



## Two new species of *Dikoleps* (Gastropoda, Skeneidae) from the Mediterranean coast of Spain

### Dos nuevas especies de *Dikoleps* (Gastropoda, Skeneidae) de la costa mediterránea española

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#### ABSTRACT

Two new species of the genus *Dikoleps* Höisaeter, 1968 (Gastropoda, Skeneidae) are described from the Mediterranean coast of Spain. The radula and external morphology of the soft parts of the two species are compared with those of the related *D. cutleriana* (Clark, 1849).

#### RESUMEN

Se describen dos nuevas especies del género *Dikoleps* Höisaeter, 1968 (Gastropoda, Skeneidae) de la costa mediterránea española. La rádula y la morfología externa de las partes blandas de las dos especies se comparan con las de la especie afín *Dikoleps cutleriana* (Clark, 1849).

KEY WORDS: *Dikoleps*, new species, *Dikoleps cutleriana*, Gastropoda, Mediterranean, SE. Spain.

PALABRAS CLAVE: *Dikoleps*, especies nuevas, *Dikoleps cutleriana*, Gastropoda, Mediterráneo, SE. España.

#### INTRODUCTION

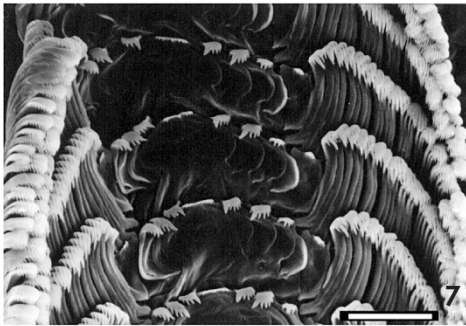
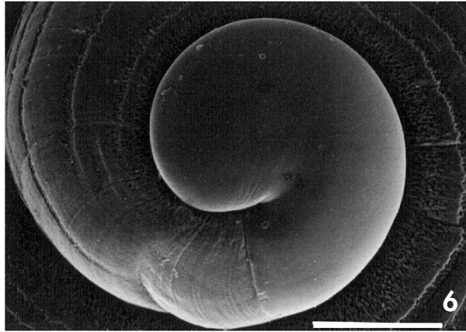
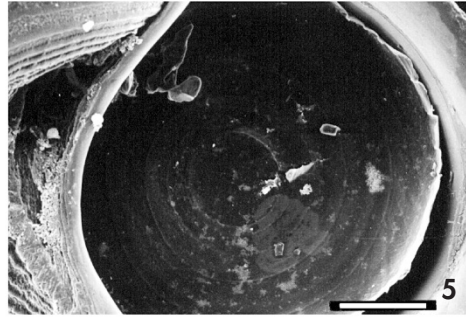
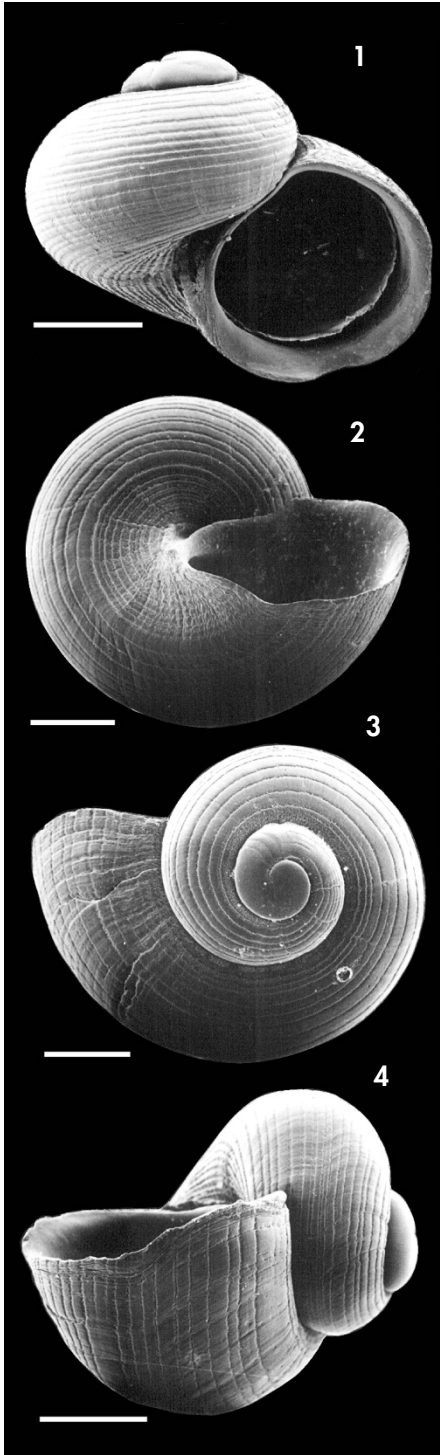
In recent years, some papers dealing with Skeneidae including descriptions of new NE. Atlantic species have been published (AARTSEN AND BOGI, 1988; RUBIO AND RODRÍGUEZ BABÍO, 1991; WARÉN, 1991, 1992, 1993). RUBIO-SALAZAR (1991) studied the skeneids of the southern and eastern coasts of Spain. WARÉN (1992: 158) gave a diagnosis of the genus *Dikoleps* (characterized by an outer lip with a shallow sinus)

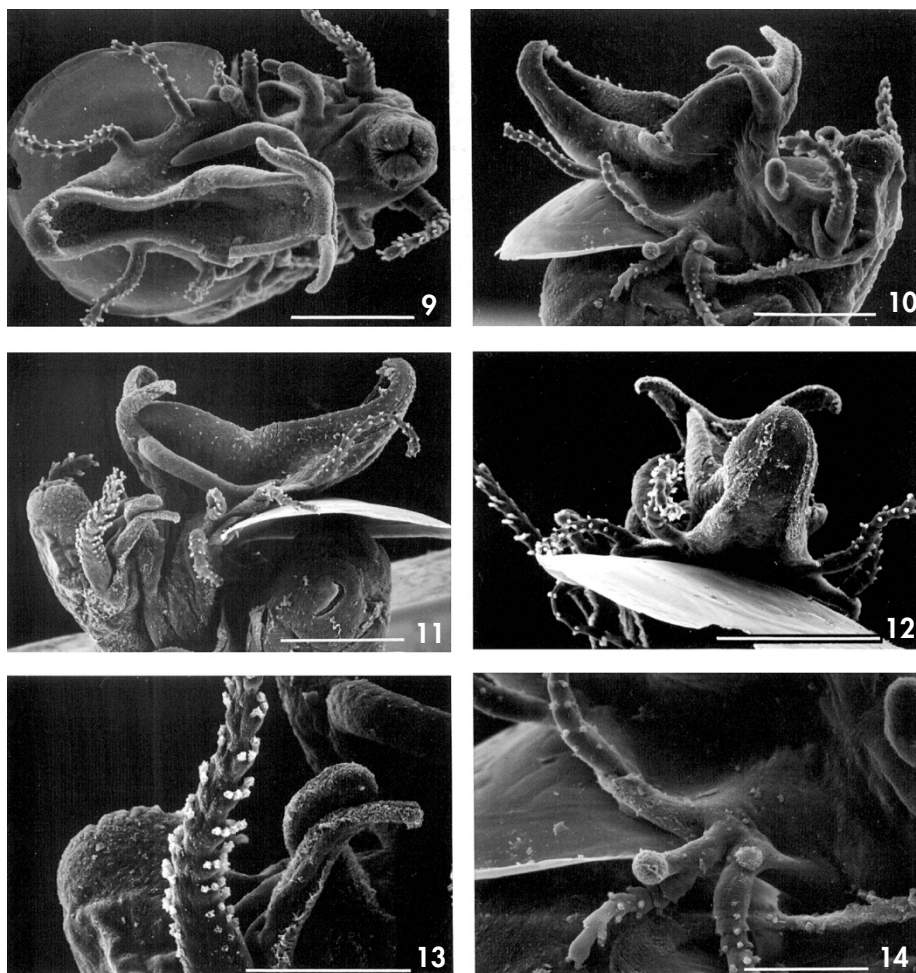
and commented on the European species; WARÉN (1991) figured the radula of the type species of *Dikoleps*, *D. pusilla* (Jeffreys, 1847). AARTSEN, MENKHORST AND GITTENBERGER (1984), RUBIO-SALAZAR (1991) and GIANNUZZI-SAVELLI, PUSATERI, PALMERI AND EBREO (1994) illustrated the five species of *Dikoleps* (*D. pusilla*, *D. nitens*, *D. pruimosa*, *D. cutleriana* and *D. depressa*) known from the Mediterranean Sea (SABELLI,

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Figures 9-14. *Dikoleps cutleriana* (Clark, 1849), critical point dried animal. 9: ventral view, showing penis; 10: left lateral view; 11: right lateral view; 12: posterior view; 13: detail of right cephalic tentacle showing sensory papillae and postoptic tentacle; 14: left side epipodial sense organs and epipodial tentacles. Locality: Limens (Ría de Vigo). Scale bars, 9-12: 200  $\mu\text{m}$ ; 13, 14: 100  $\mu\text{m}$ .

*Figuras 9-14. Dikoleps cutleriana* (Clark, 1849), animal deshidratado mediante punto crítico. 9: vista ventral, mostrando el pene; 10: vista lateral izquierda; 11: vista lateral derecha; 12: vista posterior; 13: detalle del tentáculo cefálico derecho mostrando las papilas sensoriales y el tentáculo postóptico; 14: órganos epipodiales sensoriales izquierdos y tentáculos epipodiales. Localidad: Limens (Ría de Vigo). Escalas, 9-12: 200  $\mu\text{m}$ ; 13, 14: 100  $\mu\text{m}$ .

(Left page) Figures 1-8. *Dikoleps cutleriana* (Clark, 1849). 1-4: shell; 5: umbilicus, aperture and operculum; 6: protoconch; 7, 8: radula. Locality: Limens (Ría de Vigo). Scale bars, 1-4: 500  $\mu\text{m}$ ; 5, 6: 100  $\mu\text{m}$ ; 7, 8: 10  $\mu\text{m}$ .

(Página izquierda) Figuras 1-8. *Dikoleps cutleriana* (Clark, 1849). 1-4: concha; 5: ombligo, apertura y opérculo; 6: protoconcha; 7, 8: rádula. Localidad: Limens (Ría de Vigo). Escalas, 1-4: 500  $\mu\text{m}$ ; 5, 6: 100  $\mu\text{m}$ ; 7, 8: 10  $\mu\text{m}$ .

GIANNUZZI-SAVELLI AND BEDULLI, 1990). GAGLINI (1987) described and illustrated *D. nitens*, *D. depressa* and the new *D. umbilicostriata*. FRETTER AND GRAHAM (1977) gave S.E.M. photographs of the animal of *D. cutleriana* and WARÉN AND BOUCHET (1993) of *D. nitens*. During pre-

paratory work for the first volume (Archaeogastropoda) of the Iberian prosobranch gastropods (included in the "Fauna Ibérica" project), two new species related to *D. cutleriana* (Clark, 1849) have been found and described here, after a redescription of this species.

## RESULTS

Family SKENEIDAE Clark, 1851

Genus *Dikoleps* Höisaeter, 1968

*Dikoleps* Höisaeter, 1968, *Sarsia*, 33: 47. Type species: *Margarita pusilla* Jeffreys, 1847, by original designation.

### *Dikoleps cutleriana* (Clark, 1849) (Figs. 1-14)

*Trochus exilis* Philippi, 1844. *Enumeratio Molluscorum Siciliae*, 156, pl. XXV, fig. 15.

*Delphinoidea cutleriana* Clark, 1849. *Ann. Mag. Nat. Hist.*, 2 (4): 424.

*Skenea cutleriana* (Clark): Forbes and Hanley, 1853. *British Mollusca*, 3: 164.

*Cyclostrema cutleriana* (Clark): Jeffreys, 1865. *British Conchology*, 3: 287.

*Dikoleps cutleriana* (Clark): Höisaeter, 1968. *Sarsia*, 33: 48.

*Skenea cutleriana* (Clark): Rodríguez Babío and Thirirot-Quièvreux, 1975. *Cah. Biol. Mar.*, 16 (4): 527, pl. 4 (C, D).

*Skenea cutleriana* (Clark): Fretter and Graham, 1977. *J. Moll. Stud. suppl.*, 3: 86-88, Figs 64-66.

**Type material:** 3 possible syntypes, BMNH 1852.8.13.29-30, 1852.11.22.38-43, locality on the label "South Devon".

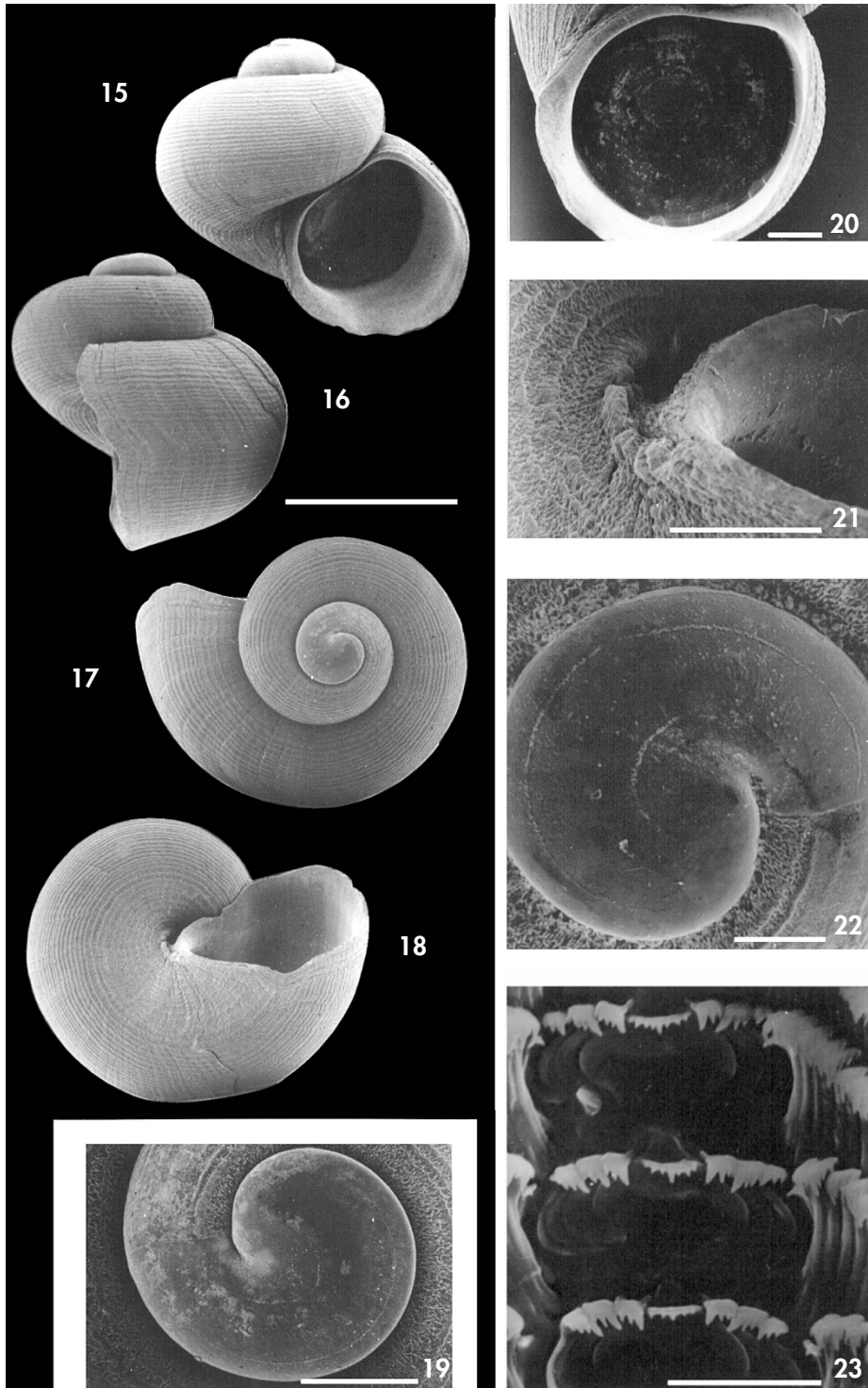
**Material examined:** 35 specimens and 14 shells from Limens (Ría de Vigo), dredged of a "mäerl" bottom (detritic bottom with calcareous algae), between 20-25 m of depth.

**Description:** Shell (Figs. 1-4) thin, translucent and somewhat glossy, whitish, of 2.4 mm of maximum diameter and 1.98 mm of maximum height ( $h/d = 0.82$ ) with three convex whorls. Protoconch (Fig. 6) smooth, of one whorl and ca. 250  $\mu\text{m}$  of diameter. Teleoconch of about two whorls, sculptured on the last whorl with

about 30 flat spiral cords with narrow interspaces and marked growth lines with three sinuses corresponding with sinuses of outer lip. Aperture rounded, prosocline, comprising about 60% of height; body whorl about 95% of shell height. Umbilicus (Fig. 5) deep and narrow, delimited by a thick spiral rib. Operculum (Fig. 5)

(Right page) Figures 15-23. *Dikoleps marianae* spec. nov. 15, 16, 17, 18: shell of the holotype; 19, 22: protoconch of the holotype and a paratype, respectively; 20: aperture and operculum of a paratype; 21: umbilicus and basal edge of aperture of the holotype; 23: radula of paratype. Type locality: Placer de las Bóvedas, Fauna Ibérica I exp., stn. 22A (36° 25.20' N, 5° 0.80' W), 30 m. Scale bars, 15-18: 500  $\mu\text{m}$ ; 19-21: 100  $\mu\text{m}$ ; 22: 50  $\mu\text{m}$ ; 23: 10  $\mu\text{m}$ .

(Página derecha) Figuras 15-23. *Dikoleps marianae* spec. nov. 15, 16, 17, 18: concha del holotipo; 19, 22: protoconchas del holotipo y un paratipo respectivamente; 20: apertura y opérculo de un paratipo; 21: ombligo y borde basal de la apertura del holotipo; 23: rádula de un paratipo. Localidad tipo: Placer de las Bóvedas, Fauna Ibérica I exp., stn. 22A (36° 25,20' N, 5° 0,80' W), 30 m. Escalas, 15-18: 500  $\mu\text{m}$ ; 19-21: 100  $\mu\text{m}$ ; 22: 50  $\mu\text{m}$ ; 23: 10  $\mu\text{m}$ .



thin, multispiral, with central nucleus and fine growth lines.

Animal (Figs. 9-14) with long cephalic tentacles of ringed aspect when retracted, bearing small sensory papillae regularly distributed on the outer edge of each ring (Fig. 13). Right postoptic tentacle (Fig. 13) long and ciliated; digitiform neck lobes (Figs. 9-11, 13) similar in shape and size and ciliated. Four epipodial tentacles similar to cephalic ones but smaller on each side; the second right and the left first and second tentacles with a basal sense organ (Figs. 9, 10, 14). Propodial penis (Figs. 9, 11) large and smooth.

Radular formula n.4.1.4.n (Figs. 7, 8). Central tooth laterally expanded, cusp with about 10 denticles of similar size. Cusp of three inner lateral teeth with a long central denticle and four smaller ones at each side; outermost lateral rectangular, with small cusp, a big central denticle and both sides finely denticulated. Marginal teeth long, joint at their bases, with a spatulated curved cusp, the innermost ones with 5-6 long denticles; the cusp of the outer ones wider and with numerous and fine denticles.

*Range:* From the southern part of the British Islands and northwestern France (FRETTER AND GRAHAM, 1977) to the Ría de Vigo (JEFFREYS, 1883; ROLÁN, 1983, our own data); absent in the North Sea and Scandinavia.

*Habitat:* Intertidal, in pools and amongst algae and sublittoral amongst

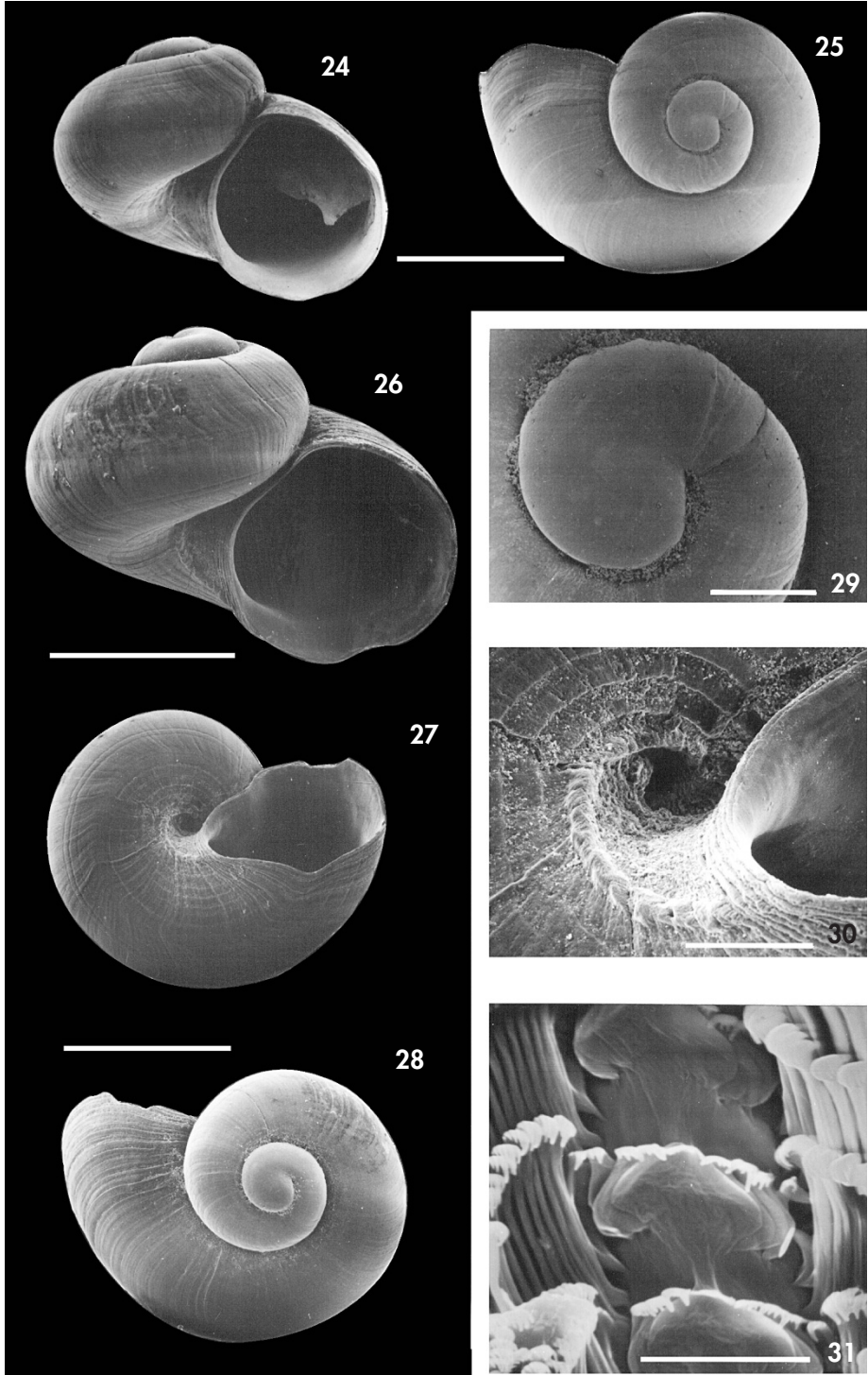
detrital material (FRETTER AND GRAHAM, 1977); muddy (ROLÁN, 1983) and sublittoral "maërl" bottoms (our own data).

*Remarks:* FRETTER AND GRAHAM (1977) described and illustrated the animal of this species, including S. E. M. photographs of a cephalic tentacle and its sensory papillae, but these authors did not describe the postoptic tentacle. According to WARÉN (1992) the radula of *D. cutleriana* has a normally developed cutting edge on the central tooth and a fourth lateral teeth lacking denticles but with cutting edge.

*D. cutleriana* probably is an Atlantic species, since we do not know Mediterranean specimens; those illustrated from SE Corsica (Solenzara) by AARTSEN ET AL. (1984) and GIANNUZZI-SAVELLI ET AL. (1994) probably belongs to *D. marianae* spec. nov. by the dense spiral sculpture. RODRÍGUEZ-BABÍO AND THIRIOT-QUIÈVREUX (1975) and FRETTER AND GRAHAM (1977) illustrated typical specimens of *D. cutleriana* from the Atlantic. *Cyclostrema funnazzensis* De Gregorio, 1889 was synonymized with *D. cutleriana* by MONTEROSATO (1890), but was originally described as a smooth shell; according to Warén (1996, com. pers.) De Gregorio probably had a specimen of *Cirsonella romettensis*. According also to WARÉN (1992, 1996, pers. com.), *Trochus exilis* Philippi, 1844, is the right name for *D. cutleriana*.

(Right page) Figures 24-31. *Dikoleps rolani* spec. nov. 24, 25: shell of the holotype; 26-28: shell of a paratype; 29: protoconch of the holotype; 30: umbilicus and basal edge of aperture of a paratype; 31: radula of a paratype. Localities: 24, 25, 29, holotype (MNCN 15.05/22256), Tunel Llarg, Meda Xica, Islas Medas (Gerona); 26-28, 30, paratype, Llavaneras (Barcelona) (41° 30.51' N, 2° 30.90' E), broken under S.E.M.; 31, paratype, Furrió de Tamariu, Llafranc (Gerona), Museo de Zoología (Facultad de Biología, Universidad de Barcelona). Scale bars, 24-28: 500 µm; 29, 30: 100 µm; 31: 10 µm.

(*Pàgina dreta*) Figuras 24-31. *Dikoleps rolani* spec. nov. 24, 25: concha del holotipo; 26-28: concha de un paratipo; 29: protoconcha del holotipo; 30: ombligo y borde basal de la apertura de un paratipo; 31: rádula de un paratipo. Localidades: 24, 25, 29, holotipo (MNCN 15.05/22256), Tunel Llarg, Meda Xica, Islas Medas (Gerona); 26-28, 30, paratipo, Llavaneras (Barcelona) (41° 30,51' N, 2° 30,90' E), rota al M.E.B.; 31, paratipo, Furrió de Tamariu, Llafranc (Gerona), Museo de Zoología (Facultad de Biología, Universidad de Barcelona). Escalas, 24-28: 500 µm; 29, 30: 100 µm; 31: 10 µm.



*Dikoleps marianae* spec. nov. (Figs. 15-23, 42-45)

*Dikoleps cutleriana* (Clark): Rubio-Salazar, 1991. *Iberus*, 9: 193, Figs. 19-22.

**Type material:** Holotype (Figs. 15-18, 19, 21) and 5 paratypes (3 specimens and 2 shells). Type locality, "Placer de las Bóvedas", Fauna Ibérica I exp., stn. 22A (36° 25.20' N, 5° 0.80' W), 30 m, coralligenous bottom with rodophytes and phaeophytes (MNCN 15.05/22255). One additional paratype (Figs. 42-45) from Crinavis, Algeciras Bay (Cádiz) (36° 09' 48" N, 5° 22' 38" W), detritic bottom, 10-14 m depth, 18-6-1996 (MNCN 15.05/27874). All the type material deposited in the "Museo Nacional de Ciencias Naturales" of Madrid (MNCN).

**Other material examined:** 2 specimens and 2 shells from "Placer de las Bóvedas", Fauna Ibérica I exp., stn. 23A (36° 24.05' N, 5° 0.99' W), 30-32 m, coralligenous bottom with *Lithophyllum* and *Lithothamnium*; 3 specimens and 4 shells from Alborán Island, Fauna Ibérica I exp., stn. 33A (35° 55.95' N, 3° 1.56' W), 33-44 m depth, rocky bottom with *Laminaria ochroleuca* and *Saccorhiza polyschides*; 34 shells from Alborán Island, Proyecto Coral Rojo, stn. 1 (35° 51' N, 3° 10' W), 200 m; 8 shells, from Seco de los Olivos, Proyecto Coral Rojo, stn. 14 (36° 31' N, 2° 50' W), 60-101 m; 15 shells, Proyecto Coral Rojo, stn. 15 (36° 31' N, 3° 50' W), 80-110 m; 16 shells, from Alborán Island, 75-130 m; 2 specimens from Punta Pedrera (Formentera), 28 m depth; 65 shells from Columbretes Islands, stn. 17CG, 60-80 m; 1 specimen and 3 shells from Crinavis, Algeciras Bay (Cádiz) (36° 09' 48" N, 5° 22' 38" W), detritic bottom, 10-14 m depth (18-6-1996); Cabo Leven, 7 Cabos, Western Sahara, 35-50 m depth.

**Etimology:** The species is named in honour of Marian Ramos, Director of the "Fauna Ibérica" project, for her contribution to Zoology in Spain.

**Description:** Shell (Figs. 15-18) thin, translucent and somewhat glossy, whitish, of 0.91 mm of maximum diameter and 0.89 mm of maximum height ( $h/d=0.97$ ), with  $2\frac{1}{2}$  convex whorls. Protoconch (Figs. 19, 22) of  $\frac{3}{4}$  whorl and ca. 235  $\mu\text{m}$  of diameter, almost smooth with two (Fig. 19) or three (Fig. 22) visible spiral lines. Teleoconch of about two whorls, sculptured on the last whorl with about 40 spiral flat cords so large or narrower than interspaces and marked growth lines with three sinuses corresponding with sinuses of outer lip. Aperture (Fig. 20) rounded, prosocline, comprising about 60-65% of height; body whorl about 95% of shell height. Umbilicus (Fig. 21) deep and narrow, delimited by a thick spiral rib. Operculum (Fig. 20) thin, multispiral, with central nucleus and fine growth lines.

Animal (Figs. 42-45) with long cephalic tentacles of ringed aspect when retracted, bearing small sensory papillae regularly distributed on the outer edge of each ring (Figs. 42-44). Right postoptic tentacle (Fig. 45) long and densely ciliated; digitiform neck lobes (Figs. 43, 44) similar in shape and size and ciliated. Four epipodial tentacles similar to cephalic ones but smaller on each side; the second and third right and the

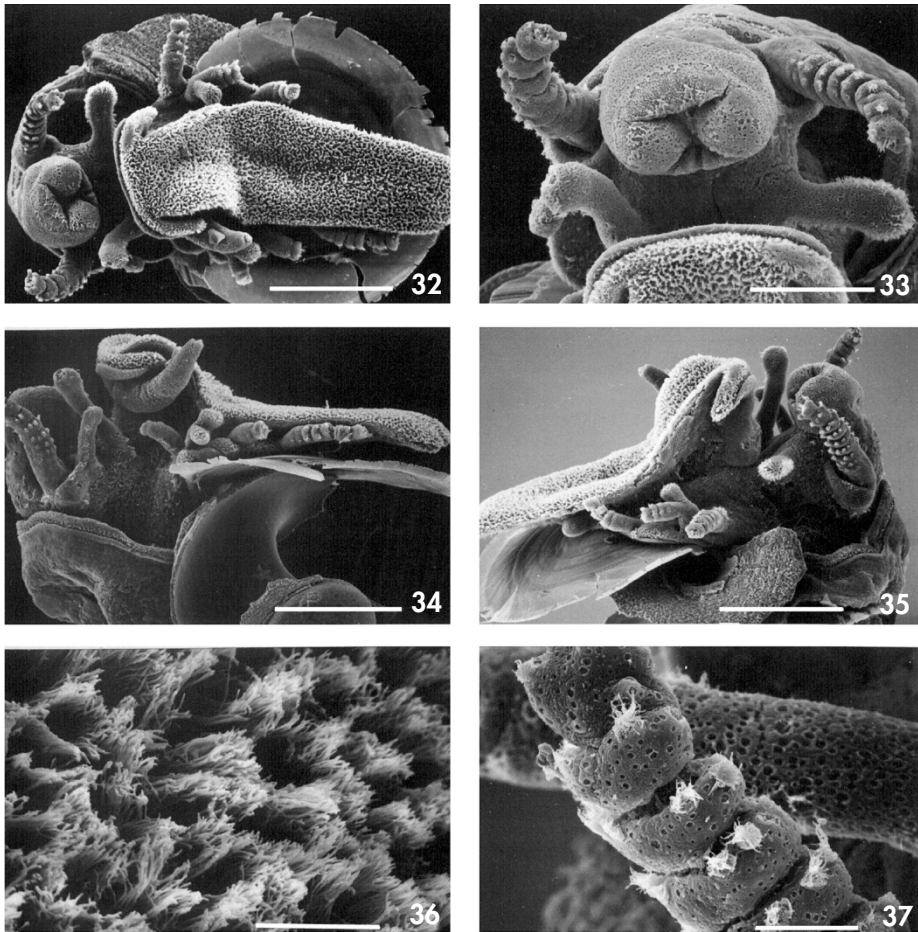
second left tentacles with a basal sense organ (Figs. 43, 44). Propodial penis (Figs. 42-45) large and smooth.

Radular formula n.4.1.4.n (Fig. 23), radula similar to that of *D. cutleriana*, but with a more prominent hooked cusp with a larger central denticle and 4-5 smaller denticles at each side. Cusp of the three inner lateral teeth with a large central denticle and 3-4 smaller at each side; outermost lateral laminar, rectangular, with a small cusp finely denticulated. Marginal teeth long, joint at their bases and with a spatulated curved cusp, the innermost ones with 6-7 denticles; the cusp of the outer ones wider and with numerous and fine denticles.

**Range:** From NW Africa (Cabo Leven, Western Sahara) to Western Mediterranean: Placer de las Bóvedas (Málaga), Seco de los Olivos (Almería), Alborán Island, Punta Pedrera (Formentera) and Columbretes Islands.

**Habitat:** A sublittoral species which lives with other skeneids (*Dikoleps nitens* and *Skenea serpuloides*) between 25 and 80 m, on *Laminaria* or coralligenous bottoms with calcareous algae (*Lithophyllum* and *Lithothamnium*) (Alborán Island and Placer de las Bóvedas), detritic bottoms (Punta Pedrera, Formentera) and "maërl" (Columbretes Islands).





Figures 32-37. *Dikoleps rolani* spec. nov., critical point dried animal. 32: ventral view; 33: ventral view of head, showing cephalic tentacles, right postoptic tentacle and reduced neck lobes; 34: right lateral view, showing propodial penis; 35: left lateral view; 36: detail of the ciliated sole of the foot; 37: detail of cephalic tentacle showing sensory papillae. Locality: Llavaneras (Barcelona). Scale bars, 32, 34, 35: 200  $\mu$ m; 33: 100  $\mu$ m; 37: 25  $\mu$ m; 36: 10  $\mu$ m.

*FigurAs 32-37. Dikoleps rolani spec. nov., animal deshidratado mediante punto crítico. 32: vista ventral; 33: vista ventral de la cabeza, mostrando los tentáculos cefálicos, el tentáculo postóptico derecho y los lóbulos reducidos del cuello; 34: vista lateral derecha, mostrando el pene propodial; 35: vista lateral izquierda; 36: detalle de la suela ciliada del pie; 37: detalle del tentáculo defálico mostrando las papilas sensoriales. Localidad: Llavaneras (Barcelona). Escalas, 32, 34, 35: 200  $\mu$ m; 33: 100  $\mu$ m; 37: 25  $\mu$ m; 36: 10  $\mu$ m.*

Shells can be found until 200 m (Seco de Motril).

*Remarks:* *Dikoleps marianae* is smaller and more elevated than *D. cutleriana*, and also differs from this species by the spirally sculptured protoconch, the more numerous spiral cords of the teleoconch

which are of the same width or narrower than the interspaces and the more prominent cusp of the central tooth with a large central denticle. The shells of *D. nitens* (Philippi, 1844) (= *D. pusilla* (Jeffreys, 1847)) and *D. umbilicostriata* (Brugnone in Gaglini, 1987) are smooth, except for

several spiral lines in half of the basal surface around the umbilicus in the last species (see remarks under the next species). *D. pruinosa* (Chaster, 1896) has the whole surface of the shell axially wrin-

kled. *D. depressa* (Monterosato, 1880) is more depressed and smooth, except for five spiral keels in the umbilicus (GAGLINI, 1987; WARÉN, 1992) (see Figures 38-40 and remarks under the next species).

### *Dikoleps rolani* spec. nov. (Figs. 24-37)

**Types:** Holotype (Figs. 24, 25, 29) and one paratype deposited in the Museo Nacional de Ciencias Naturales of Madrid (MNCN 15.05/22256); one paratype in Museo de Zoología (Facultad de Biología, Universidad de Barcelona). Type locality: Tunel Llarg, Meda Xica, Islas Medas (Gerona) (42° 3' N, 3° 15' E), sand bottom with gravel, 23 m.

**Other material examined:** 3 specimens (paratypes) (two deposited in MNCN, one in Museo de Zoología, Universidad de Barcelona) from Furrió de Tamariu, Llafranc (Gerona), 35 m, coralligenous gravel (Fig. 31, radula); 2 shells (paratypes) (MNCN) from Llavaneras (Barcelona) (41° 30. 51' N, 2° 30. 90' E), 30 m depth, shell and gravel bottom with crinoids (that illustrated in Figs. 26-28 and 30 accidentally broken under SEM).

**Etimology:** Named in honour of Emilio Rolán, for his contribution to Malacology in Spain.

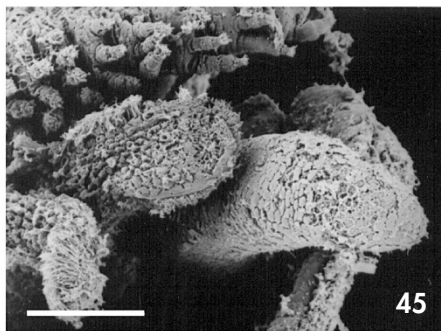
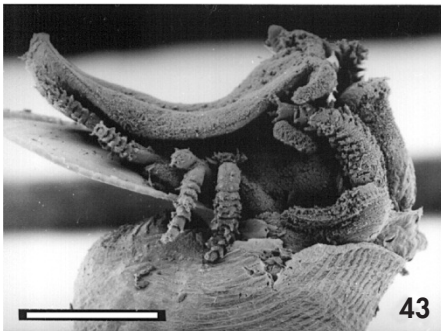
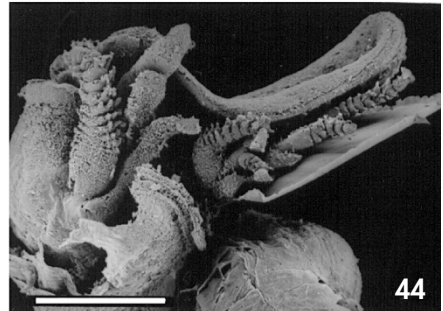
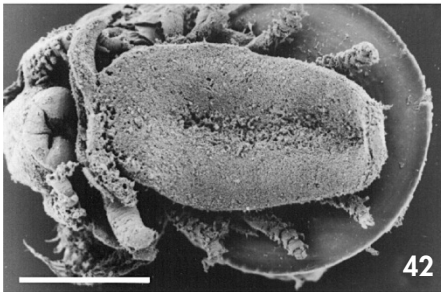
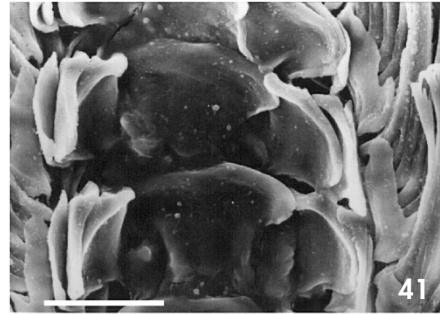
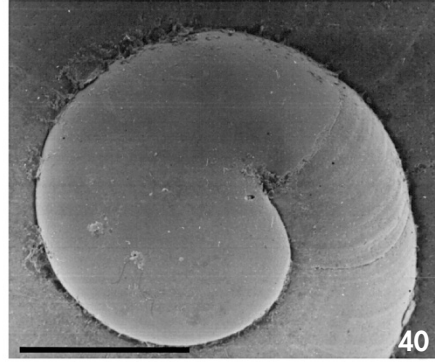
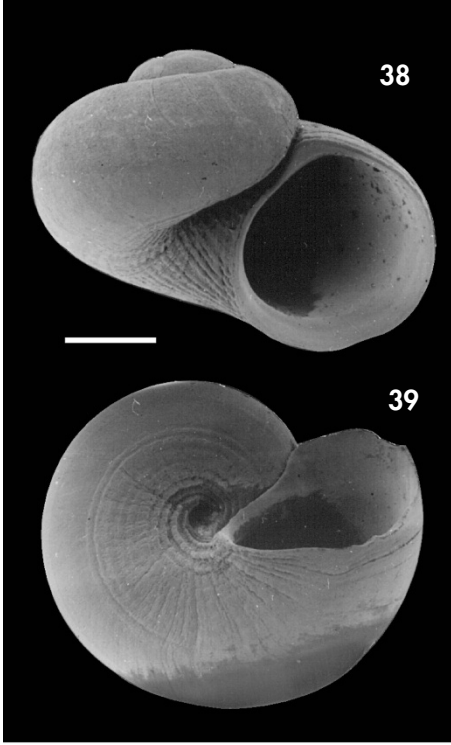
**Description:** Shell (Figs. 24-28) thin, translucent and somewhat glossy, whitish, of 1.1 mm of maximum diameter and 0.9 mm of maximum height ( $h/d=0.81$ ), with about two whorls and a quarter. Protoconch (Fig. 29) of about  $2/3$  whorl and ca. 220  $\mu\text{m}$  of diameter, smooth. Teleoconch of about  $1\frac{3}{4}$  whorls, sculptured with fine spiral grooves irregularly distributed on the last whorl, but mainly concentrated on the basis and around the umbilicus, which is delimited by a thick spiral rib. Marked growth lines with three sinuses corresponding with sinuses of outer lip, the upper one weak. Aperture rounded, prosocline, comprising about 85% of height of the body whorl, and the body whorl about 95% of shell height. Umbilicus (Fig. 30) deep and narrow, but wider

than in *Dikoleps cutleriana* and *D. marianae*, delimited by a thick spiral rib. Operculum yellowish, thin, multispiral, with central nucleus and fine growth lines.

Animal (Figs. 32-37) with long cephalic tentacles of ringed aspect when retracted, bearing small ciliated papillae regularly distributed on the outer edge of each ring (Fig. 37). Right postoptic tentacle (Figs. 33, 34) smaller and wider than that of *D. cutleriana* and *D. marianae*, and penis shorter than in this species; neck lobes (Figs. 32-35) similar to this species and densely ciliated. Four epipodial tentacles, similar to cephalic ones but smaller, on the right side and three on the left, the second tentacle on both sides with sense organ on the basis (Figs. 32, 34); instead of a fourth left epipodial tentacle appears a big sense organ, con-

(Right page) Figures 38-41. *Dikoleps umbilicostriata* (Brugnone in Gaglini, 1987), Crinavis, Algeciras Bay (Cádiz). 38, 39: shell; 40: protoconch; 41: radula, detail. Figures 42-45. *Dikoleps marianae*, spec. nov., paratype from Crinavis, Algeciras Bay (Cádiz), critical point dried animal. 42: ventral view; 43: left lateral view; 44: right lateral view, showing propodial penis; 45: detail of the right postoptic tentacle, neck lobe and propodial penis. Scale bars, 38, 39, 42-44: 200  $\mu\text{m}$ ; 40: 100  $\mu\text{m}$ ; 45: 50  $\mu\text{m}$ ; 41: 20  $\mu\text{m}$ .

(Página derecha) Figuras 38-41. *Dikoleps umbilicostriata* (Brugnone in Gaglini, 1987), Crinavis, Bahía de Algeciras (Cádiz). 38, 39: concha; 40: protoconcha; 41: rádula, detalle. Figuras 42-45. *Dikoleps marianae*, spec. nov., paratipo procedente de Crinavis, Bahía de Algeciras (Cádiz), animal deshidratado mediante punto crítico. 42: vista ventral; 43: vista lateral izquierda; 44: vista lateral derecha, mostrando el pene propodial; 45: detalle del tentáculo postóptico derecho, lóbulo del cuello y pene propodial. Escalas, 38, 39, 42-44: 200  $\mu\text{m}$ ; 40: 100  $\mu\text{m}$ ; 45: 50  $\mu\text{m}$ ; 41: 20  $\mu\text{m}$ .



cealed under the operculum (Fig. 35). Sole of foot densely ciliated (Fig. 36).

Radular formula n.4.1.4.n (Fig. 31), radula similar to that of *D. cutleriana*, but central tooth with a hooked cusp with only small denticles. Cusp of three inner lateral teeth with a big inner denticle and 3-4 smaller at the outer side; outermost lateral lamina, subrectangular, with a small denticulate cusp. Marginal teeth long and narrow, joint at their bases, with spatulated curved cusp and fine denticles along the cutting edge.

*Range:* Only known from the Catalonian coast: Llanvaneras (Barcelona), Furrió de Tamaríu and Medas Islands (Gerona).

*Habitat:* A sublittoral species, which lives on sand bottom with gravel (Medas Islands), coralligenous gravel (Furrió de Tamaríu) and on shell and gravel bottoms with crinoids (Llanvaneras), between 23 and 35 m.

*Remarks:* *Dikoleps rolani* differs from *D. cutleriana* and *D. marianae* spec. nov. mainly by its more depressed spire, different sculpture of the teleoconch (only fine spiral grooves irregularly distributed on the last whorl, but mainly concentrated on the basis and around the umbilicus) and wider umbilicus. The radula of the three species shows also some differences, mainly in the development and denticulation of the cusp of the central tooth. The penis of *D. marianae* is shorter than that of *D. cutleriana*. As said before, *D. nitens* (Philippi, 1844) (= *D. pusilla* (Jeffreys, 1847)) has smooth shell (see below) and *D. pruinosa* (Chaster, 1896) has the shell axially wrinkled. *D. rolani* resembles *D. depressa* (Monterosato, 1880), but the last species is smaller (d: 0.8 mm; h: 0.5 mm) and has spiral sculpture only in the umbilicus (GAGLINI, 1987; five spiral keels, according WARÉN, 1992, who examined two specimens from Palermo in Zoological Museum of Rome). One of these specimens of the Monterosato collection was illustrated by GAGLINI (1987) (as *Cyclostrema depressum*) and by GIANNUZZI-SAVELLI ET AL. (1994); the last authors considered it a probable syntype.

PHILIPPI (1844) described *D. nitens* as having a smooth whorl until the very

narrow umbilicus, which fits better with *D. pusilla* (Jeffreys, 1847). According to a recent study (Warén, 1996, com. pers.) of the Calabrian fossil deposits from where *D. nitens* (Philippi, 1844) was described, *D. pusilla* (Jeffreys, 1847) is a senior synonym of *D. nitens*, as Jeffreys (1865, p. 289) admitted.

The species figured as *Dikoleps nitens* by AARTSEN ET AL. (1984, fig. 41) from Algeciras and GIANNUZZI-SAVELLI ET AL. (1994) from Algeciras and Siracusa (Sicilia) agree with that figured by GAGLINI (1987, figures 13-14) as "*Cyclostrema umbilicostriatum* Brugnone in schedis", from Trapani (Sicilia). We have examined specimens of this species from Crinavis, Algeciras Bay (15-25 m depth, Figs. 38-41), Placer de las Bóvedas (Fauna Ibérica I, Stns. 22A and 23A, 20-25 m) and Roqueo del Almirante (Mijas Costa, Málaga, 25 m, A. Peñas and J. L. Martínez leg.). The shell differs from those of *D. nitens* and *D. rolani* in having a greenish-yellow (or pale orange) colour when fresh and about half a dozen strong spiral ridges around the umbilicus and several fine striae outside these covering about half of the base (Figs. 38-40). Therefore, the name *Dikoleps umbilicostriata* (Brugnone in Gagliani, 1987) is the first available and must be used for this different species; the holotype is kept in the Monterosato collection (GAGLINI, 1987). The rachidian tooth of *D. umbilicostriata* has a smooth cusp without denticles (Fig. 41), whereas that of *D. rolani* has small denticles. The cusp of lateral teeth of *D. umbilicostriata* have only one big hooked denticle, more marked in the two inner laterals; cusp of lateral teeth of *D. rolani* has also 3-4 small denticles at the outer side. As far as we know, *D. rolani* is only known from the type locality on the Catalonian coast (NW Mediterranean) and *D. umbilicostriata* seems to be restricted to the SW Mediterranean (Gibraltar Straits, Alboran Sea and Sicilia).

The preceding discussion points to at least two different groups of species within the genus *Dikoleps*. The group of *Dikoleps exilis* (Philippi, 1844) (= *D. cutleriana*), *D. marianae* spec. nov. and *D.*

*rolani* spec. nov. comprises species with more or less marked spiral sculpture on the whole last whorl and denticulate rachidian and lateral teeth. The group of *D. nitens* (Philippi, 1844) (= *D. pusilla*)

and *D. umbilicostriata* comprises species with smooth shells, except for spiral ridges around the umbilicus, and rachidian tooth lacking denticles and lateral teeth with only one hooked denticle.

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