger 1 similar to the remaining ventral cirri .....35
- 21 Parapodia with long-bladed compound chaetae .....22  
 - Parapodia without long-bladed compound chaetae.....32
- 22 Parapodia with infra-acicular simple chaetae .....  
 .....*P. levisetosa* Zhao, Westheide & Wu, 1991  
 - Parapodia without infra-acicular simple chaetae .....23
- 23 Palpi ringed .....*P. martinsi* Hartmann-Schröder, 1974  
 - Palpi smooth. ....24
- 24 Parapodia with prechaetal lobes divided. ....25  
 - Parapodia with prechaetal lobes not divided. ....28
- 25 Ventral cirri of chaetiger 1 similar or slightly longer than dorsal buccal cirri; ventral cirri of the segment with male copulatory organs elongated .....26  
 - Ventral cirri of chaetiger 1 clearly shorter than dorsal buccal cirri; ventral cirri of the segment with male copulatory organs not elongated .....*P. parhelenae* De Wilde & Govaere, 1995
- 26 Ventral cirri of the segment with male copulatory organs bifid .....  
 .....*P. helenae* De Wilde & Govaere, 1995  
 - Ventral cirri of copulatory parapodia digitiform, unbranched .....27
- 27 Males with only a pair of male copulatory organs; pigidium bilobed .....*P. bulbifera* Yamanishi, 1998  
 - Males with three or four consecutive copulatory organs; pigidium truncate .....*P. umbraculifera* Yamanishi, 1998
- 28 Males with a single pair of copulatory organs .....29  
 - Males with more than one pair of copulatory organs. ....31
- 29 Ventral cirri of the segment with male copulatory organs elongated and spherical; four chaetae per parapodium with very long spinulation...*P. longispinulata* Aguado & San Martín, 2003  
 - Ventral cirri of the segment with male copulatory organs not elongated; at least five chaetae per parapodium with shorter spinulation .....30
- 30 Ventral cirri of the segment with male copulatory organs branched .....*P. papuensis brevis* Yamanishi, 1998  
 - Ventral cirri of the segment with male copulatory organs unbranched and digitiform. ....*P. alikunhii* Tenerelli, 1965
- 31 Two pairs of consecutive male copulatory organs .....  
 .....*P. wolffi* San Martín, López & Núñez, 1999  
 - Three to six non-consecutive male copulatory organs .....  
 .....*P. galapagoensis* Westheide, 1974
- 32 Palpi four to five times as long as dorsal cirri of buccal segments; single prechaetal lobes...*P. longipalpa* Ushakov, 1956  
 - Palpi about twice as long as those .....33
- 33 Jaws with an inward projection; single prechaetal lobes .....  
 .....*P. puzae* Siewing, 1953  
 - Jaws without inward projection.....34
- 34 Prechaetal lobe bilobed anteriorly, single posteriorly; male copulatory organ single-stemmed .....*P. remota* (Southern, 1914)  
 - Prechaetal lobe sub-bilobed throughout; male copulatory organ double-stemmed .....*P. vestigialis* Yamanishi, 1998
- 35 Parapodia with infra-acicular simple chaetae.....36  
 - Parapodia without infra-acicular simple chaetae .....37
- 36 Pygidium broad, semicircular; spinous pad present on the male copulatory organ .....  
 .....*P. brevicirra platycauda* Yamanishi, 1998  
 - Pygidium normal; spinous pad absent.....  
 .....*P. brevicirra brevicirra* De Wilde & Govaere, 1995
- 37 Parapodia with long-bladed compound chaetae .....38  
 - Parapodia without long-bladed compound chaetae.....43
- 38 Blade of long-bladed compound chaetae distally bidentate .  
 .....39  
 - Blade of long-bladed compound chaetae distally unidentate .....40
- 39 Prechaetal lobe divided .....  
 .....*P. corallicola* Hartmann-Schröder, 1974  
 - Prechaetal lobe not divided .....  
 .....*P. laubieri* Hartmann-Schröder, 1970
- 40 Ventral cirri of the segments with male copulatory organs foliaceous; distinct prostomium .....*P. complexa* Alikunhi, 1947  
 - Ventral cirri of the segments with male copulatory organs entirely reduced, or fused to the copulatory organ .....41
- 41 Pygidium with caudal organ; three falcigers per parapodium .....42  
 - Pygidium without caudal organ; two falcigers per parapodium; indistinct prostomium .....  
 .....*P. paucisetosa* Yamanishi, 1998
- 42 Fan-like appendage present on the male copulatory organ; distinct prostomium.....*P. gopalai vannifera* Yamanishi, 1998  
 - Fan-like appendage absent; indistinct prostomium.....  
 .....*P. gopalai gopalai* Alikunhi, 1941
- 43 Prechaetal lobe divided .....  
 .....*P. parva* De Wilde & Govaere, 1995  
 - Prechaetal lobe not divided .....*P. reducta* Storch, 1967

### Ecology

In the SE Bay of Biscay, *Pisione inkoi* sp. nov. was sometimes found in coarse shell gravel with high percentage of

calcium carbonate (21.9-88.9%) and variable organic matter content (2.4-4.8%) from the Basque continental shelf, between 50 and 120 m depth, more often below 100 m (Table 1), in a biocenosis similar to the “Boreal Offshore Gravel Association”, the “Deep Venus Community” or “Venus fasciata - *Spisula elliptica*- *Branchiostoma*” described by Ford (1923), Jones (1950) and Thorson (1957). The accompanying macrofauna is characterized in terms of abundance by the polychaetes *Pisione remota* (Southern, 1914), *Sphaerosyllis bulbosa* Southern, 1914, *Glycera lapidum* Quatrefages, 1865 and *Protodorvillea kefersteini* (McIntosh, 1865), the ophiuran *Amphipholis squamata* (Chiaje, 1828), the anthozoan *Epizoanthus* cf. *incrustus* (Duben & Koren, 1847), and large nematodes. Therefore, compared to most known *Pisione* species, which live intertidally or in shallow waters, *Pisione inkoi* sp. nov. occurs in relatively deep-waters.

#### Distribution

Recorded from continental shelf of Bizkaia and Gipuzkoa (Basque coast, SE Bay of Biscay).

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