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TWO NEW SPECIES (POLYCHAETA: FAUVELIOPSIDAE AND NERILLIDAE) AND OTHER POLYCHAETES FROM THE MARINE LAGOON CAVE OF JAMEOS DEL AGUA, LANZAROTE (CANARY ISLANDS)

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ABSTRACT

Nine species of polychaetes were collected from Jameos del Agua, Lanzarote, in shallow waters of a semi illuminated lagoon. Two new species are described: *Fauveliopsis jameoaquensis* Núñez, and *Mesonerilla diatomeophaga* Núñez. *F. jameoaquensis* is distinguished from the other species of the genus by having only 10 setigers. *M. diatomeophaga* is related to *M. prospera* Sterrer and Iliffe, 1982 from inland marine caves of Bermuda. *M. diatomeophaga* inhabits a carpet of diatoms on which it also feeds. A species of *Macrochaeta*, identified only to the generic level, is described, unfortunately only one incomplete specimen was collected.

The fauna of the marine lagoon caves in the complex of volcanic tubes, Jameos del Agua, in Lanzarote Island, began to be known with the first reports of crustaceans (Koelbel, 1892; Calman, 1904). The first polychaete report described the polynoid *Gesiella jameensis* (Hartmann-Schröder, 1974) (Hartmann-Schröder, 1974; Pettibone, 1976).

Faunistic studies have been conducted in three zones of the complex: Cueva de los Lagos, natural lagoon of the Jameos del Agua and Atlantida Tunnel (Fig. 1). The greatest faunistic richness is found in the lagoon of Jameos del Agua and in Atlantida Tunnel. With regards to polychaetes, five species have been cited so far: *G. jameensis, Syllis cornuta* Rathke, 1843 (Iliffe et al., 1984; Hartmann-Schröder, 1988), *Paradoneis lyra* (Southern, 1914), *Protodorvillea kefersteini* (McIntosh, 1869) (García-Valdecasas, 1985) and *Speleobregma lanzaroteum* Bertelsen, 1986 (Bertelsen, 1986). The samples here studied were collected in the lagoon of Jameos del Agua, which is very popular with tourists, so that samples must be taken very early in the morning, regardless of the state of the tide. The lagoon, which is found in the interior of a volcanic tube, is not absolutely dark due to the collapse of the roof, known by the term "jameo," which permit the light to break through. This fact permits a carpet of bentonic diatoms to develop in certain zones producing a brown coloration to the bottom (0.5–2 m depth). The dominant diatoms belong to the Grammatophorae, characterized by forming zig-zag chains. It is in this environment in which a greater number of specimens of nerillid *Mesonerilla diatomeophaga* Núñez, n. sp. were found. In another area of the lagoon, at 5 m depth in an interface of coarse black sand with lapilli, without a carpet of diatoms, *Macrochaeta* sp. and *Fauveliopsis jameoaquensis* Núñez, n. sp. were collected.

MATERIALS AND METHODS

The material was collected during two biological surveys at the volcanic tube of Jameos del Agua (Lanzarote), in April 1993 and April 1995. The sediment samples were collected by scuba-diving at 0.5–5 m depths, on an irregular basaltic bottom with small areas of coarse black sand, gravel and lapilli. The volume obtained in each sample was about 100 ml, fixed with 10% formalin. Afterwards,

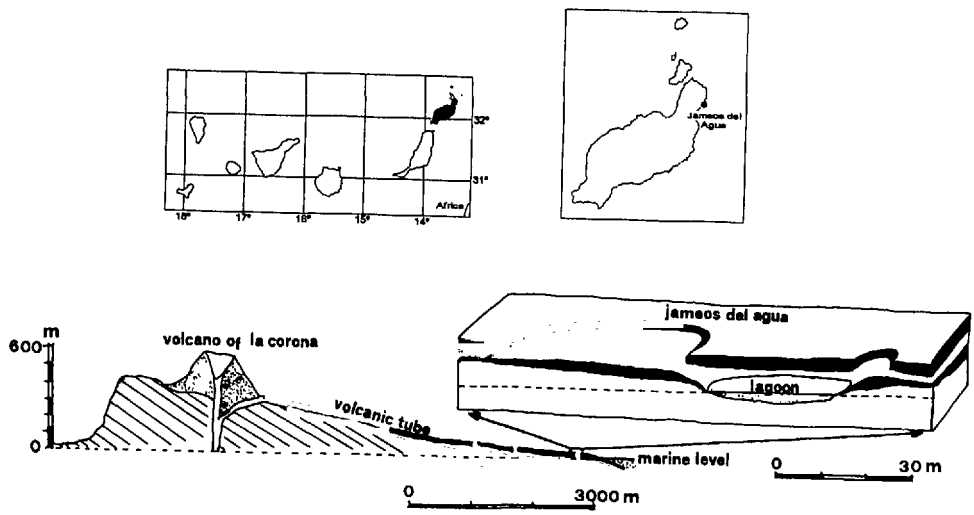

Figure 1. Map of the Canary Islands, in black Lanzarote. Map of Lanzarote. Vertical cutting of Volcano of La Corona and principal jameos (adapted from Bravo, 1964 and Macau, 1965), with enlarged vertical cutting of Los Jameos del Agua (adapted from Macau, 1965; Araña and Carracedo, 1979).

samples were screened through a 0.2-mm sieve. The specimens were isolated and preserved in 70% ethanol. Most specimens were later mounted whole in glycerine jelly for microscopical examination, to be identified and measured. Drawings were made to scale with a camera lucida, figures of setae were made using interference contrast optics (Nomarski).

Surface and bottom layer water temperature was taken with a Kurt Gohla oceanographic thermometer; the temperature was uniform throughout the lagoon (18.25°C). The salinity was taken with Autosal Guildline n° 8400A salinometer, giving values from north to south of 35.507‰, 35.540‰, 35.634‰, the littoral salinity of the Canary Islands is between 36.6–37.0‰. Phytoplankton biomass was obtained with a Fluorometer Turnes designs with a correction factor X_{10} filtering a volume of 1 liter screened through a 0.45 μm sieve Whatman GF/F. The values obtained were 0.01 mgr·m^{-3} chlorophyll and, feophytine was absent. These last values demonstrate the poverty of the phytoplankton, note that most of diatoms were found on the lagoon bottom.

The specimens have been deposited at the Museo de Ciencias Naturales, Santa Cruz de Tenerife (TFMC), at the Departamento de Biología Animal (Zoología) of the Universidad de La Laguna (DZUL) and at Bermuda Biological Station (BBS).

Family PARAONIDAE Cerruti, 1909

Paradoneis lyra (Southern, 1914)

Paradoneis lyra, Fauvel, 1923: 72, fig. 24 a–f; Mackie, 1991: 148, figs. 1–3A.

Material Examined.—1 specimen, April 1993. Black sand and lapilli. 32 setigers, length 3.35 mm, width 0.7 mm (anterior end).

Distribution.—Northeast Atlantic (coasts from Sweden to Canary Islands), northwestern Atlantic, Mediterranean Sea, Barents Sea?, South Africa?, Japan? (Mackie, 1991).

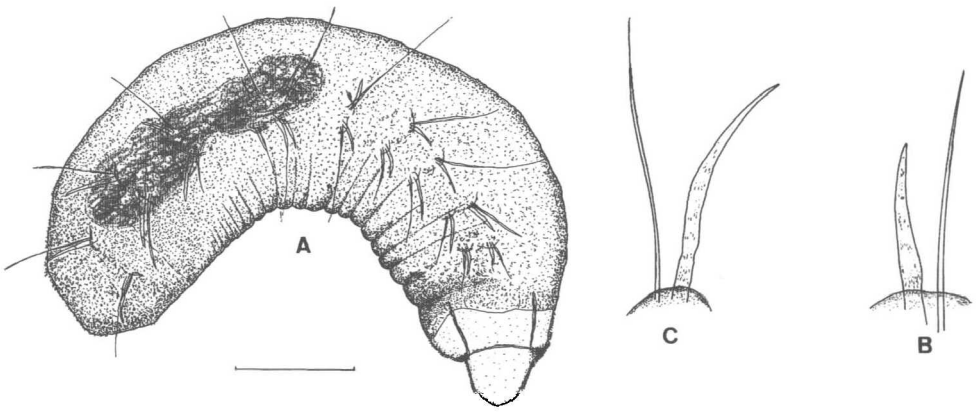

Figure 2. *Fauveliopsis jameoaquensis:* A, Mature specimen, lateral view; B, detail of setae from setiger 1; C, detail of setae from setiger 10. Scale: A = 125 μm; B, C = 29 μm.

Family FAUVELIOPSIDAE Hartmann, 1971

Fauveliopsis jameoaquensis Núñez, new species
Figure 2

Type Locality.—Natural lagoon of Jameos del Agua, Lanzarote (Canary Islands). Coarse black sand, 5 m depth, coll. J. Núñez, April 1993 and M. Pascual, April 1995.

Type Material.—Holotype (TFMC) n° AN/000192, 10 setigers, length 0.8 mm, width 0.2 mm (middle of body). 3 paratypes (DZUL) n°PO200, 10 setigers, length between 1.1–1.3 mm, width 0.3 mm (middle of body).

Etymology.—The specific name refers to its type locality.

Description.—Body short, cylindrical, translucent or brown color cuticle covered by fine sediment particles (Fig. 2A). Papillae not visible. All specimens have 10 setigers. Holotype has prostomium evaginated, pyriform, and laterally ciliated. Prostomium without appendages or eyes. Two small ciliated nucal organs. Peristomium laterally ciliated, without appendages. Parapodia biramous, small lobes inserted with reduced number of setae. Interramal papillae not visible. Holotype and two paratypes with same setal arrangement: two notosetae and two neurosetae, one is capillary and other acicular. Capillary setae external with respect to acicular ones (Fig. 2B, C). Setae first six setigers placed anteriorly (thorax) in rest posteriorly (abdomen). Two capillary notosetae in one specimen and one acicular setae in each setigers 6–9. Capillary setae in all setigers longer than acicular setae. Sexual products located in setigers 6–9. Pygidium rounded, without cirri.

Remarks.—*Fauveliopsis jameoaquensis* differs from other species of genus by its minute body (0.8–1.3 mm) with only 10 setigers in all specimens, papillae inconspicuous and in the arrangement of setae with generally 4 setae in each parapodium, of which one is capillary and one is acicular in each ramus. The number of setigers of mature animals and setal arrangement can be used to separate the described species of *Fauveliopsis* (Riser, 1987). Two species: *F. brattegardi* Fauchald, 1972 and *F. brevis* (Hartman, 1965) (Katzmann and Laubier, 1974) have short bodies, but both have 16 setigers, moreover the parapodial papillae are conspicuous.

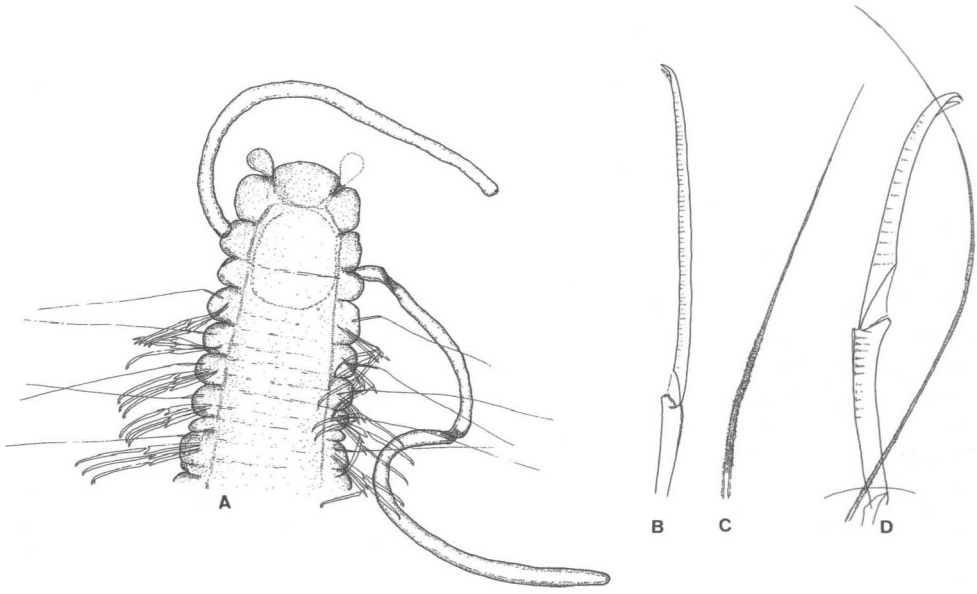

Figure 3. *Macrochaeta* sp.: A, Anterior end, dorsal view; B, compound setae from setiger 5; C, capillary setae from setiger 5; D, detail of setae from setiger 14. Scale: A = 73 μm; B–D = 14 μm.

Family ACROCIRRIDAE Banse, 1969

Macrochaeta sp.
Figure 3

Material Examined.—Natural lagoon of Jameos del Agua, Lanzarote (Canary Islands), April 1993, 3 m depth, coarse black sand. 25 segments, 1.8 mm long, 0.1 mm wide at level of pharynx.

Description.—Body unpigmented, translucent, inconspicuous and scattered spherical brown epidermal papillae only on last segments; cuticle without detritus particles. Prostomium wide, trilobed, two times longer than wide (Fig. 3A). Two short pyriform palps frontolaterally. Without eyes. Peristomium not distinguishable, second segment fused ventrally. Segments 2 and 3 achaetous, each with two long cirriform branchiae. Thoracic parapodia birameous, four times wider than long, without cirriform branchiae and cirri. Setigers 4–8 with capillary notosetae and three compound neurosetae. Capillary notosetae transversally striated, proximal part slightly curved (Fig. 3C). Compound neurosetae distally falcate, slightly transversally striated (Fig. 3B). Thoracic blade 42–55 μm. Two capillary setae replacing compound neurosetae from segments 9–13. Abdominal segments (14–25) with 1–2 capillary notosetae and 1 compound neuroseta similar to thoracic compound setae (Fig. 3D) though with a shorter blade (35–38 μm).

Remarks.—The only specimen found is in good condition but it has lost some cirriform branchiae and the posterior end is missing, so we have identified it only to the generic level. The specimen has important systematic characters which makes it different from known species belonging to genera *Acrocirrus* Grube, 1872 and *Macrochaeta* Grube, 1850 (Kudenov, 1976). *Macrochaeta* sp. is characterized by its setal arrangement: one capillary notosetae and three compound neurosetae from segment 4; the fascicle of three compound neurosetae in the anterior segments is replaced by 2 capillary neurosetae from segments 9–13. The specimen lacks eyes and the body is unpigmented, characteristics of other species of

polychaetes that live in the volcanic submarine tube of the Jameos, for example *Speleobregma lanzaroteum* Bertelsen, 1986 (Bertelsen, 1986) of which only one specimen has been collected.

Family NERILLIDAE Levinsen, 1883

Mesonerilla diatomeophaga Núñez, new species
Figure 4

Type Locality.—Natural lagoon of the Jameos del Agua, Lanzarote (Canary Islands). Carpet of diatoms on lapilli, 0.5–2 m depths. April 1993, coll. J. Núñez; April 1995, coll. L. Núñez. Coarse black sand, 5 m depth. April 1995, coll. M. Pascual.

Type Material.—Holotype (TFMC) n° AN/000193, 9 setigers, length 0.9 mm, width 0.15 mm (anterior end). 6 paratypes (DZUL) n° 201–206, 9 setigers, length between 0.8–1.2 mm, width 0.13–0.21 mm (anterior end). 3 juvenile specimens, 6, 7 setigers, length between 0.3–0.4 mm, width 0.05–0.06 mm. 3 specimens (BBS).

Etymology.—The name of the species refers to its source of food.

Description.—Body unpigmented, translucent. Prostomium rounded, three slender antennae dorsally (median antenna length between 113–200 μm, lateral antennae 225–250 μm); in most specimens some antennae lost (Fig. 4A). Pair of orange eyes behind and lateral to lateral antennae. Two ventrolateral club-shaped ciliated palps (observed in live specimens). Palps slightly curved, narrowed basally. Pharynx bulb without buccal pieces. Nine setigerous segments including the buccal segment. One short cirrus in buccal parapodia (up to 30 μm). Two elongate cirri on remainder of parapodia similar to antennae in some parapodia (up to 260 μm length) and short on other parapodia (regenerating cirri). First pair of parapodia with one bundle of about 12 setae. On setigers 2–9 parapodia carry two bundles of about 24 setae. Setae compound, heterogomph spinigers on all setigers. On first setiger setal shafts with short, pointed distal projection (Fig. 4D), all blades similar in length (about 60 μm). Setigers 2–9 with some setal shafts similar to those of the first setiger and some setae with distal spur longer (up to 8 μm) and distally blunt (Fig. 4C). Blades with dorso-ventral gradation in length, 70 μm above, 30 μm below in midbody. Pygidium (Fig. 1B) with two slender cirri (about 262 μm). No mature specimens observed carried eggs or embryos externally.

Remarks.—*Mesonerilla diatomeophaga* n. sp. is related to *M. prospera* Sterrer and Iliffe, 1982 (Sterrer and Iliffe, 1982) in that both are cavernicolous species with eyes. Though most of the nerillids are interstitial species (Westheide, 1990), *M. diatomeophaga* inhabits a carpet of benthic diatoms on lapilli, on which it also feeds, and *M. prospera* lives in mud on stones. *M. diatomeophaga* differs principally from *M. prospera* in the shape of the palps, size of the anal cirri (up to 262 μm in *M. diatomeophaga,* up to 120 μm in *M. prospera*), and in the body size, since *M. diatomeophaga* (0.8–1.2 mm length) is smaller than *M. prospera* (1.5–2.0 mm length).

Family POLYNOIDAE Kinberg, 1856
Subfamily GESIELLINAE Muir, 1982

Gesiella jameensis (Hartmann-Schröder, 1974)

Gesiella jameensis, Pettibone, 1976: 64, fig. 36; Núñez, 1990: 69, fig. 12.
Macellicephala (Macellicephala) jameensis Hartmann-Schröder, 1974: 76, figs. 1–8.

Material Examined.—5 specimens, April 1993; 4 specimens, April 1995. Pelagic. Setigers between 18 and 19, length 6–10 mm, width 3–5 mm (first setigers).

Distribution.—Volcanic tubes of Jameos del Agua, Lanzarote (Canary Islands).

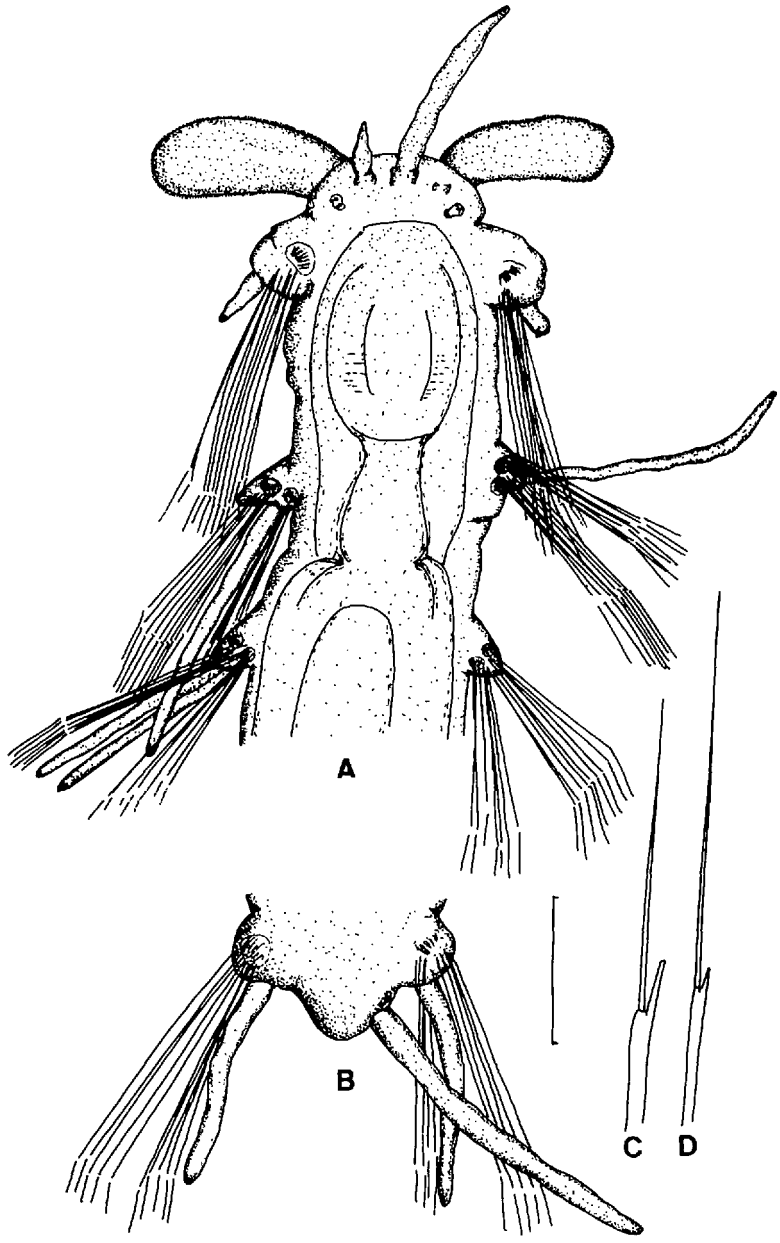

Figure 4. *Mesonerilla diatomeophaga:* A, Anterior end, dorsal view (left lateral antenna in regeneration); B, posterior end, dorsal view; C, compound seta, shaft with blunt distal projection; D, compound seta, shaft with distal pointed projection. Scale: A, B = 25 μm; C, D = 30 μm.

Family SYLLIDAE Grube, 1850
Subfamily EUSYLLINAE Rioja, 1925

Miscellania dentata Martín, Alós and Sardá, 1990

Miscellania dentata Martín, Alós and Sardá, 1990: 169, figs. 2–4; Núñez, 1990: 346, fig. 105.

Material Examined.—3 specimens, April 1995. Diatoms on lapilli. Setigers between 9 and 12, length 0.75–1.60 mm, width 0.06–0.10 mm (at level of proventriculus).

Distribution.—Atlantic Ocean (Canary Islands), northwestern Mediterranean Sea.

Subfamily EXOGONINAE Rioja, 1925

Exogone (Parexogone) gambiae Lanera, Sordino and San Martín, 1994

Exogone (Parexogone) gambiae Lanera, Sordino and San Martín, 1994: 236, fig. 2, 3.

Material Examined.—1 specimen, April 1993. Coarse black sand. 21 setigers, length 3.2 mm, width 0.2 mm (at level of proventriculus). Sexual products between 15–18 setigers, natatory setae absent.

Distribution.—Mediterranean Sea. First record for the Atlantic Ocean (Canary Islands: Lanzarote).

Subfamily SYLLINAE Grube, 1850

Syllis garciai (Campoy, 1982)

Syllis garciai, San Martín, 1984: 364, Pl. 92; Núñez, San Martín and Brito, 1992: 121, figs. 3J, 5F.
Langerhansia garciai Campoy, 1982: 386, Pl. 36–38, fig. 16

Material Examined.—4 specimens, April 1993; 3 specimens, April 1995. Coarse black sand and diatoms on lapilli. 28–31 setigers, length 3.2–3.7 mm, width 0.2–0.3 mm (at level of proventriculus).

Distribution.—Atlantic Ocean (Northwestern coasts of Iberian Peninsula, Canary Islands, Cape Verde Islands (López and San Martín, 1994), North Carolina, Cuba, western Mediterranean Sea.

Syllis truncata cryptica Ben-Eliahu, 1977

Syllis (Typosyllis) truncata cryptica Ben-Eliahu, 1977: 41, fig. 16.
Typosyllis truncata cryptica, Campoy, 1982: 418, Pl. 48, 49.
Syllis truncata cryptica, San Martín, 1984: 352, Pl. 87; Núñez, San Martín and Brito, 1992: 119, fig. 4Ñ.

Material Examined.—1 specimen, April 1995. In the pores of lapilli. 54 setigers, length 3.7 mm, width 0.2 mm (at level of proventriculus).

Distribution.—Atlantic Ocean (Northwestern coasts of Iberian Peninsula, Canary Islands, Cape Verde Islands (López and San Martín, 1994), Mediterranean Sea, Red Sea.

Discussion

Of the nine species studied in this paper, two *Paradoneis lyra* and *Gesiella jameensis* had been previously recorded for Jameos del Agua. The remaining seven species are first records for the marine fauna of the volcanic complex tubes of Jameos del Agua, Lanzarote. Together with the records of other authors, they make a total of 12 species of polychaetes, making the polychaetes one of the groups of invertebrates with best representation in this place. These species can be subdivided according to different hypothesis on the inhabitants of these marine cavernicolous environments (Iliffe et al., 1984). A first group includes ubiquitous species that occupy interstices in the interfaces of lapilli and black sand. The species of this group, the most numerous, show a wide geographical distribution or are restricted to the Atlantic-Mediterranean area. These are species adapted to live in coastal zones, in contrast to the true cavernicolous species, have pigmentation and eyes: *Paradoneis lyra, Miscellania dentata, Exogone (Parexogone) gambiae, Syllis garciai, S. cornuta, S. truncata cryptica* and *Protodorvillea kefersteini*. A second group includes endemic species, more closely related to deep waters

polychaetes, as a rule, these species are unpigmented and lack eyes: *Speleobregma lanzaroteum, Fauveliopsis jameoaquensis, Macrochaeta* sp. and *Gesiella jameensis*. The third and last group is represented by only one species, *Mesonerilla diatomeophaga,* related to *M. prospera* which lives in limestone caves in Bermuda. This may be another piece of evidence showing its origin in the Tethyan fauna (Wilkens et al., 1986).

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