Remarks: This species is very similar in shape and size to *Cyrtocapsa (?) kisoensis* Yao but differs from the latter by possessing longitudinal plicae and a smaller apical horn. Generic assignment questionable, because no aperture is visible.

Measurements(in μm): Based on 9 specimens.

	holotype	*avg.*	*min.*	*max.*
length of test	147	146	139	153
maximum width of test	57	55	50	59

Etymology: Prealpina, according to the type locality in the Prealps.

Genus ***Holocryptocapsa*** Tan 1927
Type species: Holocryptocapsa fallax Tan 1927

Stylocryptocapsa TAN 1927

***Holocryptocapsa* (?) sp. 1**
Plate 10, figures 36-39

Arcanicapsa ? sp. B ARAKAWA 1998, pl. 7, fig. 320.
Remarks: Cryptothoracic tricyrtid with subspherical test. Test bearing a depressed and complicated sutural pore occupying an important surface of the test. Cephalis with small upwards directed spines. Abdomen cylindrical, flattened antapically with a circular depression at the base. Pore frames on the abdomen hexagonal, uniform in size, tiny spines present at angles of pore frames, more numerous and downward directed at the base. The generic assignment of this species is questionable because its stratigraphic range is isolated from Early Cretaceous representatives of *Holocryptocapsa*.

Family DIACANTHOCAPSIDAE O'Dogherty 1994

Genus ***Theocapsomella*** O'Dogherty, Gorican and Dumitrica **n. gen.**
Type species: Theocapsomma cordis Kocher 1981

Diagnosis: Test generally composed of three segments. Cephalis small, hemispherical, partly encased in thorax. Thorax much larger, inflated, not submerged in the abdomen. Abdomen subglobular, distally constricted, usually somewhat larger than thorax. Aperture always present. Lumbar stricture well pronounced. Cephalis generally poreless, all the other segments bear circular pores. In some species, apical and ventral spines of the initial skeleton are prolonged outside the cephalic wall.

Some four-segmented nassellarians are also included (e.g. *Theocapsomella himedaruma* (Aita) and *T. nodosa* (Aita)), because a phylogenetic relationship with the three-segmented species is assumed. The four-segmented species are characterized by the last two segments being nearly equal in size but much larger than cephalis and thorax.

The species are distinguished by the external ornamentation and by the presence/absence of apical and ventral horns.

Remarks: Theocapsomella differs from *Diacanthocapsa* Squinabol sensu Dumitrica 1970 by having usually a less encased cephalis, only rarely an indistinct sutural pore and by sometimes having four segments. The last known occurrence of *Theocapsomella* n. gen. is middle Callovian - early Oxfordian (UAZ 8 of Baumgartner et al. 1995b) while the oldest *Diacanthocapsa* occurs in the Aptian (O'Dogherty 1994). This genus is described in order to separate the Jurassic from the Cretaceous *Theocapsomma*-like species and to include the related four-segmented species.

Included species:
Stichocapsa himedaruma Aita 1987
Stichocapsa nodosa Aita 1987
Theocapsa pentagona Aita 1987
Theocapsomma bicornis Baumgartner, in Baumgartner et al. 1995a
Theocapsomma constricta Aita 1987
Theocapsomma cordis Kocher 1981

PLATE 4

Scale bars measure 50μm for a magnification of ×250 (a) and ×300 (b). All specimens from sample VS3, if not otherwise indicated.

1-2 *Pseudoristola durisaeptum* (Aita). 1, 16525 (×250); 2, 16639 (×250).

3 *Triversus japonicus* Takemura. 3, 16603 (×250)

4-10 *Triversus schardti* O'Dogherty, Gorican and Dumitrica n. sp. 4, 16878 (×250) holotype; 5, 16820 (×250); 6, 16584 (×250); 7, 17076 (×250); 8, 16570 (×250); 9, 17089 (×250); 10, 16863 (×250).

11-15 *Pseudoristola tsunoensis* (Aita). 11, 16731 (×250); 12, 17217 (×250), sample VS4; 13, 16683 (×250); 14, 16813 (×250); 15, 16567 (×250).

16-17 *Pseudoristola horni* O'Dogherty, Gorican and Dumitrica n. sp. 16, 16755 (×250) holotype; 17, 17126 (×250), sample VS4.

18 *Pseudoristola* sp. 1. 16541 (×250).

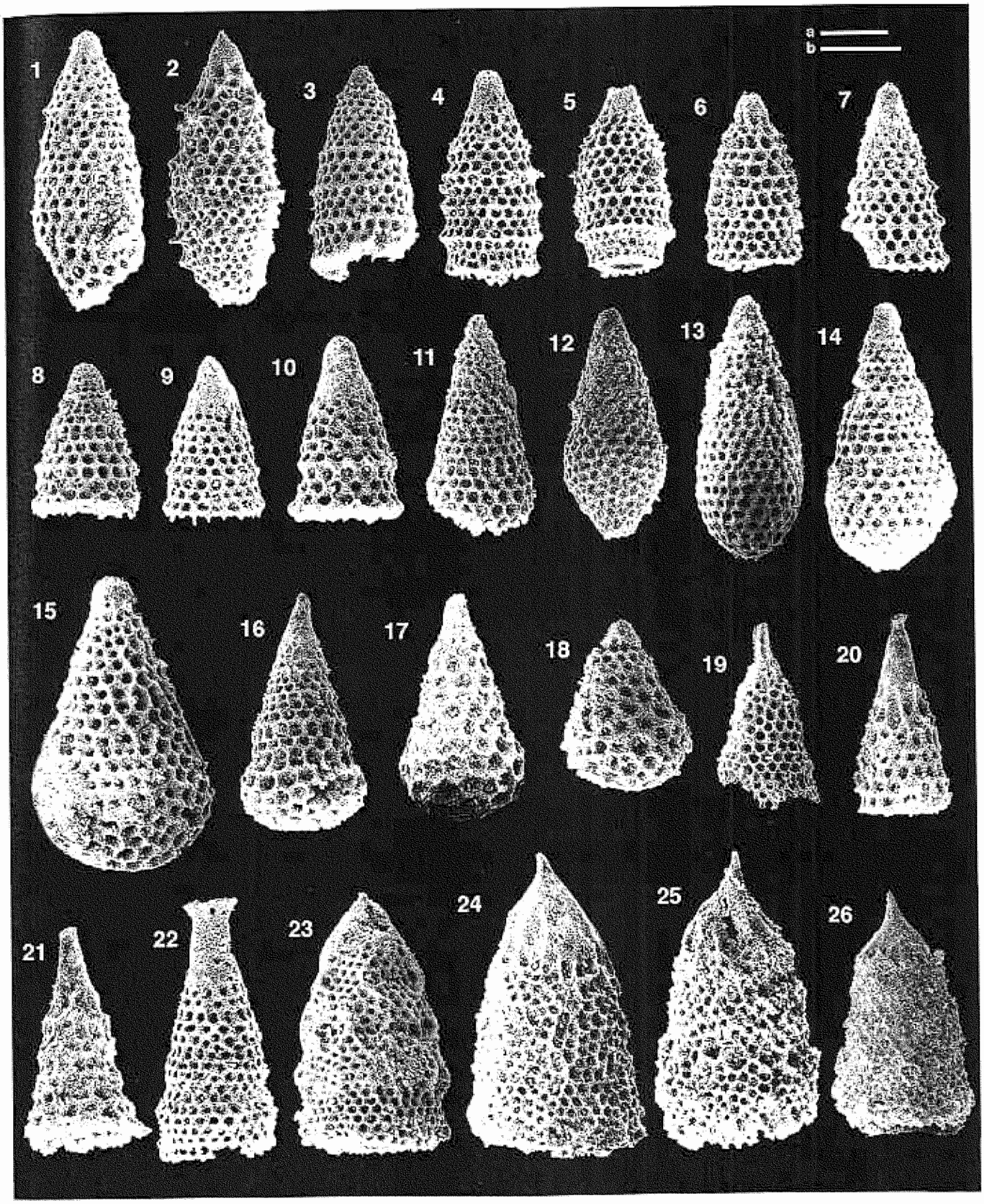
19 *Pseudodictyomitrella* sp. 1. 16772 (×300).

20-21 *Pseudodictyomitrella badouxi* O'Dogherty, Gorican and Dumitrica n. sp. 20, 16594 (×300) holotype; 21, 16718 (×300).

22 *Pseudodictyomitrella escheri* O'Dogherty, Gorican and Dumitrica n. sp. 16537 (×300) holotype.

23 *Xitus singularis* Hull. 16633 (×300).

24-26 *Xitus* (?) sp. 1. 24, 16710 (×300); 25, 17080 (×300); 26, 17252 (×300), sample VS4.


a
b
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

Theocapsomma cucurbiformis Baumgartner, in Baumgartner et al. 1995a

Theocapsomma medvednicensis Gorican, in Halamic et al. 1999

Theocapsomma sp. A sensu Baumgartner et al. 1995a

Etymology: referring to the genus *Theocapsomma*

Theocapsommella cordis (Kocher 1981)
Plate 8, figures 31, 32

Theocapsomma cordis KOCHER 1981, p. 100, pl. 17, figs. 2-4. – BAUMGARTNER 1984, p. 789, pl. 9, figs. 16-17. – YAMAMOTO et al. 1985, p. 38, pl. 8, figs. 2, 3a-b. – AITA 1987, p. 68. – DANELIAN 1989, p. 196, pl. 8, fig. 17. – MATSUOKA 1991b, pl. 2, fig. 3. – GORICAN 1994, p. 91, pl. 9, fig. 13. – BAUMGARTNER et al 1995a, p. 572, pl. 3277, figs. 1-3 (fig. 3 = holotype refigured). – KOZUR et al. 1996, pl. 3, fig. 5. – HALAMIC et al. 1999, pl. 1, figs. 17-19.

Theocapsommella cucurbiformis (Baumgartner) in Baumgartner et al. 1995a
Plate 8, figure 42

Theocapsa sp. – YAMAMOTO et al 1985, p. 38, pl. 8, fig. 1.
Theocapsa pentagona AITA 1987, p. 75, pl. 4, figs. 1a-b, not pl. 4, fig. 2; pl. 10, fig. 5.
Theocapsomma cucurbiformis BAUMGARTNER in Baumgartner et al. 1995a, p. 574, pl. 3047, figs. 1, 2. – MATSUOKA and BAUMGARTNER 1997, pl. 1, fig. 10. – HALAMIC et al. 1999, pl. 1, figs. 10-11. – PRELA et al. 2000, pl. 1, fig. 19.

Remarks: The paratypes included under *Theocapsa pentagona* Aita (1987, pl. 4, figs. 1a-b) under transmitted light possess a stout apical horn and more constricted stricture at junction between thorax and abdomen. This character and noticeable differences with the holotype of *T. pentagona* justified the inclusion in *Theocapsommella cucurbiformis*.

Theocapsommella medvednicensis (Gorican) in Halamic et al. 1999
Plate 8, figures 30, 33-37

Stylocapsa sp. B TUMANDA et al. 1996, p. 188, Fig. 7-19, 20.
Theocapsomma sp. A ARAKAWA 1997, pl. 6, fig. 17.
Theocapsomma medvednicensis Gorican in HALAMIC et al. 1999, p. 37, pl. 1, figs. 12-16.
Diacanthocapsa sp. KAMATA and MIZOBE 2001, pl. 2, fig. 6.

Remarks: Originally this species was described as having vertical ridges on thorax and lumbar stricture only. Herein we also include specimens with vertical ridges prolonged to the abdomen.

Family ULTRANAPORIDAE Pessagno 1977b (syn.: Silicarmigeridae Kozur and Mostler 1980 in Dumitrica et al. 1980, Inedorcidae Kozur and Mostler 1981, Muellericyrtidae Kozur and Mostler 1981)

Genus *Napora* Pessagno 1977a
Type species: Napora bukryi Pessagno 1977a

Ultranapora PESSAGNO 1977b

Napora bukryi Pessagno 1977a
Plate 11, figures 1-2

Napora bukryi PESSAGNO 1977a, p. 94, pl. 12, fig. 8. – KOCHER 1981, p. 77, pl. 14, fig. 23. – DE WEVER and CABY 1981, pl. 2, fig. 2K. – BAUMGARTNER 1984, p. 774, pl. 6, fig. 4. – DE WEVER et al. 1986, pl. 11, fig. 14. – PESSAGNO et al. 1986, p. 37, pl. 9, figs. 5 12-14. – DANELIAN 1989, p. 166, pl. 6, fig. 2. – WIDZ 1991, p. 247, pl. 2, fig. 21. – GORICAN 1994, p. 76, pl. 26, figs 11-12.

PLATE 5

Scale bars measure 50µm for a magnification of ×200 (a), ×250 (b), ×300 (c) and ×400 (d).
All specimens from sample VS3, if not otherwise indicated.

1-3 *Stichomitra* (?) *annibili* Kocher. 1, 16763 (×300); 2, 17298 (×300), sample VS4; 3, 16714 (×300).

4-5 *Stichomitra* (?) *tairai* Aita 4, 17056 (×300); 5, 16821 (×300).

6 *Stichomitra* (?) *keni* (Kocher). 17083 (×300).

7-9 *Pseudodictyomitrella tuscanica* (Chiari, Cortese and Marcucci). 7, 17344 (×250), sample VS4; 8, 17230 (×250), sample VS4; 9, 16756 (×250).

10-12 *Pseudodictyomitrella cappa* (Cortese). 10, 17013 (×250); 11, 16626 (×250); 12, 16640 (×250).

13-15 *Pseudodictyomitrella* sp. 2. 13, 16853 (×300); 14, 16916 (×300); 15, 16951 (×300).

16-17 *Pseudodictyomitrella* (?) sp. 4. 16, 16705 (×400); 17, 17325 (×400), sample VS4.

18 *Pseudodictyomitrella limana* (Cortese). 16872 (×300).

19-22 *Pseudodictyomitrella renevieri* O'Dogherty, Gorican and Dumitrica n. sp. 19, 16559 (×300); 20, 16779 (×300) holotype; 21, 17050 (×300); 22, 16984 (×300).

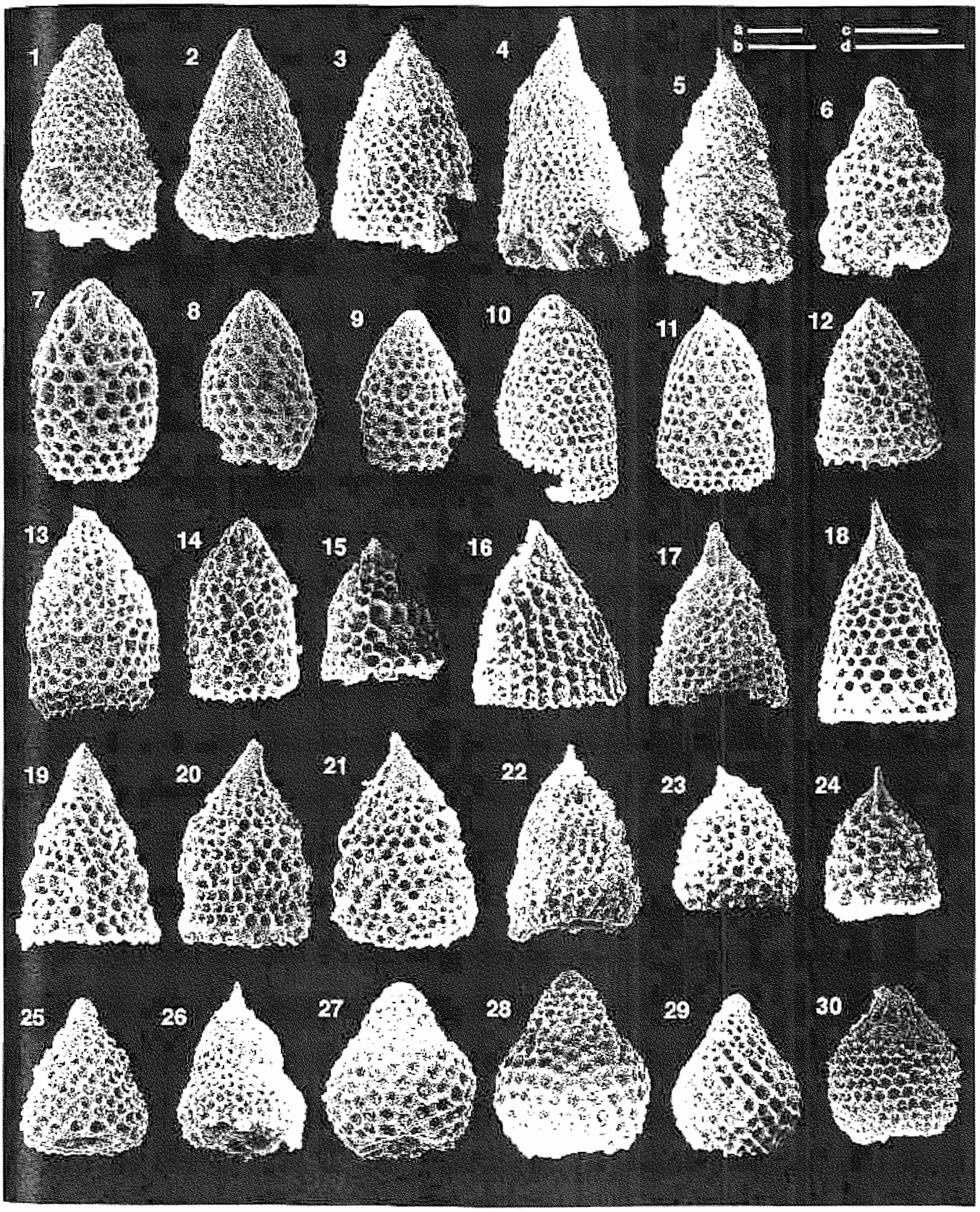
23-24 *Pseudodictyomitrella* sp. 3. 23, 16696 (×300); 24, 16764 (×300).

25 *Parvifavus* (?) sp. 1. 16740 (×300).

26 *Eucyrtidiellum gujoense* (Takemura and Nakaseko). 16507 (×300).

27-29 *Quarticella magnipora* (Chiari, Marcucci and Prela). 27, 17046 (×200); 28, 17045 (×200); 29, 16533 (×200).

30 *Quarticella* sp. 1. 30, 16940 (×250).


a
b
c
d
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30

Napora lospensis PESSAGNO 1977a, p. 96, pl. 12, figs. 9-10.- ? BAUMGARTNER et al. 1980, p. 57, pl. 3, fig. 4. – not DE WEVER and CABY 1981, pl. 2, fig. 2K. – BAUMGARTNER 1984, p. 774, pl. 6, fig. 6. – PESSAGNO et al. 1984, p. 24, pl. 2, fig. 9. – DE WEVER et al. 1986, pl. 11, figs. 13 18, 22. – PESSAGNO et al. 1986, p. 42, pl. 9, figs. 11 16. OZVOLDOVA 1988, pl. 8, fig. 6. – BAUMGARTNER et al. 1995a, p. 330, pl. 3036, figs. 1-4 (fig. 4 = holotype refigured). – HULL 1997, p. 120, pl. 45, fig. 14. – NISHIZONO 2001, pl. 2, fig. 13. – BECCARO et al. 2002, pl. 2, fig. 19.

Napora deweveri BAUMGARTNER in BAUMGARTNER et al. 1980, p. 56, pl. 3, figs. 1-3, 5; pl. 6, fig. 9. – KOCHER 1981, p. 78, pl. 14, fig. 24. – BAUMGARTNER 1984, p. 774, pl. 6, fig. 3. – AITA 1987, p. 65. – DANELIAN 1989, p.167, pl. 6, fig. 3. – CONTI and MARCUCCI 1991, pl. 3, figs. 1-2. – BAUMGARTNER et al. 1995a, p. 328, pl. 3035, figs. 1, 2 (fig. 2 = holotype refigured).

Napora deweveri Baumgartner s. l. – PESSAGNO et al. 1986, p. 39, pl. 10, fig. 14.

Napora collieri HULL 1997, p. 114, pl. 45, figs. 3 16, 24.

Napora pualensis (Blome 1984)
Plate 11, figure 3

Ultranapora pualensis BLOME 1984, p. 370, pl. 12, figs. 4 13 19-21; pl. 13, figs. 1, 7 17, 21.

Napora pualensis (Blome). – KIESSLING 1999, p. 72, pl. 14, fig. 7.

Family POULPIDAE De Wever 1981 (syn.: Triassobipodidinae Kozur 1984)

Genus ***Saitoum*** De Wever 1981
Type species: Saitoum pagei Pessagno 1977

Saitoum levium De Wever 1981
Plate 11, figures 4-5

Saitoum levium DE WEVER 1981, p. 10, pl. 1, figs. 9-10. – BAUMGARTNER et al. 1995a, p. 484, pl. 3024, figs. 1-3 (fig. 3 = holotype refigured). – PRELA et al. 2000, pl. 1, fig. 11.

Saitoum dickinsoni YEH 1987, p. 98, pl. 26, figs. 3, 22, 24.

Saitoum pagei Pessagno 1977a
Plate 11, figures 6-8

Saitoum pagei PESSAGNO 1977a, p. 98, pl. 12, figs. 11-14. – BAUMGARTNER et al. 1980, figs. 4a-b. – DE WEVER and CABY 1981, pl. 2, fig. H. – KOCHER 1981, p. 89, pl. 16, figs. 2-3. – BAUMGARTNER 1984, p. 783, pl. 8, fig. 12. – PESSAGNO et al. 1984, p. 30, pl. 4, figs. 4 11. – BAUMGARTNER 1985, fig. 38.k; fig.

PLATE 6

Scale bars measure 50μm for a magnification of ×150 (a), ×200 (b), ×250 (c), ×300 (d) and ×400 (e).
All specimens come from sample VS3, if not otherwise indicated.

1-2 *Quarticella hunzikeri* O'Dogherty, Gorican and Dumitrica n. sp. 1, 17211 (×300) holotype, sample VS4; 2, 17212 (×300), sample VS4.

3-5 *Eucyrtidiellum* (?) *circumperforatum* Chiari, Marcucci and Prela. 3, 17248 (×300), sample VS4; 4, 16540 (×300); 5, 16784 (×300).

6 *Stichocapsa japonica* Yao. 17209 (×300), sample VS4.

7-8 *Stichomitra* (?) *stecki* O'Dogherty, Gorican and Dumitrica n. sp. 7, 16592 (×200) holotype; 8, 16593 (×200).

9-10 *Willriedellum madstonense* (Pessagno, Blome and Hull). 9, 17346 (×400), sample VS4; 10, 17363 (×400), sample VS4.

11 *Stichomitra* (?) *acuta* (Hull). 17150 (×250), sample VS4.

12 *Stichomitra* (?) sp. 1. 17123 (×250), sample VS4.

13-15 *Hiscocapsa lugeoni* O'Dogherty, Gorican and Dumitrica n. sp. 13, 17335 (×200) holotype, sample VS4; 14, 16636 (×200); 15, 17169 (×200), sample VS4.

16-17 *Minocapsa* (?) *tansinhoki* Hull. 16, 16917 (×200) 17, 17063 (×200).

18 *Minocapsa* (?) sp. 1. 16643 (×200).

19-20 *Zhamoidellum* sp. 1. 19, 16956 (×250); 20, 16629 (×250).

21 *Stichocapsa pilula* (Rüst). 17330 (×250), sample VS4.

22-23 *Mictyoditra lineaplena* (Yang and Wang). 22, 16698 (×150); 23, 16700 (×150).

24-25 *Hiscocapsa* sp. 1. 24a, 16944 (×200); 24b, 16944 (×200); 25, 16505 (×200).

26-27 *Hiscocapsa* sp. 2. 26, 16826 (×200); 27, 16824 (×200).

28 *Hiscocapsa aitai* (Chiari, Marcucci and Prela). 16689 (×200).

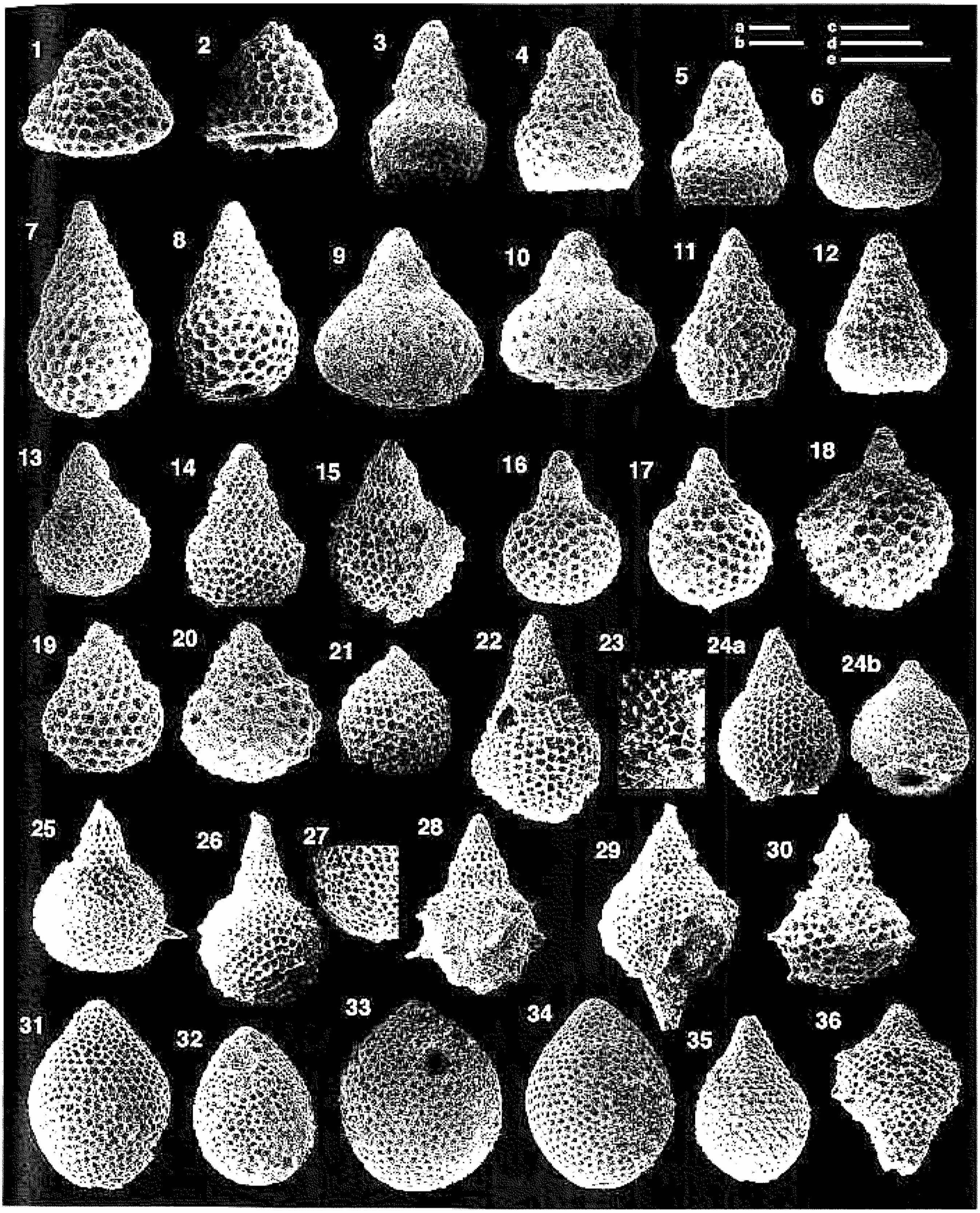
29 *Yamatoum atlanticum* O'Dogherty, Gorican and Dumitrica n. sp. 16713 (×250) holotype.

30 *Hiscocapsa* sp. 3. 16802 (×200).

31-34 *Stichocapsa robusta* Matsuoka. 31, 16702 (×200); 32, 16915 (×200); 33, 17169 (×200), sample VS4; 34, 17289 (×200), sample VS4.

35 *Stichocapsa convexa* Yao. 16597 (×200).

36 *Stichocapsa* (?) *cicciona* Chiari, Marcucci and Prela. 16545 (×200)


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24a
24b
25
26
27
28
29
30
31
32
33
34
35
36
a
b
c
d
e

43.f. – DE WEVER and CORDEY 1986, pl. 1, figs. 8-9. – BAUMGARTNER et al. 1995a, p. 486, pl. 3020, figs. 1-4 (fig. 4 = holotype refigured). – BECCARO et al. 2002, pl. 1, fig. 16.
Saitoum cf. *S. pagei* NISHIZONO 2001, pl. 3, fig. 10.

Order SPUMELLARIA Ehrenberg 1875
Superfamily ACTINOMMACEA Haeckel 1862, emend Dumitrica 1989
Family PANTANELLIIDAE Pessagno 1977b
Subfamily PANTANELLIINAE Pessagno 1977b

Genus *Pantanellium* Pessagno 1977a
Type species: Pantanellium riedeli Pessagno 1977a

Pantanellium latum Pessagno and Blome 1980
Plate 11, figures 15 16

Pantanellium latum PESSAGNO and BLOME 1980, p. 244, pl. 7, figs. 3, 4 16 18, 21, 23.

Pantanellium riedeli Pessagno 1977a
Plate 11, figures 9-14

Pantanellium riedeli PESSAGNO 1977a, p. 78, pl. 6, figs. 5-11. – PESSAGNO 1977b, p. 33, pl. 3, fig. 12. – AITA 1982, pl. 3, fig. 19. – BAUMGARTNER 1985, figs. 38a-c. – BAUMGARTNER et al. 1995a, p. 370, pl. 3078, figs. 1-4 (fig.4 = holotype refigured). – BECCARO et al. 2002, pl. 2, fig. 21.
Sphaerostylus lanceola (Parona) gr. – KOCHER 1981, p. 92, pl. 16, fig. 16.
Sphaerostylus sp. A MATSUOKA and YAO 1985, pl. 2, fig. 14.
Pachyoncus sp. A KISHIDA and HISADA 1986, fig. 2. 25.
Pantanellium sp. cf. *P. riedeli* Pessagno. – PRELA et al. 2000, pl. 1, fig. 7.

***Pantanellium* (?) sp. 1**
Plate 11, figures 17-19

Remarks: This form probably belongs to a new genus of Pantanelliidae. It is characterized by having no external spines but similar shell structure with a microsphere of the same type and a spherical cortical shell both connected by many radial bars of similar strength. Forms belonging to this genus have been recorded in the Pliensbachian, Tithonian and Upper Cretaceous.

Genus *Gorgansium* Pessagno and Blome 1980
Type species: Gorgansium silviesense Pessagno and Blome 1980

Gorgansium silviesense Pessagno and Blome 1980
Plate 11, figure 22

Gorgansium silviesense PESSAGNO and BLOME 1980, p. 235, pl. 11, figs. 2, 3,11, 24. – MIZUTANI and KOIKE 1982, pl. 1, fig. 3. – GORICAN 1987, p. 182, pl. 3, fig. 4.

Family ACTINOMMIDAE Haeckel 1862, *emend.* De Wever et al. 2001

Genus *Actinomma* Haeckel 1860
Type species: Actinomma trinacrium Haeckel 1860

Actinomma* (?) sp. cf. *A. interessanta Kiessling 1999
Plate 11, figure 20

PLATE 7

Scale bars measure 50µm for a magnification of ×100 (a), ×150 (b), ×200 (c), ×250 (d), ×300 (e) and ×400 (f).
All specimens come from sample VS3, if not otherwise indicated.

1-3 *Pseudoeucyrtis firma* Hull. 1, 16741 (×150); 2, 16738 (×150); 3, 16727 (×150).

4 *Podobursa triacantha* (Fischli). 16565 (×100), sample VS4.

5 *Podobursa rosea* Hull. 16569 (×150).

6 *Podobursa* sp. 1. 16778 (×150).

7 *Podobursa* cf. *helvetica* (Rüst). 17323 (×150) sample VS4.

8 *Unuma* sp. aff. *latusicostatus* (Aita 1985). 17243 (×250) sample VS4.

9-10 *Protunuma* (?) sp. 1, 9a, 17277 (×250); 9b detail of aperture (×500) sample VS4; 10, 17105 (×250).

11-13 *Protunuma ochiensis* Matsuoka. 11, 16840 (×250); 12, 16929 (×250); 13, 17174 (×250) sample VS4.

14 *Protunuma lanosus* Ozvoldova. 16822 (×250).

15-18 *Unuma gordus* Hull. 15, 17061 (×200); 16, 16760 (×200); 17, 16862 (×200); 18, 16919 (×200).

19-24 *Helvetocapsa matsuokai* (Sashida). 19, 16782 (×250); 20, 16783 (×250); 21, 16688 (×250); 22, 17139 (×250) sample VS4; 23, 17039 (×250); 24, 16579 (×200).

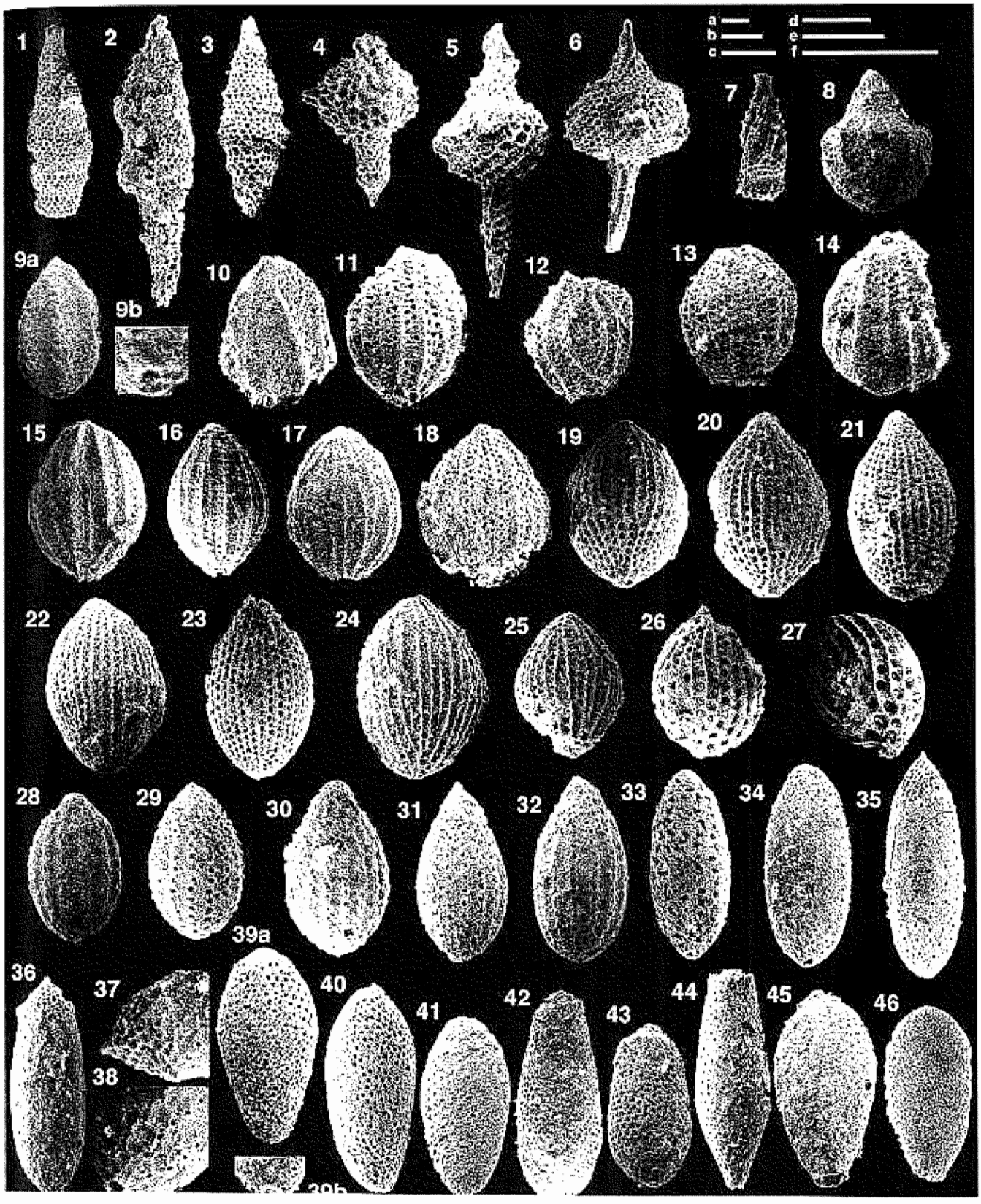
25-27 *Protunuma* sp. 2. 25, 16937 (×200); 26, 16588 (×200); 27, 16590 (×200).

28-38 *Plicaforacapsa catenarum* (Matsuoka). 28, 17160 (×300) sample VS4; 29, 16974 (×300); 30, 17140 (×300) sample VS4; 31, 17142 (×300) sample VS4; 32, 16788 (×300); 33, 16954 (×300); 34, 16964 (×300); 35, 17016 (×300); 36, 16678 (×300); 37, 16681 (×500); 38, 16680 (×500).

39-41 *Guexella clava* O'Dogherty, Gorican and Dumitrica n. sp. 39a, 16832 (×250) holotype; 39b, detail of basal aperture (×500); 40, 16528 (×250); 41,16607 (×200).

42-44 *Guexella nudata* (Kocher 1981). 42,16754 (×250); 43, 17272 (×250) sample VS4; 44, 16585 (×200).

45-46 *Guexella mangoforata* O'Dogherty, Gorican and Dumitrica n. sp. 45, 17047 (×200) holotype; 46, 16555 (×200)


a
b
c
d
e
f
1
2
3
4
5
6
7
8
9a
9b
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39a
39b
40
41
42
43
44
45
46

Family PARVIVACCIDAE Pessagno and Yang 1989 in Pessagno et al. 1989, *emend.* De Wever et al. 2001
Subfamily ACAENIOTYLINAE Yang 1993

Genus ***Acaeniotylopsis*** Kito and De Wever 1994
Type species: Acaeniotylopsis triacanthus Kito and De Wever 1994

Acaeniotylopsis variatus (Ozvoldova 1979)
Plate 11, figure 21

Acaeniotyle diaphorogona variata OZVOLDOVA 1979, p. 251, pl. 1, fig. 2. – CONTI and MARCUCCI 1991, pl. 1, fig. 2. – MATSUOKA 1992, pl. 5, fig. 10. – BAUMGARTNER et al. 1995a, p. 60, pl. 3270, figs. 1-6 (fig. 6 = holotype refigured)

Subfamily PARVIVACCINAE Pessagno and Yang 1989in Pessagno et al. 1989, *emend.* De Wever et al. 2001

Genus ***Lanubus*** Pessagno and Yang in Pessagno et al. 1989
Type species: Lanubus holdsworthi Pessagno and Yang in Pessagno et al. 1989

Lanubus holdsworthi Pessagno and Yang in Pessagno et al. 1989
Plate 11, figure 32

Lanubus holdsworthi Pessagno and Yang in PESSAGNO et al. 1989, p. 243, pl. 4, figs. 15, 25.

Family XYPHOSTYLIDAE Haeckel 1881, *sensu* Pessagno and Yang in Pessagno et al. 1989, emend De Wever et al. 2001

Genus ***Triactoma*** Rüst 1885, *emend.* Pessagno and Yang in Pessagno et al. 1989
Type species: Triactoma tithonianum Rüst 1885

***Triactoma* sp 1**
Plate 11, figure 30

Remarks: This species differs from other species of the genus by having a smoth shell with circular pores without prominent polygonal pore frames.

Genus ***Tripocyclia*** Haeckel 1881, emend. Pessagno and Yang in Pessagno et al. 1989
Type species: Tripocyclia trigonum Rüst 1885

Tripocyclia* aff. *crassa Kiessling 1999
Plate 11, figure 31

aff. *Tripocyclia crassa* KIESSLING 1999 p. 40, pl. 8, figs. 14, 22.

Remarks: Our specimen differs from the type material by having thicker and shorter spines.

PLATE 8

Scale bars measure 50µm for a magnification of ×200 (a), ×250 (b) and ×300 (c).
All specimens from sample VS3, except figures 1, 9-13, 28, 33-36, 39, 40 and 42 from VS4.

1-4 *Helvetocapsa* (?) *prealpina* O'Dogherty, Gorican and Dumitrica n. sp. 1a-b, 16895 (×300) holotype, b, antapical view; 2, 17014 (×300); 3, 17117 (×300); 4, 16792 (×300).

5-8 *Helvetocapsa lemanensis* O'Dogherty, Gorican and Dumitrica n. sp. 5a-c, 16769 (×300) holotype, b, antapical view, c, apical view; 6, 16855 (×300); 7, 16737 (×300); 8, 16759 (×300).

9-11 *Striatojaponocapsa naradaniensis* (Matsuoka). 9, 17250 (×300); 10, 16962 (×300); 11, 16701 (×300).

12-13 *Striatojaponocapsa* (?) sp. 1. 12, 17075 (×300); 13, 17365 (×250).

14-15 *Striatojaponocapsa riri* O'Dogherty, Gorican and Dumitrica n. sp. 14, 16899 (×250) holotype; 15, 16881 (×250) paratypes.

16-23 *Kilinora spiralis* gr. (Matsuoka). 16, 17097 (×250); 17, 17098 (×250); 18, 16946 (×250) juvenile form with weak development of spiral arrangement of plicae; 19, 16836 (×250); 20, 16988 (×250); 21, 17113 (×250); 22, 17086 (×250); 23, 16907 (×250).

24 *Kilinora tecta* (Matsuoka). 16775 (×300).

25-29 *Kilinora* (?) *oblongula* (Kocher). 25, 16800 (×300); 26, 16795 (×300); 27, 16994 (×300); 28, 17157 (×300); 29, 16961 (×300).

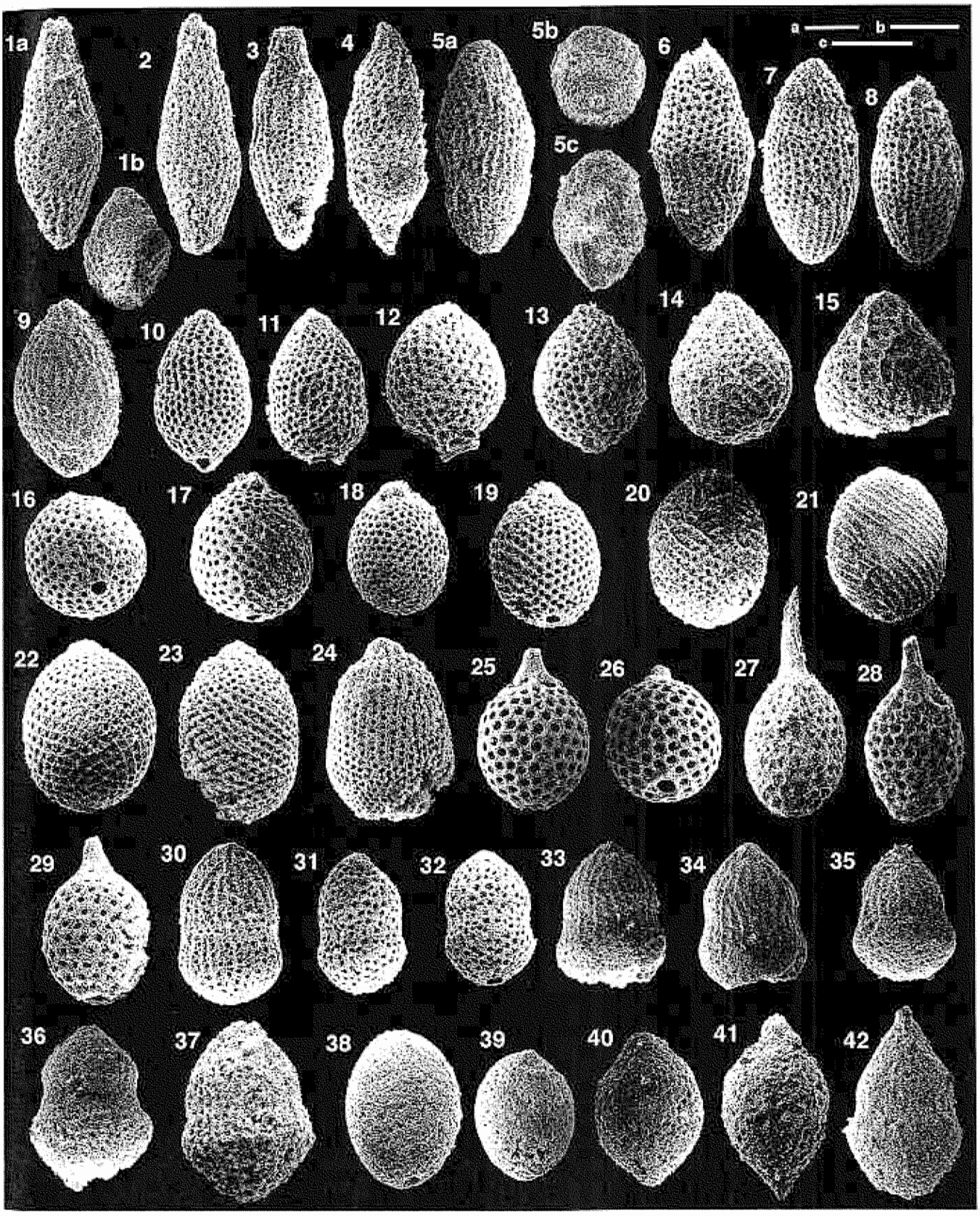
30,33-37 *Theocapsomnella medvednicensis* (Gorican). 30, 16817 (×300); 33, 17279 (×300); 34, 17275 (×300); 35, 17197 (×300); 36, 17187 (×300); 37, 17244 (×300).

31-32 *Theocapsomnella cordis* (Kocher). 31, 16865 (×300); 32, 16864 (×300).

38-39 *Archicapsa* (?) sp. 1. 38, 17102 (×200); 39, 16913 (×200).

40-41 *Yaocapsa* sp. 1. 40, 17387 (×250); 41, 17381 (×300).

42 *Theocapsomnella cucurbiformis* (Baumgartner). 17300 (×250).


1a
1b
2
3
4
5a
5b
5c
6
7
8
a
b
c
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42

Superfamily PYLONIACEA Haeckel 1881, emend Dumitrica 1989

Subsuperfamily DACTYLIOSPAERILAE Squinabol 1904, *emend* De Wever et al. 2001

Family HAGIASTRIDAE Riedel 1971 (syn.: Orbiculiformidae Pessagno 1973)

Genus *Archaeohagiastrum* Baumgartner 1984
Type species: Archaeohagiastrum munitum Baumgartner 1984

Archaeohagiastrum longipes Baumgartner in Baumgartner et al. 1995a
Plate 12, figure 23

Tetraitrabs sp. – KISHIDA and SUGANO 1982, pl. 6, fig. 11.
Archaeohagiastrum sp. A. HATTORI 1987, pl. 3, figs. 3-4. – Hattori 1988, pl. 5, fig. B.
Archaeohagiastrum sp. 1 KITO 1989, p. 117, pl. 7, figs. 12-13 15-16.
Tetratrabs sp. aff. *T. zealis* (Ozvoldova). – CARTER and JAKOBS 1991, p. 344, pl. 2, fig. 7.
Archaeohagiastrum longipes Baumgartner in BAUMGARTNER et al. 1995a, p. 106, pl. 3149, figs. 1-6

Genus *Crucella* Pessagno 1971
Type species: Crucella messinae Pessagno 1971

Crucella theokaftensis Baumgartner 1980
Plate 12, figure 16

Crucella theokaftensis BAUMGARTNER 1980, p. 308, pl. 8, figs. 19-22; pl. 12, fig. 1. – AITA 1982, pl. 3, fig. 12. – ? NAGAI 1985, pl. 5, figs. 5, 5a. – AITA 1987, p. 63, pl. 1, fig. 8; pl. 8, fig. 3. – KITO 1987, pl. 1, fig. 10. – OZVOLDOVA 1992, pl. 1, fig. 6. – YANG 1993, p. 40, pl. 6, fig. 13. – BAUMGARTNER et al. 1995a, p. 158, pl. 3131, figs. 1-3 (fig. 3 = holotype refigured). – HULL 1997, p. 20, figs. 6.12-14. – BECCARO et al. 2002, pl. 2, fig. 6.

Genus ***Monotrabs*** Baumgartner 1984, emend. O'Dogherty, Gorican and Dumitrica
Type species: Monotrabs plenoides Baumgartner 1984

Emended diagnosis: Tritrabid with rays composed of 8 strongly developed external beams in the cortical shell connected by diagonally arranged bars forming 2 rows of alternating circular to triangular pores between adjacent beams. Cross section of rays with 4 primary, 8 secondary and 8 tertiary canals. Ray tip usually knobbed with two laterally directed spines.

Remarks: The genus *Monotrabs* was described as consisting of one ray. Since this is impossible because the Hagiastridae s.l. start from a central body with a characteristic microsphere (De Wever et al. 2001) and they bear commonly 2-4 primary rays, the genus is herein emended. The holotype represents a broken and corroded specimen preserving only the middle and distal part of one ray. In order to know the number of rays we can compare the type species with *Homoeoparonaella* (?) *pseudoewingi* Baumgartner 1995a that has the same ray structure and also 2 longer lateral spines on the tip. This species is herein included in *Monotrabs*.

Monotrabs plenoides Baumgartner 1984
Plate 12, figure 25

Monotrabs plenoides BAUMGARTNER 1984, p. 773, pl. 6, figs. 1-2, 5. – non DANELIAN 1989, p. 165, pl. 6, fig. 1.
Monotrabs plenoides gr. BAUMGARTNER et al. 1995a p. 324, pl. 3152, figs. 1-2 (= holotype refigured), not 3-4.

Remarks: The specimen illustrated under this species by Danelian (1989) and Baumgartner et al. (1995a, pl. 3152, figs. 3, 4) as well as the specimen illustrated by Kocher (1981, p. 70, pl. 14, fig. 4) as hagiastrid sp. cf. *Tetraditryma pseudoplena* and later included in the synonymy of *M. plenoides* do not belong to this species and genus because they have only 6 radial beams on rays.

Monotrabs pseudoewingi (Baumgartner) in Baumgartner et al. 1995a
Plate 12, figure 27

Homoeoparonaella (?) *pseudoewingi* Baumgartner in BAUMGARTNER et al. 1995a, p. 278, pl. 3150, figs. 1-5. – non BECCARO et al. 2002, pl. 2, fig. 3.

Remarks: See remarks under the genus.

PLATE 9

Scale bars measure 50µm for a magnification of ×200 (a), ×250 (b) and ×300 (c).
All specimens come from sample VS3, if not otherwise indicated.

1-3 *Williriedellum buekkense* (Kozur). 1, 17068 (×250); 2, 17071 (×250); 3, 17241 (×250), sample VS4.

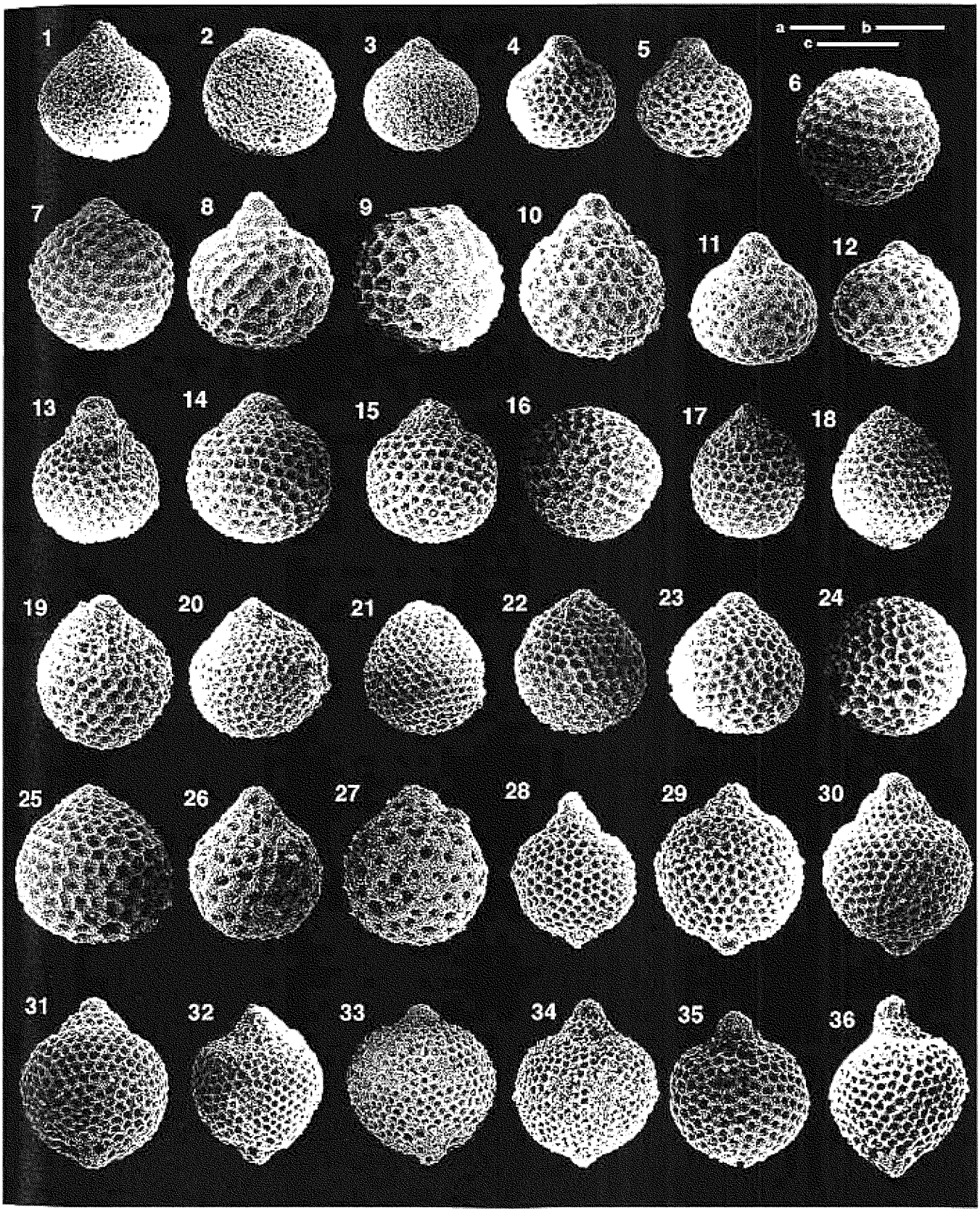
4-5 *Williriedellum* sp. 1. 4, 16953 (×300); 5, 16955 (×300).

6-12 *Williriedellum yaoi* (Kozur). 6, 17245 (×250); 7, 17246 (×250), sample VS4; 8, 16808 (×250); 9, 16809 (×250); 10, 17034 (×250); 11, 17002 (×250); 12, 17003 (×250).

13-25 *Zhamoidellum ventricosum* Dumitrica 13, 17027 (×250); 14, 16900 (×200); 15, 17012 (×200); 16, 17011 (×200); 17, 17232 (×250), sample VS4; 18, 16857 (×250); 19, 17036 (×250); 20, 17090 (×200); 21, 17085 (×200); 22, 17255 (×200), sample VS4; 23, 16920 (×300); 24, 16921 (×300); 25, 17286 (×250), sample VS4.

26-27 *Zhamoidellum* sp. 2. 26, 17269 (×300), sample VS4; 27, 17270 (×300), sample VS4.

28-36 *Williriedellum marcucciae* Cortese. 28, 16927 (×250); 29, 17028 (×250); 30, 17144 (×250), sample VS4; 31, 17147 (×250), sample VS4; 32, 16851 (×200); 33, 17396 (×200); 34, 17082 (×250); 35, 17405 (×300), sample VS2; 36, 16871 (×250).


1
2
3
4
5
a
b
c
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36

Genus ***Orbiculiforma*** Pessagno 1973
Type species: Orbiculiforma quadrata Pessagno 1973

***Orbiculiforma* sp. X** *sensu* Baumgartner et al. 1995a
Plate 12, figures 1-3

Orbiculiforma (?) sp. X BAUMGARTNER et al. 1995a, p. 354, pl. 2019, figs. 1-2.
Orbiculiforma (?) sp. aff. *O.* (?) *mclaughlini* Pessagno. – MIYAMOTO et al. 2001, pl. 6, fig. 8, pl. 7, fig. 11.

Genus ***Tetraditryma*** Baumgartner 1980
Type species: Tetraditryma pseudoplena Baumgartner 1980

Saldorfus Pessagno, Blome & Hull in PESSAGNO ET AL. 1993

Tetraditryma corralitosensis Pessagno 1997a
Plate 12, figure 22

Crucella (?) *corralitosensis* PESSAGNO 1977a, p. 72, pl. 2, figs. 10-13.
Tetraditryma corralitosensis (Pessagno). – BAUMGARTNER 1980, p. 296, pl. 7, figs. 12-15; pl. 11, fig. 13. – KOCHER 1981, p. 98, pl. 16, fig. 31. – DE WEVER and CABY 1981, pl. 2, fig. G. – BAUMGARTNER 1984, p. 787, pl. 9, figs. 6-7. – AITA 1985, fig. 6.1. – DE WEVER and MICONNET 1985, p. 390, pl. 1, fig. 9. – ISHIDA 1985, pl. 2, fig. 4. – NAGAI 1985, pl. 3, figs. 4-4a. – AITA 1987, p. 64, pl. 9, fig. 1. – DE WEVER et al. 1987a, pl. A, fig. 4. – OZVOLDOVA 1988, pl. 6, fig. 3. – EL KADIRI 1984, p. 112, pl. 20, figs. 4-5, 8. – DANELIAN 1989, p. 194, pl. 8, fig. 8. – STEIGER 1992, p. 44, pl. 10, fig. 6.
Tetraditryma sp. cf. *T. corralitosensis* (Pessagno). – WAKITA 1982, pl. 5, figs. 9-10.
Saldorfus coldspringensis PESSAGNO, BLOME and HULL in PESSAGNO et al. 1993, p. 126, pl. 3, figs. 1, 4, 7
Saldorfus corralitosensis (Pessagno). – PESSAGNO et al. 1993, p. 126, pl. 3, fig. 13.
Saldorfus oregonensis Pessagno, Blome and Hull in PESSAGNO et al. 1993, p. 127, pl. 3, figs. 11 12 18.
Tetraditryma corralitosensis corralitosensis (Pessagno). – BAUMGARTNER et al. 1995a, p. 556, pl. 3124, figs. 1-5 (fig. 2 = holotype refigured). – BECCARO et al. 2002, pl. 2, fig. 5.

Tetraditryma praeplena Baumgartner 1984
Plate 12, figure 21

Tetraditryma praeplena BAUMGARTNER 1984, p. 787, pl. 9, figs. 8-9 13-13a. – DANELIAN 1989, p. 195, pl. 8, figs. 9-14. – PESSAGNO et al. 1993, p. 127 pl. 3, figs. 6 19. – BAUMGARTNER et al. 1995a, p. 556, pl. 3125, figs. 1-5 (figs. 2-4 = holotype refigured).
Tetraditryma pseudoplena Baumgartner. – CARAYON et al. 1984, pl. 1, fig. 5 ?. – OZVOLDOVA and PETERCAKOVA 1987, pl. 35, fig. 4 ?

Family EMILUVIIDAE Dumitrica 1995 (syn.: Staurolonchidae Haeckel 1881, *sensu* Pessagno 1977a)

Genus ***Emiluvia*** Foreman 1973
Type species: Emiluvia chica Foreman 1973

Emiluvia lowercoonensis Pessagno, Blome and Hull, in Pessagno et al. 1993
Plate 12, figure 7

PLATE 10

Scale bars measure 50µm for a magnification of ×200 (a), ×250 (b) and ×300 (c).
All specimens from sample VS3, if not otherwise indicated.

1-2 *Williriedellum nodosum* Chiari, Marcucci and Prela. 1, 17262 (×250), sample VS4; 2, 17259 (×250), sample VS4.

3-5 *Protunuma quadriperforatus* O'Dogherty and Gorican. 3, 16574 (×200); 4, 16577 (×200); 5, 16576 (×200).

6-8 *Protunuma europeus* O'Dogherty, Gorican and Dumitrica n. sp. 6, 16561 (×200); 7, 16611 (×200); 8, 16610 (×200) holotype.

9-17 *Striatojaponocapsa synconexa* O'Dogherty, Gorican and Dumitrica n. sp. 9, 17008 (×200); 10, 16781 (×200) holotype; 11, 16781 (×200) antapical view; 12, 16656 (×200); 13, 17023 (×200); 14, 16752 (×200); 15, 16995 (×200); 16, 17288 (×200), sample VS4; 17, 17287 (×200), sample VS4.

18-20 *Striatojaponocapsa conexa* (Matsuoka). 18, 17101 (×200) 19, 16677 (×250); 20, 17022 (×250).

21-24 *Zhamoidellum calamin* O'Dogherty, Gorican and Dumitrica n. sp. 21, 16844 (×300); 22, 17045 (×300); 23, 16841 (×300) holotype; 24, 16842 (×300).

25 *Zhamoidellum* cf. *calamin* O'Dogherty, Gorican and Dumitrica n. sp. 17237 (×250), sample VS4.

26-27 *Zhamoidellum* sp. 3. 26, 16664 (×250); 27, 16709 (×250).

28-30 *Zhamoidellum argandi* O'Dogherty, Gorican and Dumitrica n. sp. 28a-b, 16948 (×300) holotype; 29, 16949 (×300); 30, 16756 (×300).

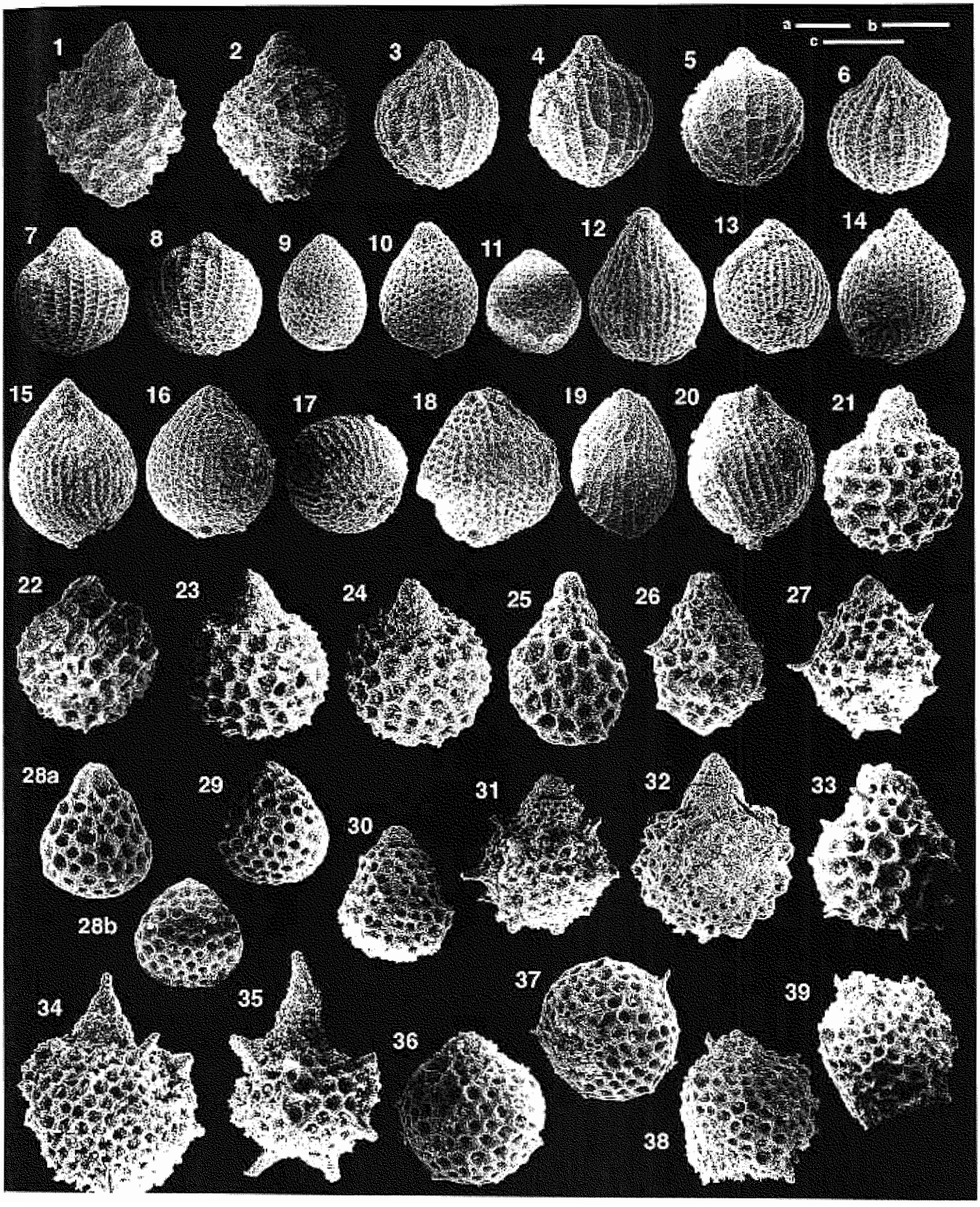
31 *Zhamoidellum* sp. 4. 16735 (×250).

32 *Zhamoidellum funatoense* (Aita). 16963 (×250).

33,35 *Arcanicapsa* sp. 1. 33, 17078 (×250); 35, 16854 (×250).

34 *Arcanicapsa leiostraca* (Foreman). 16866 (×250).

36-39 *Holocryptocapsa* (?) sp. 1. 36, 16670 (×250); 37, 16669 (×250); 38, 16617 (×250); 39, 16616 (×250).


a
b
c
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28a
28b
29
30
31
32
33
34
35
36
37
38
39

Emiluvia lowercaonensis Pessagno, Blome and Hull, in PESSAGNO et al. 1993, p. 131, pl. 4, figs. 3 14, 29.

Emiluvia nana Baumgartner in Baumgartner et al. 1995a
Plate 12, figures 8-11

Emiluvia cf. *premyogii* Baumgartner. – DE WEVER and MICONNET 1985, pl. 1, fig. 11.
Emiluvia nana Baumgartner in BAUMGARTNER et al. 1995a, p. 202, pl. 3212, figs. 1-2.

Emiluvia premyogii Baumgartner 1984
Plate 12, figure 12

Emiluvia chica Foreman. – SATO et al. 1982, pl. 3, fig. 14.
Emiluvia sp. B WAKITA 1982, pl. 6, fig. 8. – EL KADIRI 1984, p. 34, pl. 5, fig. 9; pl. 6, figs. 1-2; pl. 26, fig. 9; not pl. 24, fig.1.
Emiluvia premyogii BAUMGARTNER 1984, p.762, pl. 3, figs. 6, 8-9 11-12. – not DE WEVER and MICONNET 1985, p. 386, pl. 1, figs. 3-6. – AITA 1987, p. 63, pl. 1, fig. 3. – GORICAN 1987, p. 182, pl. 3, fig. 8. – DE WEVER et al. 1987a, pl. A, fig. 1. – OZVOLDOVA 1988, pl. 6, fig. 2; pl. 8, fig. 4. – DANELIAN 1989, p. 150, pl. 4, figs. 10-11. – KITO 1989, p. 112, pl. 6, fig. 8. – KITO et al. 1990, pl. 1, fig. 9. – OZVOLDOVA 1990, pl. 1, fig. 3. – CONTI and MARCUCCI 1991, pl. 1, fig. 18. – WIDZ 1991, p. 246, pl. 1, fig. 18. – PESSAGNO et al. 1993, p. 132, pl. 4, figs. 7 12. BAUMGARTNER et al. 1995a, p. 208, pl. 3210, figs. 1-5 (figs 4-5 holotype refigured). – BECCARO et al. 2002, pl. 2, fig. 4.
Emiluvia aff. *E. premyogii* Baumgartner. – DE WEVER and MICONNET 1985, pl. 1, fig. 8.

Emiluvia salensis Pessagno 1977a
Plate 12, figures 13-15

Emiluvia salensis PESSAGNO 1977a, p. 77, pl. 5, figs. 9-11. – KOCHER 1981, p. 65, pl. 13, fig. 10. – BAUMGARTNER et al. 1995a, p. 210, pl. 3215, figs. 1-3 (fig. 3 = holotype refigured).
Emiluvia sedecimporata salensis Pessagno. – BAUMGARTNER 1984, p. 763, pl. 3, figs. 4, 7. – DE WEVER et al. 1986, pl. 6, figs. 21, 25-26; pl. 7, fig. 5. – OZVOLDOVA 1990, pl. 3, fig. 5. – WIDZ 1991, p. 246, pl. 1, fig. 22.
Emiluvia sp. CONTI and MARCUCCI 1991, pl. 1, fig. 19.

Subsuperfamily PATULIBRACCHILAE Pessagno 1971, *emend* De Wever et al. 2001

Family ANGULOBRACCHIIDAE Baumgartner 1980, *emend.* De Wever et al. 2001

Genus ***Angulobracchia*** Baumgartner 1980
Type species: Paronaella (?) *purisimaensis* Pessagno 1977a

PLATE 11

Scale bars measure 50µm for a magnification of ×100(a) ×150(b) ×200 (c), ×250 (d) and ×300 (e).
All specimens from sample VS3, except figures 9 16, 21, 22, 29, 35, 41 and 42 from VS4.

1-2 *Napora bukryi* Pessagno. 1, 16587 (×250); 2, 16546 (×200).

3 *Napora pualensis* (Blome). 16879 (×200).

4-5 *Saitoum levium* De Wever. 4, 16650 (×250); 5, 16524 (×250).

6-8 *Saitoum pagei* Pessagno. 6, 16526 (×250); 7, 17007 (×250); 8, 17010 (×250).

9-14 *Pantanellium riedeli* Pessagno. 9, 17137 (×200); 10, 16522 (×200); 11, 16675 (×200); 12, 16520 (×200); 13, 17017 (×200); 14, 17049 (×200).

15-16 *Pantanellium latum* Pessagno and Blome. 15, 16849 (×200); 16, 17158 (×200).

17-19 *Pantanellium* (?) sp. 1. 17, 17051 (×150); 18, 16596 (×150); 19, 16647 (×150).

20 *Actinomma* (?) sp. cf. *A. interessanta* Kiessling. 16922 (×300)

21 *Acaeniotylopsis variatus* (Ozvoldova). 17379 (×150).

22 *Gorgansium silviesense* Pessagno and Blome. 17386(x200)

23 *Archaeospongoprunum praeimlayi* Pessagno, Blome and Hull in Pessagno et al. 16719 (×150).

24-25 *Archaeospongoprunum elegans* Wu. 24, 16646 (×150); 25, 16623 (×150).

26-27 *Archaeospongoprunum imlayi* Pessagno. 26, 17088 (×150); 27, 17110 (×150).

28 *Bernoullius dicera* (Baumgartner) in Baumgartner et al. 16529 (×200).

29 *Bernoullius* (?) sp. 17155 (×200).

30 *Triactoma* sp 1. 16686 (×300).

31 *Tripocyclia* aff. *crassa* Kiessling. 16508 (×300).

32 *Lanubus holdsworthi* Pessagno and Yang in Pessagno et al. 1989. 16501 (×200).

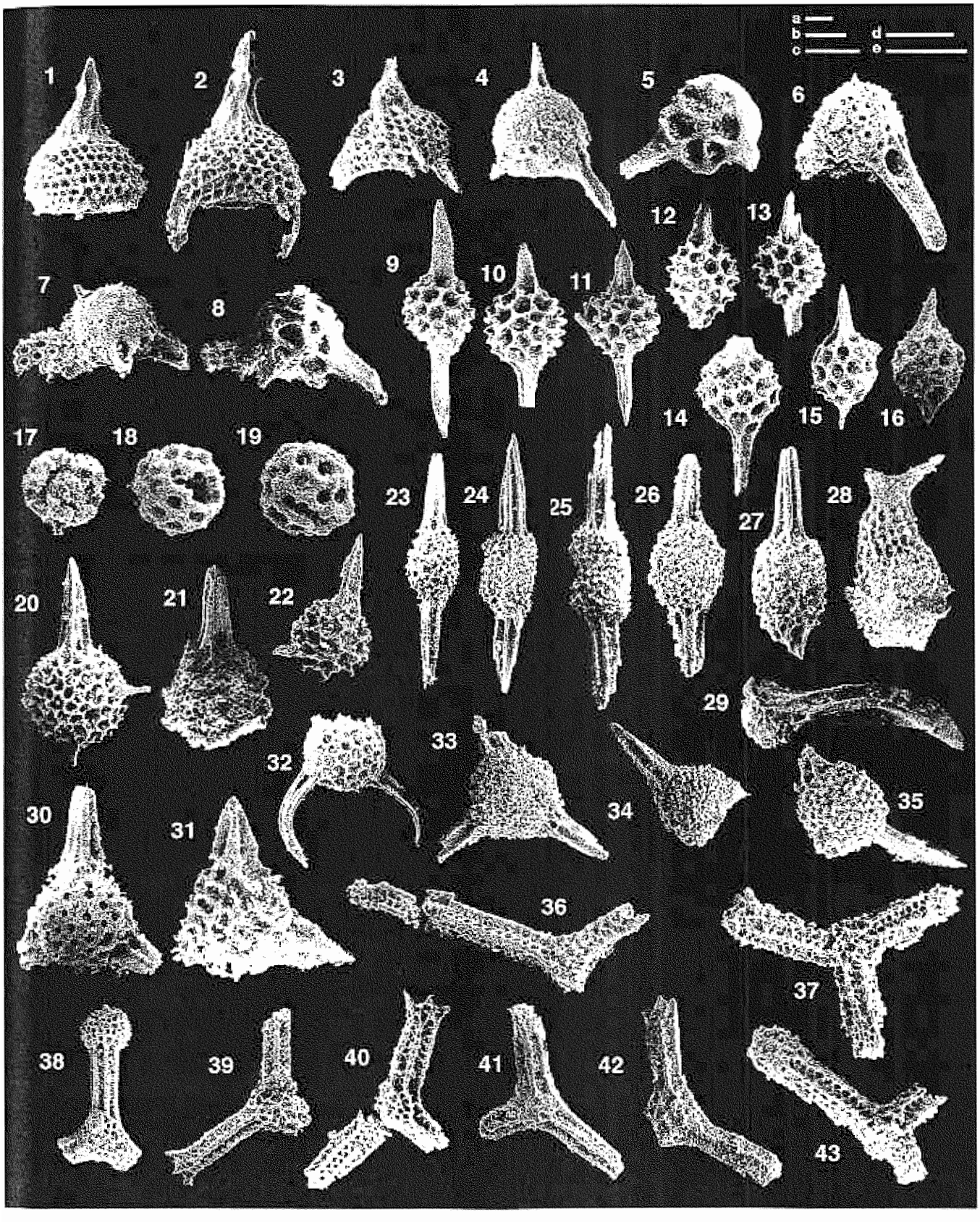
33-35 *Alievium longispineum* Yang and Wang. 33, 16644 (×150); 34, 16890 (×150); 35, 17238 (×200).

36 *Angulobracchia* sp. cf. *A. purisimaensis* (Pessagno). 16950 (×150).

37,43 *Tritrabs ewingi* (Pessagno). 37, 16804 (×100); 43, 16649 (×100).

38 *Tritrabs exotica* (Pessagno). 16691 (×100).

39-42 *Tritrabs casmaliaensis* (Pessagno). 39, 16896 (×150); 40, 16876 (×150); 41, 17299 (×150); 42, 17314 (×150).


a
b
c
d
e
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43

Angulobracchia* sp. cf. *A. puristmaensis (Pessagno 1977a)
Plate 11, figure 36

***Angulobracchia* sp.**
Plate 12, figure 30

Genus ***Bistarkum*** Yeh 1987
Type species: Bistarkum rigidum Yeh 1987

***Bistarkum* sp. 1**
Plate 12, figures 4, 5

Remarks: Specimens have a thick spongy meshwork. This species is similar to *Bistarkum mangartense* Gorican, Šmuc and Baumgartner (2003) but differs from the latter by having a more constricted central part of the shell.

Genus ***Paronaella*** Pessagno 1971
Type species: Paronaella solanoensis Pessagno 1971

Paronaella broennimanni Pessagno 1977a
Plate 12, figure 19

Paronaella broennimanni PESSAGNO 1977a, p. 69, pl. 1, figs. 4-5. – ORIGLIA-DEVOS 1983, p. 97, pl. 12, fig. 14 ? – EL KADIRI 1984, p. 205, pl. 15, figs. 6, 8.
Paronaella broennimanni Pessagno. – BAUMGARTNER 1980, p. 300, pl. 9, fig. 6. – KOCHER 1981, p. 80, pl. 15, fig. 5. – BAUMGARTNER 1984, p. 777, pl. 6, fig. 17. – DANELIAN 1989, p. 172, pl. 6, fig. 11. BAUMGARTNER et al. 1995a, p. 392, pl. 3137, figs. 1-3 (fig. 2 = holotype refigured)
Paronaella sp. – OZVOLDOVA 1990, p. 302, pl. 4, fig. 8.
Paronaella praedentata Baumgartner. – WIDZ 1991, p. 250, pl. 2, fig. 23 ?
Paronaella sp. C WIDZ 1991, p. 250, pl. 3, fig. 2, not fig. 3.

Paronaella kotura Baumgartner 1980
Plate 12, figures 17 18

Paronaella kotura BAUMGARTNER 1980, p. 302, pl. 9, figs. 15-19; pl. 12, fig. 8. – KOCHER 1981, p. 80, pl. 15, fig. 7. – ORIGLIA-DEVOS 1983, p. 99, pl. 14, fig. 6. – BAUMGARTNER 1984, p. 777, pl. 6, fig. 20. – EL KADIRI 1984, p. 207, pl. 15, figs. 2, 5; pl. 16, figs. 5-6; pl. 26, fig. 8. – DE WEVER et al. 1986, pl. 9, fig. 2. – OZVOLDOVA and PETERCAKOVA 1987, pl. 34, figs. 7, 9. – OZVOLDOVA 1988, pl. 6, fig. 4. – DANELIAN 1989, p. 173. – CONTI and MARCUCCI 1991, pl. 3, fig. 5. – WIDZ 1991, p. 248, pl. 2, fig. 17. BAUMGARTNER et al. 1995a, p. 394, pl. 3140, figs. 1-6 (figs. 4-5 = holotype refigured).

Paronaella mulleri Pessagno 1977a
Plate 12, figures 26, 28, 29

Paronaella mulleri PESSAGNO 1977a, p. 71, pl. 2, figs. 2-3. – BAUMGARTNER 1980, p. 304, pl. 9, fig. 8. – KOCHER 1981, p. 80, pl. 15, fig. 8. – ORIGLIA-DEVOS 1983, p. 100, pl. 14, fig. 2. – EL KADIRI 1984, p. 209, pl. 16, figs. 2, 8. – BAUMGARTNER 1984, p. 778, pl. 6, fig. 21. – NAGAI 1985, pl. 4, figs. 2-2a. – DE WEVER et al. 1986, pl. 8, fig. 18. – DE WEVER and CORDEY 1986, pl. 1, fig. 20. – OZVOLDOVA 1988, pl. 4, fig. 10. – DANELIAN 1989, p. 173, pl. 6, figs. 12-15. – MATSUOKA 1991b, pl. 2, fig. 15. – WIDZ 1991, p. 250, pl. 2, figs. 26-27. – BAUMGARTNER et al. 1995a, p. 396, pl. 3139, figs. 1-5 (fig. 5 = holotype refigured). – BECCARO et al. 2002, pl. 2, fig. 1.
Paronaella sp. cf. *P. mulleri* Pessagno. – BAUMGARTNER 1980, p. 304, pl. 9, fig. 5; pl. 12, figs. 4-7.

PLATE 12

Scale bars measure 50µm for a magnification of ×100 (a), ×150 (b) and ×200 (c).
All specimens from sample VS3, except figures 2, 4 12 13, 21, 23, 28 and 29 from VS4.

1-3 *Orbiculiforma* sp. X *sensu* Baumgartner et al. 1, 16601 (×150); 2, 17313 (×200); 3, 16970 (×200).

4-5 *Bistarkum* sp. 1. 4, 17284 (×200); 5, 16793 (×200).

6 *Bernoullius* (?) sp. 1. 16725 (×200).

7 *Emiluvia lowercoonensis* Pessagno, Blome and Hull, in Pessagno et al. 16780 (×200).

8-11 *Emiluvia nana* Baumgartner in Baumgartner et al. 8, 16503 (×200); 9, 16621(x200); 10, 16707 (×200); 11, 16812 (×200).

12 *Emiluvia premyoogii* Baumgartner. 17265(x200).

13-15 *Emiluvia salensis* Pessagno. 13, 17161 (×200); 14, 16768 (×200); 15, 17057 (×200).

16 *Crucella theokaftensis* Baumgartner. 16668 (×200).

17-18 *Paronaella kotura* Baumgartner. 17, 16659 (×100); 18, 17015 (×150).

19 *Paronaella broennimanni* Pessagno. 16674 (×150).

20 *Paronaella* sp. 1. 16803 (×150).

21 *Tetraditryma praeplena* Baumgartner. 17210(x150).

22 *Tetraditryma corralitosensis* Pessagno. 16571 (×100).

23 *Archaeohagiastrum longipes* Baumgartner in Baumgartner et al. 17184 (×150).

24-25 *Monotrabs plenoides* gr. Baumgartner. 16551 (×100).

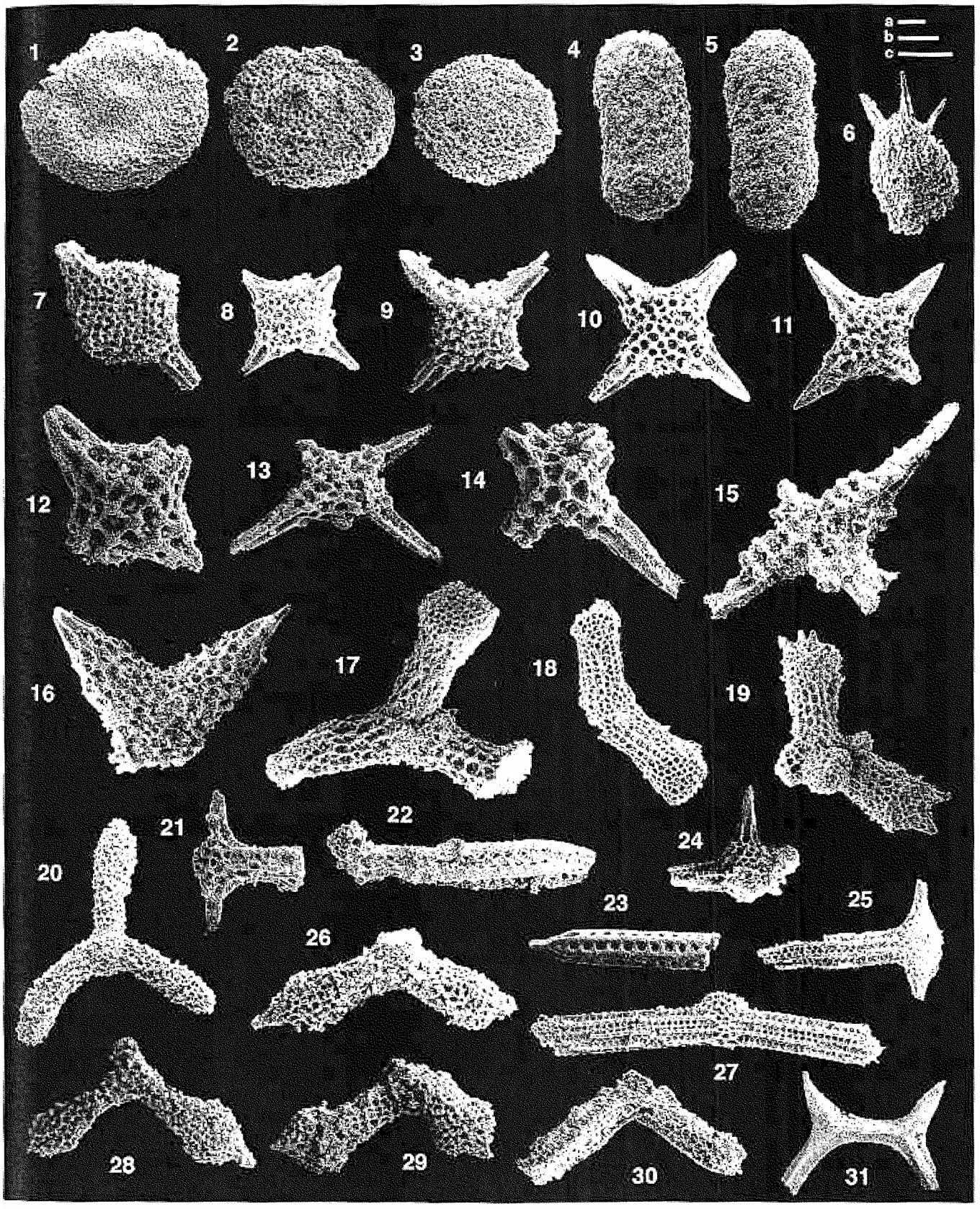
25 *Tritrabs* sp. 16518 (×100).

26,28-29 *Paronaella mulleri* Pessagno. 26, 16938 (×150); 28, 17326 (×200); 29, 17278 (×150).

27 *Monotrabs pseudoewingi* (Baumgartner) in Baumgartner et al. 16687 (×100).

30 *Angulobracchia* sp. 16977 (×150).

31 *Hexasaturnalis nakasekoi* Dumitrica and Dumitrica-Jud in press. 16801 (×150).


a
b
c
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31

Paronaella denudata (Rüst). – OZVOLDOVA 1990, pl. 1, fig. 7.

***Paronaella* sp. 1**
Plate 12, figure 20

Remarks: This species differs from other species of *Paronaella* in that the rays are circular in cross-section and not expanded distally.

Family PSEUDOAULOPHACIDAE Riedel 1967, *emend.* Dumitrica 1997

Genus ***Alievium*** Pessagno 1972
Type species: Theodiscus superbus Squinabol 1914

Alievium longispineum Yang and Wang 1990
Plate 11, figures 33-35

Alavium longispineum YANG and WANG 1990, p. 204, pl. 2, figs. 2, 4.
Spongotripus sp. Z of Yao. – HORI 2001, pl. 2, fig. 28.

Family TRITRABIDAE Baumgartner 1980

Genus ***Tritrabs*** Baumgartner 1980
Type species: Paronaella (?) casmaliaensis Pessagno 1977a

Tritrabs casmaliaensis (Pessagno 1977a)
Plate 11, figures 39-42

Paronaella (?) *casmaliaensis* PESSAGNO 1977a, p. 69, pl. 1, figs. 6-8.
Tritrabs aff. *casmaliaensis* (Pessagno). – ORIGLIA-DEVOS 1983, p. 83, pl. 10, fig. 3. – DE WEVER et al. 1986, pl. 8, fig. 12.
Tritrabs casmaliaensis (Pessagno). – BAUMGARTNER 1980, p. 293, pl. 1, fig. 10; pl. 4, fig. 11; pl. 11, fig. 10. – KOCHER 1981, p. 105, pl. 17, fig. 18. – ISHIDA 1983, pl. 10, fig. 6. not ORIGLIA-DEVOS 1983, p. 83, pl. 10, fig. 2. – BAUMGARTNER 1984, p. 791, pl. 10, fig. 9. – BAUMGARTNER 1985, fig. 43a. – AITA 1987, p. 64. – OZVOLDOVA 1988, pl. 8, fig. 8. – DANELIAN 1989, p. 206, pl. 9, figs. 13-14. – KITO 1989, pl. 8, fig. 1. – OZVOLDOVA 1990, pl. 1, fig. 8. – CONTI and MARCUCCI 1991, pl. 4, fig. 11. – WIDZ 1991, p. 257, pl. 4, fig. 17. – STEIGER 1992, p. 41, pl. 8, fig. 1, not figs. 2-3. BAUMGARTNER et al. 1995a, p. 604, pl. 3117, figs. 1-5 (fig. 5 = holotype refigured).
Tritrabs rhodoductylus Baumgartner. – CONTI and MARCUCCI 1991, pl. 4, fig. 10.
Tritrabs sp. A ISHIDA 1983, pl. 10, fig. 8.

Tritrabs ewingi (Pessagno 1971)
Plate 11, figure 37, 43

Paronaella (?) *ewingi* PESSAGNO 1971, p. 47, pl. 19, figs. 2-5. – PESSAGNO 1977a, p. 70, pl. 1, figs. 14-15.
Tritrabs ewingi ewingi Pessagno. – STEIGER 1992, p. 38, pl. 7, figs. 3-4.
Tritrabs ewingi minima STEIGER 1992, p. 39, pl. 7, fig. 6.
Tritrabs ewingi gr. (Pessagno). – JUD 1994, p. 116, pl. 23, figs. 12-13.
Tritrabs ewingi s.l. (Pessagno) BAUMGARTNER et al. 1995a, p. 606, pl. 3113, figs. 1-8 (fig. 8 = holotype refigured)

Remarks: We include species having a wide range of variation in ray length, including forms with shorter rays than specimens from the type-series

Tritrabs exotica (Pessagno 1977a)
Plate 11, figure 38

Paronaella (?) *exotica* PESSAGNO 1977a, p. 70, pl. 1, figs. 12-13.
Tritrabs exotica (Pessagno). – BAUMGARTNER 1980, p. 294, pl. 4, fig. 16. – KOCHER 1981, pl. 17, fig. 20 ? – BAUMGARTNER 1984, p. 791, pl. 10, fig. 11. – DE WEVER et al. 1986, pl. 8, fig. 19. BAUMGARTNER et al. 1995a, p. 608, pl. 3119, figs. 1-3 (fig. 3 = holotype refigured).

Tritrabs cf. *T. exotica* (Pessagno). – DE WEVER et al. 1986, pl. 8, fig. 14.

***Tritrabs* sp.**
Plate 12, figure 24

Manotrabs plenoides gr. BAUMGARTNER et al. 1995a p. 324, pl. 3152, only figs. 3-4.

Remarks: Assignment to the genus *Tritrabs* is supported because our specimen shows six primary beams; otherwise the specimen resembles representatives of the genus *Manotrabs*.

Superfamily SPONGURACEA Haeckel 1862
Family ARCHAEOSPONGOPRUNIDAE Pessagno 1973

Genus ***Archaeospongoprunum*** Pessagno 1973
Type species: Archaeospongoprunum venadoensis Pessagno 1973

Archaeospongoprunum elegans Wu 1993
Plate 11, figures 24-25

Archaeospongoprunum elegans WU 1993, p. 118, pl. 1, figs. 5, 7, 23. – BECCARO et al. 2002, pl. 1, fig. 22.
Archaeospongoprunum sp. – NISHIZONO 2001, pl. 1, fig. 3.

Archaeospongoprunum imlayi Pessagno 1977a
Plate 11, figures 26-27

Archaeospongoprunum imlayi PESSAGNO 1977a, p. 73, pl. 3, figs 1-4. – KOCHER 1981, p. 59, pl. 12, figs 22-23. – MIZUTANI 1981, p. 171, pl. 37, figs. 1, 4. – ADACHI 1982, pl. 5, fig. 1. – AITA 1982, pl. 3, fig. 11. – SATO et al. 1982, pl. 3, fig. 13. – OZVOLDOVA and SYKORA 1984, pl. 1, fig. 9. LI 1986, p. 301, pl. 1, fig. 6. – OZVOLDOVA 1988, pl. 1, fig. 3. – OZVOLDOVA 1992, pl. 2, fig. 3. – SASHIDA et al. 1993, fig. 6.39. – WU 1993, p. 118, pl. 1, fig. 18. – KOZUR et al. 1996, pl. 3, fig. 3; pl. 6, fig. 10. – SASHIDA and UEMATSU 1996, p. 53, figs. 8-8.12. – CHIARI et al. 1997, pl. 1, fig. 18. – HULL 1997, p. 28, pl. 8, fig. 1. SUZUKI and NAKAE 1997, pl. 1, fig. 5. – HORI 1998, pl. 2, figs. 9.10. – HORI 1999, p. 68, fig. 5-12.
Archaeospongoprunum sp. – TAKASHIMA and KOIKE 1984, pl. 3, fig. 2. – MATSUOKA and BAUMGARTNER 1997, pl. 3, fig. 13.
Archaeospongoprunum sp. aff. *A. imlayi* Pessagno. – MURATA et al. 1982, pl. 1, fig. 1. – DE WEVER et al. 1986, pl. 6, fig. 14. – LI 1986, p. 301, pl. 1, fig. 7.
Archaeospongoprunum globosus WU 1993, p. 118, pl. 1, figs. 8 16.

Archaeospongoprunum praeimlayi Pessagno, Blome and Hull in Pessagno et al. 1993
Plate 11, figure 23

Archaeospongoprunum praeimlayi Pessagno, Blome and Hull in PESSAGNO et al. 1993, p. 116, pl. 1, figs. 8, 9, 20, 22, 25, 29.

Family GOMBERELLIDAE Kozur and Mostler 1981, *emend.* De Wever et al. 2001

Genus ***Bernoullius*** Baumgartner 1984
Type species: Eucyrtis (?) *dicera* Baumgartner in Baumgartner et al. 1980

Bernoullius dicera (Baumgartner) in Baumgartner et al. 198
Plate 11, figure 28

Lophophaena sp. – OZVOLDOVA 1979, p. 259, pl. 4, figs. 4-5.
Eucyrtis(?) *dicera* BAUMGARTNER et al. 1980, p. 54, pl. 3, fig. 16; pl. 6, fig. 10, not fig. 6. – KOCHER 1981, p. 67, pl. 13, figs. 17-18. – DE WEVER and CABY 1981, pl. 2, fig. 1.
Bernoullius dicera (Baumgartner). – BAUMGARTNER 1984, p. 760, pl. 2, fig. 16. – AITA 1987, p. 63. – DANELIAN 1989, p. 145, pl. 3,

fig. 9. – KITO 1989, p.157, pl. 17, fig. 2. – WIDZ 1991, p.244, pl. 1, fig. 15. BAUMGARTNER et al. 1995a, p. 122, pl. 3223, figs. 1-3 (fig. 1 = holotype refigured).
Cuniculiformis (?) *diceris* (Baumgartner). – EL KADIRI 1984, p. 70.

***Bernoullius* (?) sp. 1**
Plate 12, figure 6

Remarks: This species differs from *Bernoullius spelae* Jud by its smaller size.

Order ENTACTINARIA Kozur and Mostler 1982
Family SATURNALIDAE Deflandre 1953
Subfamily HEXASATURANLINAE Kozur and Mostler 1983

Genus ***Hexasaturnalis*** Kozur and Mostler 1983
Type species: Spongosaturnalis ? hexagonus Yao 1972.

Hexasaturnalis nakasekoi Dumitrica and Dumitrica-Jud 2005
Plate 12, figure 31

Acanthocircus suboblongus (Yao). – KOCHER 1981, p. 52, pl. 12, figs. 4-5. – AITA 1987, p. 63, pl. 8, fig. 9. – OZVOLDOVA and PETERCAKOVA 1987, pl. 31, fig. 3. – DANELIAN 1989, p. 132, pl. 1, figs. 12-13. – WIDZ 1991, p. 243, pl. 1, fig. 5. – OZVOLDOVA 1992, pl. 2, fig. 2. – AUBRECHT and OZVOLDOVA 1994, pl. 2, fig. 2. – KIESSLING 1995, p. 269, pl. 6, fig. 21. – HULL 1997, p. 31, pl. 1, figs. 16, 20.
Acanthocircus carinatus Foreman. – DE WEVER and MICONNET 1985, pl. 2, figs. 7-8.
Acanthocircus suboblongus - KISHIDA and HISADA 1986, fig. 2.21.
Acanthocircus variabilis (Squinabol). – YANG and WANG 1990, pl. 2, fig. 8. – KOZUR et al. 1996, pl. 4, fig. 3, not fig. 1.
Acanthocircus sp. aff. *A. carinatus* Foreman. – PESSAGNO et al. 1993, p. 124, pl. 2, fig. 11.
Acanthocircus suboblongus Yao. – CHIARI 1994, p. 382, pl. 1, figs. 3, 4.
Acanthocircus suboblongus minor Baumgartner in Baumgartner et al. 1995a, p. 66, pl. 3085, only fig. 4.
Acanthocircus suboblongus suboblongus (Yao). – BAUMGARTNER et al. 1995a, p. 68, pl. 3088, only fig. 1. – CHIARI et al. 1997, pl. 1, fig. 2. – PRELA et al. 2000, pl. 1, fig. 2.
? Acanthocircus sp. aff. *A. suboblongus* Foreman. – HULL 1997, p. 31, pl. 9, fig. 19.
Hexasaturnalis sp. aff. *H. suboblongus* (Yao). – BECCARO et al. 2002, pl. 3, fig. 26.
Hexasaturnalis nakasekoi DUMITRICA and DUMITRICA-JUD 2005, pl. 1, figs. 3–13; pl. 2, figs. 1-4, 7-8.

Description: Ring elliptical with two spines at each end. All spines three-bladed but at each end on the same face one spine (the left shows two blades and the other one -the right- one blade). The blade of the right spine is thick and usually shorter than the other two blades of the left spine and results from the fusion of the external blade of the right portion of the ring with the external blade of the portion situated between the two spines, which is very high. For such a fusion the right portion of the ring twists slightly invertedly clockwise so the external blade becomes almost perpendicular to the plane of the ring. As a result of this rotation and disposition of the blades the ring is not bilaterally symmetrical. It has a symmetry of rotation of 180° and the spines are similar along diagonals.

Remarks: Hexasaturnalis nakasekoi was frequently confounded with *H. suboblongus* (Yao). The latter species is older, commonly Bajocian, its spines are four-bladed and the ring has a bilateral symmetry, whereas *H. nakasekoi* first appears in the lower or middle Bathonian and is characteristic of the Bathonian-Tithonian interval.

ACKNOWLEDGMENTS

We thank Elisabeth Carter and Atsushi Matsuoka for helpful reviews and recommendations for improving the manuscript. We would like to express our gratitude to Patrick De Wever and Wolfgang Kiessling for final review of this paper. This work has been partly supported by the Swiss National Science Foundation (projects 20-40756.94 and 21-45789.95) and the Spanish-Slovenian bilateral cooperation project (MAE and ZRC SAZU).

REFERENCES

ADACHI, M., 1982. Some considerations on the *Mirifusus baileyi* assemblage in the Mino terrain, central Japan. *News of Osaka Micropaleontologists*, Special Volume, 5: 211-225.

———, 1988. Further study on the Sakahogi Conglomerate and surrounding Mesozoic strata in the southern Mino Terrane, Japan. *Bulletin of the Mizunami Fossil Museum* 14: 113-128.

ADACHI, M. and KOJIMA, S., 1983. Geology of the Mt. Hikagedaira area, east of Takayama, Gifu Prefecture, central Japan. *Journal of Earth Sciences Nagoya University*, 31: 37-67.

AITA, Y., 1982. Jurassic radiolarian biostratigraphy in Irazuyama district, Kochi Prefecture, Japan - a preliminary report. *News of Osaka Micropaleontologists*, Special Volume, 5: 255-270.

———, 1985. Jurassic radiolarian biostratigraphy of the Irazuyama Formation (Takano Section), Shikoku, Japan. *Scientific and Technical Reports of the Mining College, Akita University*, 6: 33-41.

———, 1987. Middle Jurassic to Lower Cretaceous radiolarian biostratigraphy of Shikoku with reference to selected sections in Lombardy Basin and Sicily. *Science Reports of the Tohoku University*, Series 2: Geology, 58(1): 1-91.

AITA, Y. and OKADA, H., 1986. Radiolarians and calcareous nannofossils from the uppermost Jurassic and lower Cretaceous strata of Japan and Tethyan regions. *Micropaleontology*, 32(2): 97-128.

AOKI, T. and TASHIRO, M., 1982. A stratigraphical study of the Cretaceous Shimanto Belt (The "Doganaro" and Uwagumi Formations) at Uwagumi, Kagami-machi, Kami-gun, Kochi Prefecture, Shikoku. *Research Reports of the Kochi University*, 31: 1-39.

ARAKAWA, R., 1997. Jurassic radiolarian succession from the siliceous mudstone in the Kuzuu area of the Ashio Terrane, central Japan. Part I. *Bulletin of the Tochigi Prefectural Museum* 14: 1-19.

———, 1998. Middle Jurassic Radiolaria assemblages from Manganese dioxide nodules, Kuzuu area of Ashio terrane, central Japan. *Bulletin of the Tochigi Prefectural Museum* 15: 51-76.

AUBRECHT, R. and OZVOLDOVÁ, L., 1994. Middle Jurassic-Lower Cretaceous development of the Pruské Units in the western part of the Pieniny Klippen Belt. *Geologica carpathica*, 45(4): 211-223.

BAUMGARTNER, P. O., 1980. Late Jurassic Hagiastridae and Patulibracchiidae (Radiolaria) from the Argolis Peninsula (Peloponnesus, Greece). *Micropaleontology*, 26(3): 274-322.

———, 1984. A Middle Jurassic - Early Cretaceous low latitude radiolarian zonation based on unitary associations and age of Tethyan radiolarites. *Eclogae geologicae Helvetiae*, 77(3): 729-841.

———, 1985. Jurassic sedimentary evolution and nappe emplacement in the Argolis Peninsula (Peloponnesus, Greece). *Mémoires de la Société helvétique des Sciences Naturelles*, 99: 1-111.

———, 1992. Lower Cretaceous radiolarian biostratigraphy and biogeography off northwestern Australian (ODP sites 765 and 766

and DSDP site 261), Argo abyssal plain and lower Exmouth Plateau. *Proceedings of the Ocean Drilling Program, Scientific Results* 123: 299-342. College Station, TX: Ocean Drilling Program

BAUMGARTNER, P. O., BARTOLINI, A., CARTER, E. S., CONTI, M., CORTESE, G., DANELIAN, T., DE WEVER, P., DUMITRICA, P., DUMITRICA-JUD, R., GORICAN, S., GUEX, J., HULL, D. M., KITO, N., MARCUCCI, M., MATSUOKA, A., MURCHEY, B., O'DOGHERTY, L., SAVARY, J., VISHNEVSKAYA, V., WIDZ, D. and YAO, A., 1995b. Middle Jurassic to Early Cretaceous radiolarian biochronology of Tethys based on Unitary Associations. *Mémoires de Géologie* (Lausanne), 23: 1013-1048.

BAUMGARTNER, P. O. and BERNOULLI, D., 1976. Stratigraphy and radiolarian fauna in a Late Jurassic-Early Cretaceous section near Achladi (Evvoia, Eastern Greece). *Eclogae geologicae Helvetiae*, 69(3): 601-626.

BAUMGARTNER, P. O., DE WEVER, P. and KOCHER, R., 1980. Correlation of Tethyan Late Jurassic-Early Cretaceous radiolarian events. *Cahier de Micropaléontologie*, part 2: 23-86.

BAUMGARTNER, P. O., O'DOGHERTY, L., GORICAN, S., DUMITRICA-JUD, R., DUMITRICA, P., PILLEVUIT, A., URQUHART, E., MATSUOKA, A., DANELIAN, T., BARTOLINI, A., CARTER, E. S., DE WEVER, P., KITO, N., MARCUCCI, M. and STEIGER, T., 1995a. Radiolarian catalogue and systematics of Middle Jurassic to Early Cretaceous Tethyan genera and species. *Mémoires de Géologie* (Lausanne), 23: 37-685

BECCARO, P., BAUMGARTNER, P. O. and MARTIRE, L., 2002. Radiolarian biostratigraphy of the Fassano Formation, Middle-Upper Jurassic, Southern Alps, Italy. In: Carter, E.S. et al., Eds., Micropaleontology of Radiolarians. Proceeding of Interrad IX. *Micropaleontology*, 48 supplement 1: 43-60.

BERTRAND, J., 1970. Etude pétrographiques des ophiolites et des granites du Flysch des Gets (Haute-Savoie, France). *Archives de physique et des sciences naturelles de Genève*, 23(2): 279-342.

BILL, M., BUSSY, F., COSCA, M., MASSON, H. and BUNZIKER, J. C., 1997. High-precision U-Pb and $^{40}Ar/^{39}Ar$ dating of an alpine ophiolite (Gets nappe, French Alps). *Eclogae geologicae Helvetiae*, 90(1): 43-54.

BILL, M., NÄGLER, T. F. and MASSON, H., 2000. Major, minor, trace element, Sm-Nd and Sr isotopic compositions of mafic rocks from the earliest oceanic crust of the Alpine Tethys. *Schweizerische Mineralogische und Petrographische Mitteilungen*, 80: 131-145.

BILL, M., O'DOGHERTY, L., GUEX, J., BAUMGARTNER, P. O. and MASSON, H., 2001a. Radiolarite ages in Alpine-Mediterranean ophiolites: Constraints on the oceanic spreading and the Tethys-Atlantic connection. *Geological Society of America, Bulletin* 113(1): 129-143.

BILL, M., MASSON, H. and THÉLIN, P., 2001b. Low-grade metamorphism of the Gets nappe (Western Alps). *Schweizerische Mineralogische und Petrographische Mitteilungen*, 81(2): 229-237.

BLOME, C., 1984. Middle Jurassic (Callovian) radiolarians from carbonate concretions, Alaska and Oregon. *Micropaleontology*, 30(4): 343-389.

BRAGIN, N. YU., TEKIN, U. K. and ÖZÇELIK, Y. 2002. Middle Jurassic radiolarians from the Akgöl Formation, central Pontids, northern Turkey. *Neues Jahrbuch für Geologie und Paläontologie, Monatshefte* 10: 609-628.

CALKINS, G. N., 1909. *Protozoölogy*. New York: Lea & Febiger. 349 pp.

CAMPBELL, A. S., 1954. Radiolaria. In: *Treatise on Invertebrate Paleontology*. Vol. Part D, Protista 3 (Ed. by R. C. Moore), pp. 11-195. Lawrence,Kansas: Geological Society of America and University of Kansas Press.

CARAYON, V., DE WEVER, P. and RAOULT, J.-F., 1984. Etude des blocs exotiques contenus dans les séries francisciennes du Sud-Ouest de l'Oregon (U.S.A.): conséquences sur l'âge des mélanges franciscains. *Comptes Rendus de l'Académie des Sciences de Paris, Série II*, 298(16): 709-714.

CARON, C., 1972. La nappe supérieure de Préalpes, subdivisions et principaux caractères du sommet de l'édifice préalpin. *Eclogae geologicae Helvetiae*, 65(1): 47-73.

CARON, C. and WEIDMAN, M., 1967. Sur les flysch de la région des Gets (Haute-Savoie). *Eclogae geologicae Helvetiae*, 60(2): 357-398.

CARTER, E. S. and JAKOBS, G. K., 1991. New Aalenian Radiolaria from the Queen Charlotte Islands, British Columbia: implications for biostratigraphic correlation. *Geological Survey of Canada, Current Research*, Paper. 91-1A: 337-351.

CAYEUX, L., 1897. Contribution à l'étude micrographique des terrains sédimentaires. I. Etude de quelques dépôts siliceux secondaires et tertiaires du Bassin de Paris et de la Belgique. 2. Craie du Bassin de Paris. *Mémoires de la Société Géologique du Nord*. 1.Ille, 4(2): 1-581.

CHIARI, M., 1994. Radiolarian assemblage from ophiolite sequence of Northern Apennines: 2-Sasso di Castro Serrucha. *Ofioliti* 19(2b): 377-395.

CHIARI, M., CORTESE, G., MARCUCCI, M. and NOZZOLI, N., 1997. Radiolarian biostratigraphy in the sedimentary cover of the ophiolites of South-Western Tuscany, Central Italy. *Eclogae geologicae Helvetiae*, 90(1): 55-77.

CHIARI, M., MARCUCCI, M. and PRELA, M., 1994. Mirdita ophiolites Project: 2. Radiolarian assemblages in the cherts at Fushe Arrez and Shebaj (Mirdita Area, Albania). *Ofioliti* 19(2a): 313-338.

CHIARI, M., MARCUCCI, M. and PRELA, M., 2002. New species of Jurassic radiolarians in the sedimentary cover of ophiolites in the Mirdita area, Albania. In: Carter, E.S. et al., Eds., Micropaleontology of Radiolarians. Proceedings of Interrad IX. *Micropaleontology*, 48(supplement 1): 61-87.

CLÉMENT, 1986. "La Nappe de la Simmé." PhD Thesis, Université de Fribourg.

CONTI, M. and MARCUCCI, M., 1991. Radiolarian assemblage in the Monte Alpe cherts of Ponte di Legnoseno, Val Graveglia (eastern Liguria, Italy). *Eclogae geologicae Helvetiae*, 84(3): 791-817.

CORDEY, F., 1998. Radiolaires des complexes d'accrétion de la Cordillère Canadienne (Colombie-Britannique). *Geological Survey of Canada, Bulletin*, 509: 1-209.

CORTESE, G., 1993. Radiolarian biostratigraphy of the Tuscan Cherts (Tuscan Succession) from Val di Limn, Tuscany, Northern Apennines). *Paleopelagos*, 3: 165-185.

DANELIAN, T. 1989. "Radiolaires jurassiques de la zone Ionienne (Epire, Grèce). Paléontologie-Stratigraphie implications paléogéographiques." Ph.D. Thesis, Université Pierre et Marie Curie, 89-25: 1-269.

DANELIAN, T., ROBERTSON, A. H. F. and DUMITRIADES, S., 1996. Age and significance of radiolarian sediments within basic extrusive of the marginal basin Guevgueli Ophiolite (northern Greece). *Geological Magazine* 133(2): 127-136.

DE WEVER, P., 1981. Une nouvelle sous-famille, les Poulpinae, et quatre nouvelles espèces de *Solenotus* radiolaires mésozoïques téthysiens. *Géobios* 14(1): 5-15.

DE WEVER, P., and BAUMGARTNER, P. O., 1993. Radiolarians from the base of the supra-ophiolitic Schistes Lustrés Formation in the Alps (Saint-Véran, France and Traversiero Massif, Italy). *Mémoires de Géologie* (Lausanne), 23: 725-730.

DE WEVER, P., BAUMGARTNER, P. O. and POLINO, R., 1987. Précision sur les datations de la base des Schistes Lustrés postophiolitiques dans les Alpes Cottiennes. *Comptes Rendus de l'Académie des Sciences de Paris*. Série II, 305: 487-491.

DE WEVER, P. and CABY, R., 1981. Datation de la base des schistes lustrés postophiolitiques par des radiolaires (Oxfordien supérieur-Kimmeridgien inférieur) dans les Alpes Cottiennes (Saint-Véran, France). *Comptes Rendus de l'Académie des Sciences de Paris*, Série II, 292: 467-472.

DE WEVER, P. and CORDEY, F., 1986. Datation par les Radiolaires de la Formation des Radiolarites s.s. de la Série du Pinde-Olonos (Grèce): Bajocien (?)-Tithonique. *Marine Micropaleontology* 11: 113-127.

DE WEVER, P. and DANELIAN, T., 1995. Supra-ophiolitic radiolarites from Alpine Corsica (France). *Mémoires de Géologie* (Lausanne), 23: 731-735.

DE WEVER, P. and DANELIAN, T. Durand-Delga, M., Cordey, F. and KITO, N., 1987b. Datations des radiolarites post-ophiolitiques de Corse alpine à l'aide des Radiolaires. *Comptes Rendus de l'Académie des Sciences de Paris*, Série II, 305: 893-900

DE WEVER, P., DUMITRICA, P., CAULET, J. P., NIGRINI, C. and CARIDROIT, M., 2001. *Radiolarians in the Sedimentary Record*. Amsterdam: Gordon and Breach Science Publishers. 533 pp.

DE WEVER, P., GEYSSANT, J. R., AZÉMA, J., DEVOS, L., DUÉE, G., MANIVIT, H. and VRIELYNCK, B., 1986. La coupe de Santa Anna (zone de Sciacca, Sicile): Une synthèse biostratigraphique des apports des inocer-, micro- et nannofossiles du Jurassique supérieur et Crétacé inférieur. *Revue de Micropaléontologie*, 29(3): 141-186

DE WEVER, P. and MICONNET, P. 1985. Datations directes des radiolarites du bassin de Lagonero (Lucanie, Italie méridionale). Implications et conséquences. *Revista española de Micropaleontología* 17(2): 373-402.

DEFLANDRE, G. 1953. Radiolaires fossiles. In: Grassé, P. P., (Ed.), *Traité de Zoologie*, Vol. 1, pp. 389-436. Paris: Masson.

DUMITRICA, P., 1970. Cryptocephalic and cryptothoracic Nassellaria in some Mesozoic deposits of Romania. *Revue roumaine de Géologie, Géophysique et Géographie* (série Géologie) 14(1): 45-124.

———, 1989. Internal skeletal structures of the superfamily Pyloniacea (Radiolaria), a basis of a new systematics. *Revista española de Micropaleontología*, 21(2): 207-264

———, 1995. Systematic framework of Jurassic and Cretaceous Radiolaria. *Mémoires de Géologie* (Lausanne), 23: 19-35

———, 1997. On the status of the Lower Cretaceous Radiolarian species *Alievium helenae* Schaaf and of other related species. *Revue de Micropaléontologie*, 40(3): 211-223

DUMITRICA, P. and DUMITRICA-JUD, R., 2005. *Hexasaturnalis subbaloghi* nov. sp., a Jurassic saturnalid radiolarian species frequently confounded with *Hexasaturnalis suboblongus* (Yao). *Revue de Micropaléontologie*, 2005. 48: (doi:10.1016/j.revmic.2005.03.001).

DUMITRICA, P., IMMENHAUSER, A. and DUMITRICA-JUD, R. 1997. Mesozoic Radiolarian Biostratigraphy from Masirah Ophiolite, Sultanate of Oman Part I: Middle Triassic, Uppermost Jurassic and Lower Cretaceous Spumellarians and Multisegmented Nassellarians. *Bulletin of the national Museum of natural Science, Taiwan*, 9: 1-106.

DUMITRICA, P., KOZUR, H. and MOSTLER, H., 1980. Contribution to the radiolarian fauna of the Middle Triassic of the Southern Alps. *Geologisch - Paläontologische Mitteilungen Innsbruck* 10(7): 1-46.

DUMITRICA, P. and MELLO, J., 1982. On the age of the Meliata Group and the Silica Nappe radiolarites (localities Drahovce and Bohunovo, Slovak Karst, ČSSR). *Geologické práce, Zprávy*, 77: 17-28.

EHRENBERG, C. G., 1838. Über die Bildung der Kreidefelsen und des Kreidemergels durch unsichtbare Organismen. *Abhandlungen der königliche preussischen Akademie der Wissenschaften zu Berlin* 59-147.

———, 1847. Über eine halberdthische, von Herrn R. Schomburgk entdeckte, vorherrschend aus mikroskopischen Polycystinen gebildete, Gebirgsmasse von Barbados. *Bericht der königlicher preussischen Akademie der Wissenschaften zu Berlin*: 382-385.

———, 1875. Fortsetzung der mikrogeologischen Studien als Gesamt-Uebersichtder mikroskopischen Paläontologie gleichzeitig analysirter Gebirgsarten der Erde, mit specieller Rucksicht auf den Polycystinen-Mergel von Barbados. *Abhandlungen der königliche preussischen Akademie der Wissenschaften zu Berlin*, 1-225.

EL KADIRI, K., 1984. "Les radiolarites Jurassiques des klippes de Chrafate (Rif Septentrional-Maroc): Stratigraphie, Taxonomie." Dissertation, Université de Pau 168: 1-459

———, 1992. Description de nouvelles espèces de radiolaires jurassiques de la Dorsale calcaire externe (Rif, Maroc). *Revista española de Paleontología. Núm. Extra.*, 37-48.

EMPSON-MORIN, K., 1982. Reexamination of the late Cretaceous radiolarian genus Amphipyndax Foreman. *Journal of Paleontology*, 56(2): 507-519

FISCHLI, H., 1916. Beitrage zur Kenntnis der fossilen Radiolarien in der Rigirnagelfluh. *Mitteilungen der Naturwissenschaftlichen Gesellschaft in Winterthur*, Jahrgang 1915-1916 11: 44-47.

FLÜCK, W., 1973. Die Flysche der prealpinen Decken im Simmental und Saanenland. *Matériaux pour la Carte Géologique de la Suisse n.s.* 146: 1-88.

FORHMAN, H. P., 1968. Upper Maestrichtian Radiolaria of California. *Special Papers in Paleontology*, 3: 1-82.

———, 1972. Radiolaria from DSDP Leg 20. *Initial Reports of the Deep Sea Drilling Project*, 20: 249-305. Washington, DC: US Government Printing Office

———, 1975. Radiolaria from the North Pacific, Deep Sea Drilling Project, Leg 32. *Initial Reports of the Deep Sea Drilling Project*. 32: 579-676. Washington, DC: US Government Printing Office.

———, 1978. Mesozoic Radiolaria in the Atlantic Ocean off the northwest coast of Africa, Deep Sea Drilling Project, Leg 41. *Initial Reports of the Deep Sea Drilling Project*, 41: 719-761. Washington, DC: US Government Printing Office

GORICAN, S., 1987. Jurassic and Cretaceous radiolarians from the Budva zone (Montenegro, Yugoslavia). *Revue de Micropaléontologie*, 30(3): 177-196.

———, 1994. Jurassic and Cretaceous radiolarian biostratigraphy and sedimentary evolution of the Budva Zone (Dinarides, Montenegro). *Mémoires de Géologie* (Lausanne) 18: 1-120.

GORICAN, Š., ŠMUC, A. and BAUMGARTNER, P. O., 2003. Toarcian Radiolaria from Mt. Mangart (Slovenian-Italian border) and their paleoecological implications. *Marine Micropaleontology*, 49 (3): 275-301.

GÓRKA, H., 1989. Les Radiolaires du Campanien inférieur de Cracovie (Pologne). *Acta palaeontologica polonica*, 34(4): 327-354.

GRILL, J. and KOZUR, H., 1986. The first evidence of the Unuma echinatus radiolarian zone in the Rudabanya Mts. (northern Hungary). *Geologisch Paläontologische Mitteilungen Innsbruck* 13(11): 239-275.

GRUNAU, H., 1947. "Geologie von Arosa (Graubunden) mit besonderer Berucksichtigung des Radiolarit-Problems." Dissertation. University of Bern (Aschmann & Scheller A. G., Zurich) 1-109.

———, 1959. Mikrofazies und Schichtung ausgewählter jungmesozoischer, Radiolarit-führender Sedimentserien der Zentral-Alpen mit Berücksichtigung elektronmikroskopischer und chemischer Untersuchungsmethoden. In: Cuvillier J. and Schurmann H. M. E., Eds., *International sedimentary petrographical series*, Vol. 4, pp. 179. Leiden: E. J. Brill.

———, 1965. Radiolarian cherts and associated rocks in space and time. *Eclogae geologicae Helvetiae* 58: 157-208.

GUEX, J., 1991. *Biochronological Correlations*. Berlin/Heidelberg/New York: Springer-Verlag, 250 pp.

HAECKEL, E., 1860. Fernere Abbildungen und Diagnosen neuer Gattungen und Arten von lebenden Radiolarien des Mittelmeeres. *Monatsberichte der königliche preussischen Akademie der Wissenschaften zu Berlin*, 835-845.

———, 1862. *Die Radiolarien (Rhizopoda Radiaria)*. Eine monographie. Berlin: Reimer, 572 pp.

———, 1881. Entwurf eines Radiolarien-Systems auf Grund von Studien der Challenger-Radiolarien. *Jenaische Zeitschrift für Naturwissenschaft* 15: 418-472.

———, 1887. Report on the Radiolaria collected by H.M.S. Challenger during the years 1873-1876. *Report on the Scientific Results of the Voyage of the H.M.S. Challenger, Zoology* 18: clxxxviii + 1803.

HALAMIĆ, J. and GORIČAN, Š., 1995. Triassic radiolarites from Mts. Kalnik and Medvednica (Northwestern Croatia). *Geologica Croatica*, 48(2): 129-146.

HALAMIĆ, J. and GORIČAN, Š., SLOVENEC, D. and KOLAR-JURKOVŠEK, T. 1999. A Middle Jurassic Radiolarite-Clastic Succession from the Medvednica Mt. (NW Croatia). *Geologia Croatica* 52 (1): 29-57.

HATTORI, I., 1987. Jurassic radiolarian fossils from the Nanjo Massif, Fukui Prefecture, Central Japan. *Bulletin of the Fukui Municipal Museum of natural History*, 34: 29-101.

———, 1988. Radiolarian fossils from manganese nodules at the upper reach of the Tomiugawa in the Nanjo Massif, Fukui Prefecture, central Japan, and the tectonic significance of the northwestern Mino Terrane. *Bulletin of the Fukui Municipal Museum of Natural History*, 35: 55-101.

———, 1989. Jurassic radiolarians from manganese nodules at three sites in the western Nanjo Massif, Fukui Prefecture, Central Japan. *Memoirs of the Faculty of Education, Fukui University*, 2(29): 47-134.

HATTORI, I. and SAKAMOTO, N., 1989. Geology and Jurassic Radiolarians from manganese nodules of the Kanmuriyama-Kanakusadake Area in the Nanjo Massif, Fukui Prefecture, Central Japan. *Bulletin of the Fukui Municipal Museum of Natural History*, 36: 25-79.

HATTORI, I. and YOSHIMURA, M., 1982. Lithofacies distribution and radiolarian fossils in the Nanjo area in Fukui Prefecture, central Japan. *News of Osaka Micropaleontologists*, Special Volume, 5: 103-116.

———, 1983. Late Triassic to Middle Jurassic ages for greenstones within the Mesozoic Nanjo Massif of the Mino terrane, central Japan. *Memoirs of the Faculty of Education, Fukui University*, Series 2, 32: 67-80.

HORI, R., 1990. Lower Jurassic Radiolarian Zones of SW Japan. *Transactions and Proceedings of the palaeontological Society of Japan*, new Series 159: 562-586.

HORI, R., AITA, Y. and GRANT-MACKIE, J. A., 1996. Preliminary report on Lower Jurassic radiolaria of Gondwana origin from the Kawhia coast, New Zealand. *The Island Arc*, 5: 104-113.

HORI, R. and YAO, A., 1988. *Parahsuum* (Radiolaria) from the Lower Jurassic of the Inuyama area, central Japan. *Journal of Geosciences, Osaka City University*, 31: 47-61.

HORI, N., 1998. Latest Jurassic radiolarians from the Odaira area in the Torinoko Block, Yamizo Mountains, and its paleobiogeographic significance - a consideration on the spatio-temporal distribution of the Volt. *Journal of the Geological Society of Japan* 104: 223-242.

———, 1999. Latest Jurassic radiolarians from the northeastern part of the Torinoko Block, Yamizo Mountains, central Japan. *Science Reports of the Institute of Geoscience, University of Tsukuba, Section B: Geological Sciences*, 20: 47-114.

———, 2001. Triassic and Jurassic radiolarians from the chert-clastic sequence of the Takatori Unit in the Torinoko Block, Yamizo Mountains. *News of Osaka Micropaleontologists*, special Volume 12: 159-180.

HULL, D. M., 1997. Upper Jurassic tethyan and southern boreal radiolarians from western North America. *Micropaleontology*, 43(2): 1-202.

ICHIKAWA, K. and YAO, A. 1976. Two new genera of Mesozoic cyrtoid radiolarians from Japan. In: Takayanagi, Y. and Saito, T., Eds., *Progress in Micropaleontology*, Special Publication, pp. 110-117. New York: Micropaleontology Press.

IMAZATO, A. and OTOH, S. 1993. Jurassic radiolarians from the Nyukawa area, northernmost part of the Mino Belt. *News of Osaka Micropaleontologists*, special Volume, 9: 131-141.

IMOTO, N., TAMAKI, A., TANABE, T. and ISHIGA, H., 1982. An age determination on the basis of radiolarian biostratigraphy of a bedded manganese deposit at the Yumiyama Mine in the Tamba District, southwest Japan. *News of Osaka Micropaleontologists*, special Volume, 5: 227-235.

ISHIDA, K., 1983. Stratigraphy and radiolarian assemblages of the Triassic and Jurassic siliceous sedimentary rocks in Konose Valley, Tokushima Prefecture, Southwest Japan. *Journal of Science, University of Tokushima* 16: 111-141.

———, 1985. Radiolarian and conodont ages of the sedimentary bodies and their spatial arrangements in the South Zone of the Chichibu Belt in Tokushima Prefecture - Studies of the South Zone of the Chichibu Belt in Shikoku, Part 5. *Journal of Science, University of Tokushima* 18: 27-81.

———, 1986. Discovery of Jurassic radiolarians from the "Sambosan Group" at Hitsuenu, Kochi City, Shikoku and its significance. *Journal of the geological Society of Japan*, 92(2): 159-161.

———, 1997. *Stylocapsa* (?) *spiralis* Assemblage (Radiolaria) from the Kuriganko Formation of the Torinosu Group in East Shikoku, SW Japan. *News of Osaka Micropaleontologists*, special Volume 10: 195-203.

———, 1999. Radiolarians as tracers for provenance of gravels in Lower Cretaceous molasse (Outer Zone of SW Japan). *Geodiversitas*, 21(4): 637-656.

ISHIDA, K. and HASHIMOTO, H., 1997. Mesozoic and Paleozoic radiolarians from the chert pebbles and fine clastics of the Ryoseki and Monobegawa Groups in East Shikoku. *News of Osaka Micropaleontologists*, special Volume 10: 217-235.

ISOZAKI, Y. and MATSUDA, T., 1985. Early Jurassic radiolarians from bedded chert in Kamiaso, Mino Belt, central Japan. *Earth Science Journal of the Association for the geological Collaboration in Japan*, 39(6): 429-442.

IWATA, K. and TAJIKA, J., 1989. Jurassic and Cretaceous radiolarians from the pre-Tertiary system in the Hidaka Belt, Maruseppu region, Northeast Hokkaido. *Journal of the Faculty of Science, Hokkaido University*, Series 4, Geology and Mineralogy, 22(3): 453-466.

JAFFÉ, F. C., 1955. Les ophiolites et les roches connexes de la région du Col des Gets. *Bulletin Suisse de Minéralogie et Pétrographie*, 35: 1-147.

JUD, R., 1994. Biochronology and systematics of Early Cretaceous Radiolaria of the Western Tethys. *Mémoires de Géologie (Lausanne)* 19: 1-147.

KAMATA, Y. and MIZOBE, S.-I. 2001. Co-occurrence of an Early Jurassic ammonite and Middle Jurassic radiolarians in the Kuzu Complex of the Ashio Belt, central Japan and its stratigraphic bearing. *News of Osaka Micropaleontologists*, special Volume 12: 191-201.

KAMETAKA, M., KOJIMA, S. and KEMKIN, I. V., 1997. Mesozoic radiolarians from the Taukha terrane, Far East Russia. *News of Osaka Micropaleontologists*, special Volume 10: 143-154.

KATO, Y. and IWATA, K., 1989. Radiolarian biostratigraphic study of the pre-Tertiary system around the Kamikawa Basin, central Hokkaido, Japan. *Journal of the Faculty of Science, Hokkaido University*, Series 4: Geology and Mineralogy, 22(3): 425-452.

KAWABATA, K., 1988. New species of Latest Jurassic and Earliest Cretaceous radiolarians from the Sorachi Group in Hokkaido, Japan. *Bulletin of the Osaka Museum of natural History*, 43: 1-13.

KELLICI, I., DE WEVER, P. and KODRA, A., 1994. Radiolaires mésozoïques du Massif ophiolitique de Mirdita, Albanie. Paléontologie et stratigraphie. *Revue de Micropaléontologie*, 37(3): 209-222.

KIDO, S., 1982. Occurrence of Triassic chert and Jurassic siliceous shale at Kamiaso, Gifu Prefecture, central Japan. *News of Osaka Micropaleontologists*, special Volume, 5: 135-151.

KIDO, S., KAWAGUCHI, I., ADACHI, M. and MIZUTANI, S., 1982. On the *Dictyomitrella* (?) *kamoensis-Pantanellium foveatum* assemblage in the Mino area, central Japan. *News of Osaka Micropaleontologists*, special Volume, 5: 195-210.

KIESSLING, W., 1995. New radiolarians from the earliest Cretaceous of the Sultanate of Oman (Wahrah Formation, Jebel Buwaydah). *Paläontologisches Zeitschrift*, 69(3-4): 321-342.

———, 1999. Late Jurassic Radiolarians from the Antarctic Peninsula. *Micropaleontology* special issue, 45(S1): 1-96.

KIESSLING, W. and ZEISS, A. 1992. New palaeontological data from the Hochstegen Marble (Tauern window, eastern Alps). *Geologisch Paläontologische Mitteilungen Innsbruck* 1991/92 18: 187-202.

KISHIDA, Y. and HISADA, K., 1986. Radiolarian assemblages of the Sambosan Belt in the western part of the Kanto Mountains, central Japan. *News of Osaka Micropaleontologists*, special Volume, 7: 25-34.

KISHIDA, Y. and SUGANO, K., 1982. Radiolarian zonation of Triassic and Jurassic in outer side of southwest Japan. *News of Osaka Micropaleontologists*, special Volume, 5: 271-300.

KITO, N., 1987. Stratigraphic relation between greenstones and clastic sedimentary rocks in the Kamuikotan Belt, Hokkaido, Japan. *Journal of the geological Society of Japan*, 93(1): 21-35.

———, 1989. "Radiolaires du Jurassiques Moyen et Supérieur de Sicile (Italie): Biostratigraphie et Taxonomie." Département de Géologie sédimentaire, Université Pierre et Marie Curie, Paris, 89-7: 1-239.

KITO, N. and DE WEVER, P., 1994. New species of Middle Jurassic Actinommidae (Radiolaria) from Sicily (Italy). *Revue de Micropaléontologie*, 37(2): 123-134.

KITO, N. and DE WEVER, P., DANELIAN, T. and CORDEY, F., 1990. Middle to Late Jurassic radiolarians from Sicily (Italy). *Marine Micropaleontology* 15(3-4): 329-349.

KOCHER, R. N., 1981. Biochronostratigraphische Untersuchungen oberjurassischer radiolarien führender Gesteine, insbesondere der Südalpen. *Mitteilungen aus dem geologischen Institut der Eidgenossischen Technischen Hochschule und der Universitat Zürich*, Neue Folge, 234: 1-184.

KOJIMA, S., 1982. Some Jurassic, Triassic and Permian radiolarians from the eastern part of Takayama City, central Japan. *News of Osaka Micropaleontologists*, special Volume, 5: 81-91.

———, 1989. Mesozoic terrane accretion in Northeast China, Sikhote-Alin and Japan regions. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 69: 213-232.

KOJIMA, S. and MIZUTANI, S., 1987. Triassic and Jurassic Radiolaria from the Nadanhada Range, Northeast China. *Transactions and Proceedings of the palaeontological Society of Japan*, new Series 148: 256-275.

KOZUR, H., 1980. Ruzhencevispongidae, eine neue Spumellaria Familie aus dem oberen Kungurian (Leonardian) und Sakmarian des Vorurals. *Geologisch - Paläontologische Mitteilungen Innsbruck* 10(6): 235-242.

———, 1984. New radiolarian taxa from the Triassic and Jurassic. *Geologisch Paläontologische Mitteilungen Innsbruck* 13(2): 49-88.

———, 1985. The radiolarian genus *Eoxitus* n. gen. from the Unuma echinatus Zone (Bajocian) of northern Hungary. *Proceedings of the koninklijke nederlandse Akademie van Wetenschappen, Series B: Palaeontology, Geology, Physics, Chemistry, Anthropology*, 88(2): 211-220.

———, 1991. The evolution of the Meliata-Hallstatt ocean and its significance for the early evolution of the Eastern Alps and Western

Kwanto Mountains, Japan. *News of Osaka Micropaleontologists*, special Volume, 5: 67-80.

OŽVOLDOVÁ, L. 1979. Radiolarian assemblage of radiolarian cherts of Padbiel locality (Slovakia). Časopis pro mineralogii a geologii, 24(3): 249-261.

———, 1987. Investigations of Mesozoic Radiolarians from West Carpathians, Brief review. *Miscellanea micropaleontologica*, 2(1): 191-202.

———, 1988. Radiolarian associations from radiolarites of the Kysuca succession of the Klippen Belt in the Vicinity of Myjava - Turá Lúka (West Carpathians). *Geologický Sborník* (Bratislava), 39(3): 369-392.

———, 1990. Occurrence of Albian radiolaria in the underlier of the Vienna Basin. *Geologický Sborník* (Bratislava), 41(2): 137-154.

———, 1992. The discovery of a Callovian radiolarian association in the Upper Posidonia Beds of the Pieniny succession of the Klippen Belt (Western Carpathians). *Geologica carpathica*, 43(2): 111-122.

OŽVOLDOVÁ, L. and PETERČÁKOVÁ, M. 1987. Biostratigraphic research of upper Jurassic limestones of the Čachtice Carpathians (locality Bzince pod Javorinou). *Západné karpaty, Séria Paleontológia* 12: 115-124.

———, 1992. Hauterivian radiolarian association from the Luckavska Formation, Manin Unit (Mt. Butkov, western Carpathians). *Geologica carpathica*, 43(5): 313-324.

OŽVOLDOVÁ, L. and SÝKORA, M. 1984. The radiolarian assemblage from Čachtické Karpaty Mts. limestones (the locality Sipkovaky Háj). *Geologický Sborník* (Bratislava), 35(2): 259-290.

PARONA, C. F. 1890. Sugli schisti silicei a radiolarie di Cenna presso il Monginevro. *Atti della reale Accademie delle Scienze di Torino*, 27: 305-319.

PAVŠIČ, J. and GORICAN, Š., 1987. Lower Cretaceous Nannoplankton and Radiolaria from Vrenik (western Slovenia). *Razprave IV, Razreda Sazu*, 28(2): 15-38.

PESSAGNO, E. A., 1971. Jurassic and Cretaceous Hagiastridae from the Blake-Bahama Basin (Site 5A, JOIDES Leg 1) and the Great Valley Sequence, California Coast Ranges. *Bulletins Of American Paleontology*, 60(264): 5-83.

———, 1972. Cretaceous Radiolaria, Part I: The Phaseliformidae, new family, and other Spongodiscacea from the Upper Cretaceous portion of the Great Valley Sequence, part II: Pseudoaulophacidae Riedel from the Cretaceous of California and the Blake-Bahama Basin (*JOIDES leg 1*). *Bulletins of American Paleontology*, 61(270): 269-328.

———, 1973. Upper Cretaceous Spumellarians from the Great Valley Sequence, California Coast Ranges. *Bulletins of American Paleontology*, 63(276): 49-102.

———, 1976. Radiolarian zonation and stratigraphy of the Upper Cretaceous portion of the Great Valley Sequence, California Coast Ranges. *Micropaleontology* special Publication, 2: 1-95.

———, 1977a. Upper Jurassic Radiolaria and radiolarian biostratigraphy of the California Coast Ranges. *Micropaleontology*, 23(1): 56-113.

———, 1977b. Lower Cretaceous radiolarian biostratigraphy of the Great Valley Sequence and Franciscan Complex, California Coast Ranges. *Contribution Cushman Foundation for foraminiferal Research*, special Publication 15: 1-87.

PESSAGNO, E. A., FINCIL, W. and ABBOTT, P. L., 1979. Upper Triassic Radiolaria from the San Hipolito Formation, Baja California. *Micropaleontology*, 25(2): 160-197.

PESSAGNO, E. A. and BLOME, C., 1980. Upper Triassic and Jurassic Pantanelliinae from California, Oregon and British Columbia. *Micropaleontology*, 26(3): 225-273.

PESSAGNO, E. A., BLOME, C., HULL, D. M. and SIX, W. M., 1993. Jurassic Radiolaria from the Josephine ophiolite and overlying strata, Smith River subterrane (Klamath Mountains), northwestern California and southwestern Oregon. *Micropaleontology*, 39(2): 93-166.

PESSAGNO, E. A., BLOME, C. and LONGORIA, J., 1984. A revised radiolarian zonation from Upper Jurassic of western North America. *Bulletins of American Paleontology*, 87(320): 1-51.

PESSAGNO, E. A., SIX, W. M. and YANG, Q., 1989. The Xiphostylidian Hueckel and Parvivaccidae, n. fam., (Radiolaria) from the North American Jurassic. *Micropaleontology*, 35(3): 193-255.

PESSAGNO, E. A. and WHALEN, P., 1982. Lower and Middle Jurassic Radiolaria (multicyrtid Nassellarina) from California, east-central Oregon and the Queen Charlotte Islands, B. C. *Micropaleontology*, 28(2): 111-169.

PESSAGNO, E. A. and WHALEN, P., and YEH, K. Y., 1986. Jurassic Nassellarina (Radiolaria) from North American geologic terranes. *Bulletins of american Paleontology*, 9(326): 1-75.

PETERČÁKOVÁ, M., 1990. Radiolarian from cherts of the Kalisco limestone formation of the Manin unit (Butkov, West Carpathians). *Geologický Sborník* (Bratislava), 41(2): 155-169.

PRELA, M., CHIARI, M. and MARCUCCI, M., 2000. Jurassic radiolarian biostratigraphy of the sedimentary cover of ophiolites in the mirdita area, albania: new data. *Ofioliti*, 25(1): 55-62.

RENZ, G. W., 1974. Radiolaria from Leg 27 of the Deep Sea Drilling Project. *Initial Reports of the Deep Sea Drilling Project*, 27: 769-841. Washington, DC: US Government Printing Office.

RIEDEL, W. R., 1967. Some new families of Radiolaria. *Proceedings of the geological Society of London* 1640: 148-149.

RIEDEL, W. R. and SANFILIPPO, A., 1974. Radiolaria from the southern Indian Ocean, DSDP Leg 26. *Initial Reports of the Deep Sea Drilling Project*, 26: 771-814. Washington, DC: US Government Printing Office.

RÜST, D., 1885. Beiträge zur Kenntniss der fossilen Radiolarien aus Gesteinen des Jura. *Palaeontographica*, 31: 269-321.

———, 1898. Neue Beiträge zur Kenntniss der Fossilen Radiolarien aus Gesteinen des Jura und der Kreide. *Palaeontographica*, 45: 1-67.

SAKA, Y., 1983. Preliminary note on the Jurassic strata in the Chichibu terrane, western Shima Peninsula, southwest Japan. *Gakuyutsu Kenkyu, School of Education, Waseda University*, 32: 29-34.

SANFILIPPO, A. and RIEDEL, W. R., 1985. Cretaceous Radiolaria. In: Bolli, H. M., Saunders, J. B. and Perch-Nielsen, K., Eds., *Plankton Stratigraphy*, pp. 573-630. Cambridge/ New York: Cambridge University Press.

SANO, H., YAMAGATA, T. and HORIBO, K. 1992. Tectonostratigraphy of Mino terrane; Jurassic accretionary complex of southwest Japan. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 96: 41-57.

SASHIDA, K., 1988. Lower Jurassic multisegmented Nassellaria from the Itsukuichi area, western part of Tokyo Prefecture, central Japan. *Science Reports of the Institute of Geoscience, University of Tsukuba*, Section B: Geological Sciences, 9: 1-27.

SASHIDA, K., IGO, H. and SATO, T., 1993. Late Jurassic radiolarians from the Yamizo Mountains. *Annual Report of the Institute of Geoscience, the University of Tsukuba* 19: 33-42.

SASHIDA, K., IGO, H., IGO, H., TAKIZAWA, S., HISADA, K., SHIBATA, T., TSUKADA, K. and NISHIMURA, H., 1982. On the Jurassic radiolarian assemblages in the Kanto district. *News of Osaka Micropaleontologists*, special Volume, 5: 51-66.

SASHIDA, K. MUNASRI, ADACHI, S. and KAMATA, Y., 1999. Middle Jurassic radiolarian fauna from Rote Island, Indonesia. *Journal of Asian Earth Sciences* 17(4): 561-572.

SASHIDA, K. and UEMATSU, H., 1995. Late Jurassic radiolarians from the Torinosu-type limestone embedded in the Early Cretaceous Hinodani Formation of the northern Shimanto Terrane, Shikoku, Japan. *Science Reports of the Institute of Geoscience, University of Tsukuba*, Section B: Geological Sciences 17: 39-69.

SATO, T., NISHIZONO, Y. and MURATA, M., 1982. Paleozoic and Mesozoic radiolarian faunas from the Shaksunasan Formation. *News of Osaka Micropaleontologists*, special Volume, 5: 301-310.

SATO, T., MURATA, M. and YOSHIDA, H., 1986. Triassic to Jurassic radiolarian biostratigraphy in the southern part of Chichibu terrain of Kyushu, Japan. *News of Osaka Micropaleontologists*, special Volume, 7: 9-23.

SAVARY, J. and GUEX, J., 1999. Discrete Biochorological Scales and Unitary Associations: Description of the BioGraph Computer Program. *Mémoires de Géologie* (Lausanne) 34: 1-281.

SCHAAP, A., 1981. Late Early Cretaceous Radiolaria from Deep Sea Drilling Project Leg 62. *Initial Reports of the Deep Sea Drilling Project*, 62: 419-470. Washington, DC: US Government Printing Office.

———, 1984. Les radiolaires du Crétacé inférieur et moyen: Isologie et systématique. *Science géologiques (Strasbourg) Mémoire*, 75: 1-189.

SQUINABOL, S., 1904. Radiolarie cretacee degli Euganei. *Atti e Memorie della reale Accademia di Scienze, Lettere ed Arti in Padova*, nuova serie, 20: 171-244.

———, 1912. Radiolari della strada nazionale al Monginevro. *Bollettino del reale Comitato geologico d'Italia*, 43(2-3): 281-289.

———, 1914. Contributo alla conoscenza dei Radiolarii fossili del Veneto. Appendice - Di un genere di Radiolari caratteristico del Secondario. *Memorie dell'Istituto geologico della reale Università di Padova*, 2: 249-306.

STEIGER, T., 1992. Systematik, stratigraphie und Paläökologie der Radiolarien des Oberjura-Unterkreiden-Grenzbereiches im Osterhorn-Tirolikum (Nördliche Kalkalpen, Salzburg und Bayern. *Zitteliana* 19: 3-188.

SUNOUCHI, H., SUGANO, K. and OGAWA, Y., 1982. Occurrence of Jurassic radiolarian from siliceous claystone in the northern belt of the Chichibu terrane, north of Ino town, Kochi prefecture and its significance. *Journal of the Geological Society of Japan*, 88(12): 975-978.

SUZUKI, H. and NAKAE, S., 1997. Lithostratigraphy and geologic age of the Furuya Formation of the Tamba Belt: Latest Jurassic radiolarians from Kutsuki, Shiga Prefecture, Southwest Japan. *News of Osaka Micropaleontologists*, special Volume 10: 205-210.

SÝKORA, M. and OŽVOLDOVÁ, L., 1996. Lithoclast of Middle Jurassic radiolarians in debris flow sediments from Silica Nappe (locality Bleškavy Pramen, Slovak Karst). *Mineralia Slovaca* 28(1): 21-25.

TAKAHASHI, O. and ISHII, A., 1995. Radiolarian Assemblage-zones in the Jurassic and Cretaceous Sequence in the Kanto Mountains, Central Japan. *Memoirs of the Faculty of Science, Kyushu University, Series D, Earth and planetary Science*, 24(1): 49-85.

TAKASHIMA, K. and KOIKE, T., 1984. Stratigraphy and geological structure of the Mesozoic strata in the Gozenyama-Itsukaichi area, southeastern part of the Kanto mountains. *Science Report, Yokohama National University*, sect. II, 31: 29-50.

TAKEMURA, A., 1986. Classification of Jurassic Nassellarians (Radiolaria). *Palaeontographica*, Abteilung A: Palaeozoologie-Stratigraphie 195(1-3): 29-74.

TAKEMURA, A. and NAKASEKO, K. 1982. Two new Jurassic genera of family Paleoscenidiidae (Radiolaria). *Transactions and Proceedings of the palaeontological Society of Japan*, new Series 128: 452-464.

TAKEMURA, A. and NAKASEKO, K., 1986. The cephalic skeletal structure of Jurassic "*Eucyrtidium*" (Radiolaria). *Journal of Paleontology*, 60(5): 1016-1024.

TAKETANI, Y. and KANIE, Y., 1992. Radiolarian age of the Lower Yezo Group and the upper part of the Sorachi Group in Hokkaido. In: Ishizaki K. and Saito, T., Eds., *Centenary of Japanese Micropaleontology*, pp. 365-373. Tokyo: Terra Scientific Publishing Company.

TAN, S. H., 1927. Over de samenstelling en het ontstaan van krijt- en mergel-gesteenten van de Molukken. In: *Jaarboek van het mijnwezen in Nederlandsch Oost-Indie, jaargang* 55 1926, verhandelingen, 3rd gedeelte, pp. 5-165.

TANAKA, H., FUJITA, H., MIYAMOTO, T. and HASE, A., 1985. Discovery of late Jurassic radiolarian fossils from the Shinkai Formation developed to the south of Mt. Hinidate, Oita Prefecture, Kyushu. *Journal of the geological Society of Japan*, 91(8): 569-571.

TUMANDA, F., 1989. Cretaceous radiolarian biostratigraphy in the Esashi Mountain area, Northern Hokkaido, Japan. *Science Reports of the Institute of Geoscience, University of Tsukuba*, Section B: Geological Sciences 10: 1-44.

TUMANDA, F., SASHIDA, K. and IGO, H., 1996. Some Jurassic radiolarians from Busuanga Island, Calamian Island Group, Palawan, Philippines. In: Noda, H. and Sashida, K., Ed., *Professor Hisayoshi Igo, Commemorative volume on Geology and Paleontology of Japan and Southeast Asia*., pp. 163-192. Tokyo: Gakujyutsu Tosho Insatsu Co.

WAKITA, K., 1982. Jurassic radiolarians from Kuzuryu-ko- Gujo-hachiman area. *News of Osaka Micropaleontologists*, special Volume, 5: 153-171.

———, 1988. Early Cretaceous melange in the Hida-Kanayama area, central Japan. *Bulletin of the geological Survey of Japan*, 39(6): 367-421.

WAKITA, K. KOJIMA, S., OKAMURA, Y., NATAL'IN, B. and ZYABREV, S. V. 1992. Triassic and Jurassic Radiolaria from the Khabarovsk complex, eastern Russia. *News of Osaka Micropaleontologists*, special Volume, 8: 9-19.

WAKITA, K. and OKAMURA, Y., 1982. Mesozoic sedimentary rocks containing allochthonous blocks, Gujo-hachiman, Gifu Prefecture, central Japan. *Bulletin of the geological Survey of Japan*, 33(4): 161-185.

WIDZ, D., 1991. Les Radiolaires du Jurassique supérieur des radiolarites de la zone des Klippes de Pieniny (Carpathes occidentales, Pologne). *Revue de Micropaléontologie*, 34(3): 231-260.

WIDZ, D. and DE WEVER, P., 1993. Nouveaux Nassellaires (Radiolaria) des radiolarites Jurassiques de la coupe de Szeligowy Potok (Zones de Klippes de Pieniny, Carpathes Occidentales, Pologne). *Revue de Micropaléontologie*, 36(1): 77-91.

WISNIOWSKI, T., 1889. Beitrag zur Kenntniss der Mikrofauna aus den oberjurassischen Feuersteinknollen der Umgegend von Krakau. *Jahrbuch der Kaiserlich-Königlichen geologischen Reichsanstalt*, (1888), 38(4): 657-702.

WU, H., 1993. Upper Jurassic and Lower Cretaceous radiolarians of Xialu chert, Yarlung Zangbo ophiolite belt, southern Tibet. *Micropaleontology*, Special Publication, 6: 115-136.

YAMAGATA, T. 1989. Mesozoic chertic formations of Mino Terrane, northwestern Mino Mountains, central Japan. *Journal of the geological Society of Japan*, 95(6): 447-461.

———, 1995. Occurrence of Jurassic radiolarians from mudstone of the Ryuzenyan formation, Suzuka Mountains, central Japan, *News of Osaka Micropaleontologists*, Special Volume, 9: 143-149.

YAMAMOTO, H., 1983. Occurrence of late Jurassic radiolarians of the *Mirifusus baileyi* assemblage from Neo village, Gifu prefecture, central Japan. *Journal of the geological Society of Japan*, 89: 595-596.

YAMAMOTO, H., MIZUTANI, S. and KAGAMI, H., 1985. Middle Jurassic radiolarians from Blake Bahama Basin, West Atlantic Ocean. *Bulletin of the Nagoya University, Furukawa Museum* 1: 25-49.

YANG, Q., 1993. Taxonomic Studies of Upper Jurassic (Tithonian) Radiolaria from the Taman Formation, east-central Mexico. *Palaeoworld*, 3: 1-164.

YANG, Q. and MATSUOKA, A., 1997. A comparative study on Upper Jurassic radiolarian biostratigraphy of the Taman Formation, east-central Mexico and the ODP Site 801B Section, west Pacific. *Science Reports of the Niigata University*, Series E: Geology and Mineralogy 12: 29-49.

YANG, Q. and WANG, Y. J., 1990. A taxonomic study of Upper Jurassic radiolarian from Rutog county, Xizang (Tibet). *Acta Micropalaeontologica Sinica*, 7(3): 195-218.

YAO, A., 1972. Radiolarian fauna from the Mino Belt in the northern part of the Inuyama Area, Central Japan, Part I: Spongosaturnalids. *Journal of Geosciences, Osaka City University* 15: 21-65.

———, 1979. Radiolarian fauna from the Mino Belt in the northern part of the Inuyama Area, Central Japan, Part II: Nassellaria 1. *Journal of Geosciences, Osaka City University*, 22: 21-72.

———, 1982. Middle Triassic to Early Jurassic radiolarians from the Inuyama area, central Japan. *Journal of Geosciences, Osaka City University*, 25: 53-70.

———, 1983. Late Paleozoic and Mesozoic radiolarians from southwest Japan. In: Iijima, A., Hein, J. R. and Siever, R., Ed., *Siliceous Deposits in the Pacific Region*, Vol. 36 pp. 361-375. Amsterdam: Elsevier.

———, 1984. Subdivision of the Mesozoic complex in Kii-Yura area, southwest Japan and its bearing on the Mesozoic basin development in the southern Chichibu terrane. *Journal of Geosciences, Osaka City University*, 27: 41-103.

———, 1991. Occurrence of Paleozoic radiolarians from eastern inner Mongolia. In: Ishii, K., Liu, X., Ichikawa, K. and Huang, B., Eds., *Pre-Jurassic Geology of Inner Mongolia, China* pp. 175-187. Report of China-Japan Cooperative Research Group.

———, 1997. Faunal change of Early-Middle Jurassic radiolarians. *News of Osaka Micropaleontologists*, special Volume 10: 155-182.

YAO, A., MATSUDA, T. and ISOZAKI, Y., 1980. Triassic and Jurassic radiolarians from the Inuyama area, central Japan. *Journal of Geosciences, Osaka City University*, 23: 135-154.

YAO, A., MATSUOKA, A. and NAKATANI, T., 1982. Triassic and Jurassic radiolarian assemblages in southwest Japan. *News of Osaka Micropaleontologists*, special Volume, 5: 27-43.

YASUDA, M., 1989. Equivalents to the Torinosu Group of the Chichibu Belt in the southeastern part of the Kanto Mountains, central Japan; lithology and radiolarian biostratigraphy. *Journal of the Geological Society of Japan*, 95(6): 463-478.

YEH, K., 1987. Taxonomic studies of lower Jurassic Radiolaria from east-central Oregon. *National Museum of Natural Science, Special Publication*, 2: 1-169.

YOKOTA, S. and SANO, H., 1986. Radiolarian fossils from the Middle Jurassic Ammonites-bearing formation of Bisho, Yatsushiro district, Kumamoto Prefecture. *News of Osaka Micropaleontologists*, special Volume, 7: 53-58.

ZAMORAS, L. R. and MATSUOKA, A., 2000. Early Late Jurassic radiolarians from the clastic unit in Busuanga Island, North Palawan, Philippines. *Science Reports of the Niigata University*, Series E: Geology and Mineralogy 15: 91-109.

Manuscript received December 15, 2004
Manuscript accepted April 25, 2005

APPENDIX 1:
List of species with indication of species occurrences (slashing means occurrence without illustration), Mesozoic Radiolarian Database number (MRDn of Baumgartner et al. 1995); stratigraphic range according to UAZones Baumgartner et al. 1995b and M-u's (Matsuoka's Unitary Associations calculated in Savary and Guex 1999).

Pl.	Fig.	Genera and species	Samples		MRDn	UAz	M-u's
11	21	*Acaeniotylopsis variatus* (Ozvoldova)		VS4	[illegible]	3-8	
11	20	*Acanthocircus* (?) sp. cf. *A.* [illegible] Kiessling	VS3				
11	33-35	*Alievium longispineum* Yang and Wang	VS3	VS4			
12	30	*Angulobracchia* sp.	VS3				
11	36	*Angulobracchia* sp. cf. *A. purisimaensis* (Pessagno)	VS3				
10	34	*Arcanicapsa leiostraca* (Foreman)	VS3		3062	4-20	
10	33, 35	*Arcanicapsa* sp. 1	VS3				
1	15-19	*Archaeodictyomitra cellulata* O'Dogherty, Goričan and Dumitrica n. sp.		VS4			
1	15-17	*Archaeodictyomitra patricki* Kocher	VS3	VS4			
1	14	*Archaeodictyomitra primigena* Pessagno and Whalen	VS3				
1	4-5	*Archaeodictyomitra prisca* Kozur and Mostler	VS3				
1	10-13	*Archaeodictyomitra rigida* Pessagno	VS3	VS4			
1	8-9	*Archaeodictyomitra whalenae* Kozur and Mostler		VS4			
1	20	*Archaeodictyomitra* sp. 1		VS4			
1	6-7	*Archaeodictyomitra* sp. 2	VS3				
12	23	*Archaeohagiastrum longipes* Baumgartner in Baumgartner et al.		VS4	3149	3-7	2-6
11	24-25	*Archaeospongoprunum elegans* Wu	VS3				
11	26-27	*Archaeospongoprunum imlayi* Pessagno	VS3				
11	23	*Archaeospongoprunum* [illegible] Pessagno, Blome and Hull in Pessagno et al.	VS3				
5	38-39	*Archicapsa* (?) sp. 1	VS3	VS4			
11	39	*Bernoullius* (?) sp.		VS4			
12	6	*Bernoullius* (?) sp. 1	VS3				
11	28	*Bernoullius dicera* (Baumgartner) in Baumgartner et al.	VS3	VS4	3223	3-10	
12	4-5	*Bistarkum* sp. 1	VS3	VS4			
3	8-9	*Cinguloturris carpatica* Dumitrica	VS3		4197	7-11	24-30
3	10-12	*Cinguloturris getsensis* O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
4	26	*Crolanium* (?) *pulchrum* Hull	VS3				
4	25	*Crolanium* (?) sp. 1	VS3				
12	16	*Crucella theokaftensis* Baumgartner	VS3		3131	7-11	
3	15	*Dictyomitrella* (?) *kamoensis* Mizutani and Kido	VS3	VS4	4011	3-7	12-25
3	13	*Dictyomitrella* (?) sp. 1		VS4			
3	14	*Dictyomitrella* (?) sp. 2	VS3				
3	16	*Dictyomitrella* (?) sp. 3		VS4			
12	7	*Emiluvia* [illegible] Pessagno, Blome and Hull, in Pessagno et al.	VS3				
12	8-11	*Emiluvia orea* Baumgartner in Baumgartner et al.	VS3	VS4	3212	6-11	
12	12	*Emiluvia premyogii* Baumgartner		VS4	3210	3-10	8-9
12	13-15	*Emiluvia sedanensis* Pessagno	VS3	VS4	3215	4-13	
6	3-5	*Eucyrtidiellum* (?) *circumperforatum* Chiari, Marcucci and Prela	VS3	VS4			
5	26	*Eucyrtidiellum gujoense* (Takemura and Nakaseko)	VS3				
5	3	*Eucyrtidiellum nodosum* Wakita	VS3		3014	3-10	16-22
3	1-2	*Eucyrtidiellum ptyctum* (Riedel and Sanfilippo)	VS3	VS4	3017	5-11	14-29
3	4-6	*Eucyrtidiellum unumaense* (Yao)	VS3	VS4	3012	3-8	
11	51	*Gorgansium* [illegible] Pessagno and Blome		VS4			
7	39-41	*Guexella* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
7	45-46	*Guexella* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
7	42-44	*Guexella nudata* (Kocher 1981)	VS3	VS4	[illegible]	5-8	12-19
8	1-4	*Helvetocapsa* (?) [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
8	5-8	*Helvetocapsa* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
7	19-24	*Helvetocapsa matsuokai* (Sashida)	VS3	VS4			
12	51	*Hexasaturnalis nakasekoi* Dumitrica and Dumitrica-Jud in press	VS3				
6	28	*Hiscocapsa minor* (Chiari, Marcucci and Prela)	VS3				
6	13-15	*Hiscocapsa* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3	VS4			
6	24-25	*Hiscocapsa* sp. 1	VS3				
6	26-27	*Hiscocapsa* sp. 2	VS3				
6	30	*Hiscocapsa* sp. 3	VS3				
10	36-39	*Holocryptocanium* (?) sp. 1	VS3				
2	28	*Hsuum* sp.	VS3				
2	29	*Hsuum* [illegible] Yang and Wang	VS3				
2	30-32	*Hsuum* sp. 1	VS3				
1	24	*Hsuum* (?) sp. 2	VS3				

APPENDIX 1
continued.

3	21-22	*Hsuum* (?) [illegible] Aita	VS3	VS4	3235/37	4-7	22-12
8	25-29	*Kilinora* (?) *oblongula* (Kocher)	VS3	VS4	3058	6-8	17-18
8	24	*Kilinora tecta* (Matsuoka)	VS3		4047	5-6	10-19
8	15-23	*Kilinora spiralis* gr. (Matsuoka)	VS3	VS4	3046	6-7	19-22
11	32	*Loopus* [illegible] Pessagno and Yang in Pessagno et al. 1989	VS3				
1	21	*Mictyoditra decora* (Rüst)	VS3		3269	4-7	
6	22-23	*Mictyoditra* [illegible] (Yang and Wang)	VS3				
6	34	*Minocapsa* (?) sp. 1	VS3				
6	16-17	*Minocapsa* (?) *pendula* Hull	VS3				
3	19	*Mirifusus chenodes* (Renz)		VS4	3162	0-22	
3	18	*Mirifusus guadalupensis* Pessagno	VS3		3160	5-11	26-36
12	27	*Monotrabs* [illegible] (Baumgartner) in Baumgartner et al.	VS3		3150	3-2	
12	24-25	*Monotrabs plenoides* gr. Baumgartner	VS3		3152	5-8	
11	1-2	*Napora bukryi* Pessagno	VS3		3035/55	7-13	
11	3	*Napora* [illegible] (Blome)	VS3				
12	1-3	*Orbiculiformella* sp. X sensu Baumgartner et al.	VS3	VS4	3019	1-6	
11	17-19	*Pantanellium* (?) sp. 1	VS3				
11	15-16	*Pantanellium* [illegible] Pessagno and Blome	VS3	VS4			
11	9-14	*Pantanellium riedeli* Pessagno	VS3	VS4	3078	7-12	
2	6-13	*Parahsuum carpathicum* Widz and De Wever	VS3	VS4	3340	7-11	
2	8	*Parahsuum grande* Hori and Yao	VS3		4031	1-3	
2	4	*Parahsuum officerense* (Pessagno and Whalen)	VS3				
1	37	*Parahsuum levicostatum* Takemura	VS3				
1	34	*Parahsuum* [illegible] (Pessagno and Whalen)	VS3				
2	2	*Parahsuum rosebudense* (Pessagno and Whalen)	VS3				
1	1-3	*Parahsuum stanleyense* (Pessagno and Whalen)	VS3				
3	3	*Parahsuum* sp. 1	VS3				
1	33, 35	*Parahsuum* (?) sp. 2	VS3	VS4			
2	5	*Parahsuum* sp. 3	VS3				
12	19	*Paronaella bronnimanni* Pessagno	VS3		3127	4-10	
12	17-18	*Paronaella kotura* Baumgartner	VS3		3140	3-10	
12	26, 28-29	*Paronaella mulleri* Pessagno	VS3	VS4	3130	6-10	16-17
12	30	*Paronaella* sp. 1	VS3				
3	34	*Parvicingula* aff. [illegible] (Kozur)		VS4			
3	35	*Parvicingula schoolhousensis* Pessagno and Whalen	VS3		3184	3-3	
3	12-21	*Parvicingula* [illegible] (Grill and Kozur)	VS3	VS4			
5	25	*Parvifavus* (?) sp. 1	VS3				
7	26-28	*Plicaforacapsa elegans* (Matsuoka)	VS3	VS4	3044	6-7	16-21
7	7	*Podobursa* cf. *helvetica* (Rüst)		VS4	3169	3-10	20-21
7	3	*Podobursa rosea* Hull	VS3				
7	8	*Podobursa* sp. 1	VS3				
7	4	*Podobursa triacantha* (Fischli)		VS4			
7	9-10	[illegible] (?) sp. 1		VS4			
10	6-8	*Protunuma* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
7	14	*Protunuma lanosus* Ozvoldova	VS3				
7	11-13	*Protunuma ochiensis* Matsuoka	VS3	VS4	3298	5-14	18-22
10	3-5	*Protunuma quadriperforatus* O'Dogherty and Goričan	VS3				
7	25-27	*Protunuma* sp. 2	VS3				
5	16-17	*Pseudodictyomitrella* (?) sp. 4	VS3	VS4			
4	20-21	*Pseudodictyomitrella* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
5	10-12	*Pseudodictyomitrella* [illegible] (Cortese)	VS3				
4	22	*Pseudodictyomitrella* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
5	18	*Pseudodictyomitrella* [illegible] (Cortese)	VS3				
5	19-22	*Pseudodictyomitrella* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
4	10	*Pseudodictyomitrella* sp. 1	VS3				
5	13-15	*Pseudodictyomitrella* sp. 3	VS3				
5	23-24	*Pseudodictyomitrella* sp. 2	VS3				
5	7-9	*Pseudodictyomitrella* [illegible] (Chiari, Cortese and Marcucci)	VS3	VS4			
3	1-3	*Pseudoeucyrtis firma* Hull	VS3	VS4	3176	5-10	
4	1-2	*Pseudoristola* [illegible] (Aita)	VS3		4083	3-3	
4	16-17	*Pseudoristola* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3	VS4			
4	13-15	*Pseudoristola* [illegible] (Aita)	VS3	VS4	3025	6-7	
4	18	*Pseudoristola* sp. 1	VS3				
6	1-2	*Quarticella* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.		VS4			
5	27-29	*Quarticella* [illegible] (Chiari, Marcucci and Prela)	VS3				

APPENDIX 1
continued.

5	30	*Quarticella* sp. 1	VS3				
3	17	*Ristola minor* Baumgartner and De Wever	VS3		3330	5-7	
11	4-5	*Saitoum levium* De Wever	VS3		3024	4-9	
11	6-8	*Saitoum pagei* Pessagno	VS3		3020	4-11	
3	7	*Solenotryma* (?) *ichikawai* Matsuoka and Yao	VS3		4037	7-21	35-[illegible]
6	36	*Stichocapsa* (?) [illegible] Chiari, Marcucci and Prela	VS3				
6	35	*Stichocapsa* [illegible] Yao	VS3		3033	1-11	[illegible]-14
6	5	*Stichocapsa japonica* Yao	VS3	VS4	3108	3-5	9-14
6	21	*Stichocapsa* [illegible] (Rüst)		VS4			
6	31-34	*Stichocapsa robusta* Matsuoka	VS3	VS4	3258	3-7	12-22
6	11	*Stichomitra* (?) [illegible] (Hull)		VS4			
5	1-3	*Stichomitra* (?) [illegible] Kocher	VS3	VS4			
5	6	*Stichomitra* (?) [illegible] (Kocher)	VS3				
6	7-8	*Stichomitra* (?) [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
5	4-5	*Stichomitra* (?) [illegible] Aita	VS3				
6	12	*Stichomitra* (?) sp. 1		VS4			
10	18-20	*Striatojaponocapsa conexa* (Matsuoka)	VS3	VS4	3297	4-7	12-23
8	9-11	*Striatojaponocapsa* [illegible] (Matsuoka)	VS3	VS4	3045	6-7	22-23
8	14-15	*Striatojaponocapsa* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
10	9-13	*Striatojaponocapsa* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3	VS4	4052	4-5	11-16
8	12-13	*Striatojaponocapsa* (?) sp. 1	VS3	VS4			
5	20-21	*Tethysetta* [illegible] (Kozur)	VS3				
12	22	*Tetraditryma corralitosensis* Pessagno	VS3	VS4	3124	5-10	6-8
12	21	*Tetraditryma praeplena* Baumgartner		VS4	3125	1-7	
8	42	*Theocapsomma cucurbiformis* (Baumgartner)		VS4	3047	6-7	
8	31-32	*Theocapsomma cordis* (Kocher)	VS3	VS4	3277	5-8	16-38
8	30, 33-37	*Theocapsomma medvednicensis* (Goričan)	VS3	VS4			
2	24	*Transhsuum hisuikyoense* (Isozaki and Matsuda)	VS3		3304	2-7	2-8
2	14, 18-23, 25	*Transhsuum maxwelli* gr. (Pessagno)	VS3	VS4	3108	3-10	12-36
2	15-17	*Transhsuum* [illegible] (Pessagno and Whalen)	VS3				
11	30	*Trillus* sp. 1	VS3				
11	31	*Tripocyclia* aff. *crassa* Kiessling	VS3				
11	39-42	*Tritrabs casmaliaensis* (Pessagno)	VS3	VS4	3113	4-10	
11	37, 43	*Tritrabs ewingi* (Pessagno)	VS3				
11	38	*Tritrabs exotica* (Pessagno)	VS3				
12	25	*Tritrabs* sp.					
4	3	*Triversus japonicus* Takemura	VS3				
4	4-10	*Triversus schmidti* O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
7	15-18	*Unuma gordus* Hull	VS3		3309	4-6	10-15
7	8	*Unuma* sp. aff. *latusicostatus* (Aita 1985)		VS4			
9	1-3	*Williriedellum* [illegible] (Kozur)	VS3	VS4			
6	9-10	*Williriedellum* [illegible] (Pessagno, Blome and Hull)		VS4			
9	33-36	*Williriedellum marcucciae* Cortese	VS3	VS4	4060	4-8	11-21
10	1-2	*Williriedellum* [illegible] Chiari, Marcucci and Prela		VS4			
9	4-5	*Williriedellum* sp. 1	VS3				
9	6-12	*Williriedellum yaoi* (Kozur)	VS3	VS4			
4	34-35	*Xitus* (?) sp. 1	VS3	VS4			
4	23	*Xitus* [illegible] Hull	VS3				
6	29	*Yamatoum* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3		3368	7-7	
9	40-41	*Yaocapsa* sp. 1	VS3	VS4			
10	28-30	*Zhamoidellum* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
10	21-24	*Zhamoidellum* [illegible] O'Dogherty, Goričan and Dumitrica n. sp.	VS3				
10	25	*Zhamoidellum* cf. [illegible] n. sp.		VS4			
10	32	*Zhamoidellum* [illegible] (Aita)	VS3	VS4	3070	3-11	
9	15-25	*Zhamoidellum ventricosum* Dumitrica	VS3	VS4	3378	8-11	
6	19-20	*Zhamoidellum* sp. 1	VS3				
9	26-27	*Zhamoidellum* sp. 2		VS4			
10	36-37	*Zhamoidellum* sp. 3	VS3				
10	31	*Zhamoidellum* sp. 4	VS3				