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Table 1—Comparison of *Doconesthes* species. All lengths in µm unless specified.

Species	<i>Doconesthes robinsoni</i> sp. nov.	<i>Doconesthes sessilis</i> Topsent 1928	<i>Doconesthes aff. sessilis</i> Topsent, 1928 (in Tabachnick & Collins 2008).	<i>Doconesthes sessilis</i> Topsent, 1928 (in Tabachnick & Mentshenina 2013)	<i>Doconesthes dustinchiversi</i> Reiswig 2015
Appearance	Pale cream oval sponge length 10cm, width 8cm, thickness ~2cm.	Piece from sponge base 9x6x3.5mm attached onto coral branch.	Ovoid 12X10mm with some prosthelia.	Vase-like 160mm high, 40–90mm in diameter.	Slightly flattened sac 65.4 by 50.8 by 22.8mm.
Distribution	Sars Seamount, Drake Passage, 570–820m.	Azores, Atlantic, 2460m	North-west of Charlie-Gibbs fracture zone, Mid-Atlantic Ridge, 1650–1670m.	Northern Mid-Atlantic ridge near Charlie-Gibbs fracture zone. 2608m.	Bowie Seamount, NE Pacific (western Canada), 562-1061m.
Hypodermal pentactins	Proximal ray 53–(98)–203 by 22.1–(33.8)–58.7, tangential rays 323–(463)–652 by 16.8–(38.8)–56.3.	Proximal > 126-245 ('remarkably brief') Tangential 800 by 30	Anchorate Tangential 600 by 8 Proximal >6000 Hypodermal tangential 213–667, proximal ray 1.5–2 times as long as tangential.	Proximal 319–1292 Tangential 365–912 by 11–39. Also hexactins of similar size.	Proximal 144-841 by 20-32 Tangential 382-782 by 21-34
Dermal centrotylote diactins length by width	206–(251)–295 by 10.0–(13.6)–20.3	320–390 by 6–10	78–140 by 3–8	23–68 by 6–7	224-353 by 5-13
Atrial hexactins	Ray length 197–(312)–467 by 20–(25)–33.	Not recorded.	Ray length 154–224 by 4–8	Rays 76–304 by 5–15	Pinular Distal ray 89-733 by 8-28 Tangential ray 159-431 by 8-25 Proximal 82-284 by 8-24 Dermal 224-353 by 5-13; hypodermal 501-1601 by 10-21; Choanosomal 1473-7155 by 9-29.
Diactin	1110–3084 by 13–28	Sub-dermal 1000–1400 by 45–50 Choanosomal 1150–5000 by 8–55	900–1600 by 8–62	2500–6000 by 12–175	Oxyhexactin 70-183 Hemioxyhexaster 140-180
Smooth oxyoidal microscleres diameter	48–(59)–74, mostly oxyhexasters	100–110 diameter	90–146, mostly oxyhemihexasters	61–152 diameter—oxyhemihexasters and Oxyhexasters. Oxyhexactins 65–122 diameter.	Oxyhexaster 65–122 diameter.
Strobiplumicome diameter	65.6–(81.5)–97.7	40 diameter	32–47	30–(43)–59	33-53

Table 2—Measurements from *Sympagella walleri* sp. nov. holotype and paratypes (measurements in μm).

	<i>Holotype</i> MNHNCL POR-15003	<i>Paratype</i> MNHNCL POR-15004	<i>Paratype</i> BELUM.Mc2015.313
<i>Choanosomal diactin</i>	1441–(2601)–3736 by 11.3–(15.5)–26.7	1496–(2781)–3518 by 9.4–(16.6)–23.8	1517–(2388)–3655 by 9.9–(17.3)–23.8
<i>Dermal pentactin proximal ray</i>	495–(715)–1006 by 18.2–(25.0)–32.2	616–(875)–1063 by 16.8–(26.7)–32.2	573–(1008)–1374 by 24.4–(32.9)–44.7
<i>Dermal pentactin tangential ray</i>	232–(333)–415 by 15.9–(25.2)–33.2	355–(448)–646 by 19.8–(28.6)–40.6	310–(422)–541 by 22.1–(30.6)–39.5
<i>Dermal hexactin proximal ray</i>	396–(625)–742 by 19.0–(26.2)–31.2	286–(367)–536 by 15.9–(23.3)–32.2	459–(530)–575 by 29.5–(32.5)–36.6
<i>Dermal hexactin distal ray</i>	148–(449)–665 by 18.2–(26.6)–32.6	294–(425)–586 by 18.7–(24.7)–28.8	219–(414)–548 by 26.9–(32.7)–40.0
<i>Dermal hexactin tangential ray</i>	231–(407)–594 by 15.9–(23.0)–33.2	254–(332)–424 by 9.3–(24.5)–31.9	393–(472)–555 by 19.0–(31.0)–40.0
<i>Pinular hexactin pinnular ray</i>	107–(125)–136 by 11.3–(19.2)–25.1	64–(74)–96 by 7.7–(9.5)–12.2	81–(110)–124 by 9.1–(14.4)–19.2
<i>Pinular hexactin proximal ray</i>	56–(83)–113 by 6.4–(9.8)–13.5	64–(74)–96 by 7.7–(9.4)–12.2	47–(68)–86 by 5.8–(7.9)–10.8
<i>Pinular hexactin tangential ray</i>	53–(95)–120 by 4.8–(9.2)–12.2	60–(82)–116 by 7.0–(10.0)–13.6	52–(74)–102 by 5.4–(7.7)–10.9
<i>Discohexaster total diameter</i>	81–(92)–103	54–(84)–110	66–(75)–84
<i>Discohexaster centrum diameter</i>	3.4–(5.2)–7.0	3.6–(5.3)–6.8	5.4–(6.9)–9.6
<i>Strobiloplumicome total diameter</i>	Not found in spicule preparation	16.7 and 20.9	11.0–(14.3)–18.4
<i>Strobiloplumicome centrum diameter</i>	Not found in spicule preparation	2.0, 2.8	1.9–(2.5)–2.9

Table 3—Comparison of *Sympagella* species. Microsclere types found in *Sympagella* are shown in Figure 6.

		Species - measurements in μm										
	<i>Sympagella walleri</i> sp. nov.	<i>Sympagella anomala</i> Ijima 1903	<i>Sympagella cantharellus</i> (Lendenfeld 1915)	<i>Sympagella clavipinula</i> Tabachnick & Lévi 2004	<i>Sympagella cooki</i> Tabachnick & Menshenin 2013	<i>Sympagella delauzei</i> Boury-Enault, Vacelet, Reiswig & Chevaldonné 2014	<i>Sympagella ecomari</i> Tabachnick & Menshenina 2013	<i>Sympagella gracilis</i> (Schulze, 1903) BMNH 1908.9.24.28 (type specimen). Bold measurements from slide of type, normal from description.	<i>Sympagella johnstoni</i> (Schulze 1886) BMNH 87.10.20.34 (type specimen)	<i>Sympagella multihexastera</i> Tabachnick, Janussen & Menshenina 2008	<i>Sympagella nux</i> Schmidt 1870 BMNH1887.10.20.35 (type specimen)	
Appearance	The type specimen is a thin walled cup approximately 15cm high with a diameter of 7cm at the osculum.	Stalked sponge with irregular form—normally several buds with terminal oscules. Growing on hexactinellid s.	Horizontally expanded plate with stalk. Plates 50–92mm up to 6mm thick.	450mm high, 50–90mm diameter at base, 150mm at apex. Has tubular peduncle.	Funnel like with no prosthelia, probably with short peduncle . 100mm high, 12mm at base, 60–70mm at osculum.	Urn-shaped 17–51mm high, 14–52mm wide, stalk 17–34mm long.	Wall fragments 1mm thick.	Funnel-shaped.	Tube-like fragments 2–4mm thick.	Lamella-like fragments 5–8mm thick.	Type specimen is thin stem (~1mm diameter) with small bud-like structure (3mm maximum diameter) at end of one of the two branches. <i>Stalked Urn</i> 2–4.5cm high and 2–4cm in diameter. <i>Peduncle</i> 5–10cm by 3–4mm.	
Distribution by Notes	Sars Seamount, Drake Passage, Southern Ocean 620–1030m.	Sagami Sea, Japan, 430–572m	4063m off Peru	Norfolk Ridge, South of New Caledonia 680–780m	Mid-Atlantic Ridge. 2620–2676m.	Valinco Canyon Corsica 188m, Avempace Bank, Alboran Sea 388m	Mid-Atlantic Ridge 2623–2428m	Sunda Islands Timor, Indonesia, 421m,	Halfway between Cape of Good Hope and Kerguelen Islands. 567m.	Rowley Shoals, Australia 405m.	Florida 1666m. Turks and Caicos Islands 2827m.	
<i>Choanosomal diactin</i>	1441–(2601)–3736 by 11.3–(15.5)–26.7	Generally <1500 by 27	2200–9100 by 5–80	760–2580 by 9–30	1200–10000 by 40–320 1400–6800 by 6–15.	539–760 by 2.5–3.7	2400–3900 by 15	3000–5000 by 60–100 1604–(2077)–2507 by 17.7–(22.9)–31.2	1473–(2189)–3391 by 6.2–(17.2)–25.2.	1500–2900 by 10–130	563–(709)–827 by 6.3–(9.0)–11.3 <i>620–1350 by 10–18</i> <i>1755–3913 by 27–40</i>	
<i>Dermal Pentactin proximal ray</i>	495–(715)–1006 by 18.2–(25.0)–32.2	'somewhat longer than tangential'	150–1370	680–840 by 23–46	1300–1400 by 20–30	190–549 by 4–14	610–1140 by 20	166–(564)–808 by 22.1–(32.2)–44.2	Not found on slide	300–1000	354 by 11 <i>520–740 by 20–41</i>	
<i>Dermal pentactin tangential ray</i>	232–(333)–415 by 15.9–(25.2)–33.2	Up to 600 by 34	250–770 by 19–32	340–1000 by 23–46	500–700	185–470 by 4.4–12.7	280–500	400 312–(485)–759 by 18.2–(28.6)–38.0	Not found on slide	250–870	220 by 11 <i>310–538 by 12–39</i>	
<i>Dermal</i>	396–(625)–742 by		160–2200 by 18–67	n/a	160–680 by 6–	168–435 by 3–	600–700 by	Not found in	346–(553)–783	150–370 by 10–	344 by 15	

<i>hexactin proximal ray</i>	19.0–(26.2)–31.2				50	10	2	prep.	by 23.8–(28.1)–34.5	26	
<i>Dermal hexactin distal ray</i>	148–(449)–665 by 18.2–(26.6)–32.6		160–2200 by 18–67	n/ a	160–680 by 6–50	168–435 by 3–	~200		262–(333)–448 by 20.9–(23.4)–28.3	150–370 by 10–26	201 by 18
<i>Dermal hexactin tangential ray</i>	231–(407)–594 by 15.9–(23.0)–33.2		160–2200 by 18–67	n/ a	160–680 by 6–50	168–435 by 3–	300–400	Up to 1500	193–(369)–533 by 22.8–(29.7)–35.3	150–370 by 10–26	291 by 15
<i>Pinular hexactin pinular ray</i>	107–(125)–136 by 11.3–(19.2)–25.1	Up to 100 by 35 or 148 by 40—thinner in atrial than dermal.	100–385 (d) 100–270(a) 55–115 by 6–10(s)	213–410 by 19–38 (a)	67–130 (d) 78–141(a)	92–232 by 3.3–5 Pentactins 74–128 by 2–5	93–267 by 7 (d) 70–196 by 7 (a)	100–150 by 30 (d) 160 (a)	77.9–(98.2)–114.2 by 17.8–(24.8)–31.0.	66–143 by 9 (d) 92–204 (a)	78.9(95.3)120.4 <i>D 100–165</i> by 5–25 <i>A 144–676</i> by 12–26.6
<i>Pinular hexactin inward facing ray</i>	56–(83)–113 by 6.4–(9.8)–13.5	75–100	50–144 by 4–10 (d by a) 50–90 by 4–10 (s)	91–144 by 8–9 (a)	37–81 (d) 52–174	30–122 by 1.8 by 5.2	59–122 by 4–5 (d) 37–85 by 4–5(a)	97.0–(107)–112 by 12.6–(22.8)–28.4 36.7–(46.5)–62.3 by 6.0–(7.9)–10.0	54.3–(66.8)–76.3 by 6.3–(10.0)–15.1	41–77 by 2–3 (d) 51–82 (a)	Reduced to bud. 2.7–(5.0)–7.2 by 2.6–(4.6)–7.0. <i>D 3–5</i> <i>A 115–152</i> by 5–11
<i>Pinular hexactin tangential ray</i>	53–(95)–120 by 4.8–(9.2)–12.2	75–100	50–144 by 4–10 (d/a) 54–100 (s)	76–129 by 8–9 (a)	63–89 by 5–7(d) 52–174(a)	43–120 by 2–5 Pentactins 45–67 by 1–4	78–148 by 4–5 (d) 67–111 by 4–5(a)	41.1–(54.5)–62.6 by 6.7–(7.8)–11.0	67.7–(82.9)–103.4 by 7.6–(10.9)–14.7.	41–77 by 2–3 (d) 41–71 (a)	39.7(50.3)61.0 by 2.6(4.5)6.8 <i>D 65–105</i> by 4–9 <i>A 92–186</i> by 6–10
<i>Discohexaster total diameter</i>	81–(92)–103	42—split branchlets (found in body of 1 specimen) 30–90 2–4 terminals—these found in stalk only.	Not present	72–104	none	25–75	54–80	65.5–(79.4)–91.0	81.8–(98.5)–116.0	101–105	With two terminal branches per primary 61.9–(72.0)–84.0. 70–85
<i>Discohexaster centrum/primary rosette diameter</i>	3.4–(5.2)–7.0		Not present	7–18	none	1.4–2.5	7–16	5.9–(8.1)–10.1	7.0(9.1)11.6	8–17	4.9–(6.9)–9.1 2.5–3
<i>Oxyoidal microscleres diameter</i>	None	‘Onychohexasters 68–100—bearing 3–6 branchlets.	Onychohexasters 39–130 Oxyhexasters 90–133 Helonychhexasters 33–58	58–86 onychohexasters by oxyhexasters	107–141(oxyhexaster) 104–148 Oxyhexactin	Microhexactins 9–66.9	None	Oxyhexaster Onychaster 80–100	None present (although type description notes that some very thin discohexasters resemble oxyhexasters).	Oxyhexaster and Oxyhemihexaster 76–113 Onychohexaster 63um diameter (1 found).	None
<i>Oxyoidal microsclere centrum</i>	None	None	Onychhexasters 5–6 Oxyhexasters 5–7 Helonychhexasters 4–6	9–18 onychohexasters by oxyhexasters	6–15 oxyhexaster)	None	None		None present.	8–17	None

<i>Strobiplumico me total diameter</i>	16.7 and 20.9	34-64	47-69	22-50	25-47	None	29-58	40-50 Not found on slide.	28.3 (only one found in preparation and this was broken). (from type description noted as 50um diameter). 8.7	29-63	17.5 (only one found and end rays broken) 35-42
<i>Strobiplumico me primary rosette diameter</i>	2.0,2.8		Not given.	9-16	11-14	None	7-18			13-25	5.6 3-5.5

Table 4—*Caulophacus* (*Caulophacus*) species present in Antarctic and surrounding area.

<i>Species</i>	<i>C. palmeri</i> sp. nov.	<i>C. antarcticus</i> Schulze & Kirkpatrick 1910	<i>C. basispinosus</i> Levi 1964	<i>C. chilense</i> Reiswig & Araya 2014	<i>C. discohexactinus</i> Janussen, Tabachnick & Tendal 2004	<i>C. galathea</i> Levi 1964	<i>C. instabilis</i> Topsent 1910	<i>C. latus</i> Schulze 1886	<i>C. oviformis</i> (Schulze 1886)	<i>C. pipetta</i> (Schulze 1886)	<i>C. scotiae</i> Topsent 1910
Appearance	Hispid cream sponge with bulbous mushroom-like top and narrow stalk.	Described only from stems 4mm–21cm long.	Grey sponge with a terminal disk (20 by 12 by 1.5mm) on peduncle.	Curved stem 277mm long surmounted by funnel shaped body 28mm in height and 81mm maximum diameter. .	Incomplete specimen, flat and irregular in outline. 5x3cm, 1–3mm thick.	Fragments 30 by 30mm, 4–5mm wide.	Type specimen in bad state and impossible to distinguish exact form.	Flat mushroom with circular disk-like body (15.5cm diameter) and stalk 5mm thick.	Egg-shaped specimen 2cm in length, 12mm diameter. Wall 3–4mm. Terminal oscule 6mm in diameter.	Specimen resembles clay pipe or cigar holder. Oval body 5 by 1.5cm, stalk 3mm in diameter (torn off 3cm from body).	Goblet on stalk. 93 cm high (85cm for stalk). 37 by 24mm wide on body. Body in form of cup.
Distribution by Notes	Only known from the type specimen from the Shackleton Fracture Zone, Drake Passage, Southern Ocean.	Antarctic, from stations to north-west of Gauss station 2725–3397m	Cape Town, Durban 3800m.	50km off Caldera, Chile 1300–1800m.	Weddell Sea, 1153–1223m.	Cape–Town–Durban 5110–5340m.	North–east of Antarctic peninsula. 3246m.	Type locality between Cape of Good Hope and Kerguelen Islands, 2926m	Antarctic Ocean 62o26’S, 95o44’E 3612m.	Antarctic Ocean 53o55’S, 108o35’E 3566m	Weddell Sea. 2579m.
<i>Choanosomal diactin</i>	903(1517)3502 by 9.3(18.4)33.8		1100–1300 by 8–12	1043–2879 by 7–16	700 by 7	2000 by 10–12		Length not given.	present	present	Up to 300
<i>Dermal Pentactin proximal ray</i>	476(761)1541		225–800 by 17–28	251–1018 by 17–39	present	600–900 by 30–40		Not mentioned		present	present
<i>Dermal pentactin tangential ray</i>	241(310)421	149 by 6.25		313–728 by 14–43		500–600 by 30–35					
<i>Choanosomal hexactin proximal ray</i>	310(724)988			357–1194 by 16–51		1100–2300			present	present	
<i>Choanosomal hexactin distal ray</i>	304(592)892		225–800 by 17–28	357–1194 by 16–51							
<i>Choanosomal hexactin tangential ray</i>	304(614)851			357–1194 by 16–51							
<i>Pinular hexactin pinular ray D—dermal, A—atrial.</i>	D 167(187)203 by 15.9(28.6)40.1 A 118(164)193 by 20.1(28.3)47.4	214 by 26	155–200 by 25–35	D 126–299 by 8–17 A 77–316 by 7–15	209(319)408 184(249)275	100–115 by 20–30	160–240 by 60–75	500 1000	Present—measurements not given.	Present—measurements not given.	D-short-70–110 by 40–50 A 800–900 by 20–30
<i>Pinular hexactin proximal ray</i>	D 69(77)87 by 7.4(8.5)11.5 A 33(73)98 by 5.4(8.6)12.6	Rounded knob.	75–90 by 6	D 89–138 by 7–13, A 57–139 by 6–14	71(105)133 87(102)117	75–100		Not given—sometimes reduced so spicules are pentactins. Not given			D 140–160
<i>Pinular hexactin</i>	D 61.8(74.1)88.2	81 by 7.5	65–100	D 82–143 by 7–13,	66(105)153	75–100	Often reduced to				D 230–240

<i>tangential ray</i>	by 6.3(8.3)12.2 A 55.2(68.3)81.6 by 6.4(8.1)11.3			A 79–152 by 6–12	61(97)138		tubercles resemble pentactins.					
<i>Discohexactin diameter</i>	D 116(135)169 D 5.0(8.3)11.2	150 by 6 (rays 75 by 6)	100–120	114–249 by 11–23	82(153)173	80–90	155–210 (rare)	250	Not present	Present	Discohexasters 'hexactinales'	
<i>Discohexaster D (total diameter), d (centrum diameter)</i>	Not found.	85 diameter with 5–6 terminal rays. Hemidiscohexaster 130 diameter (rare)	Not present	1: 93–132 2: 38–124 Hemidiscohexaster 104–204	D 46, d 13 (only 1 found).	Not present	Diameter 140 with 5–6 terminal rays. Rare discohexasters 'hemihexactinales' –218 diameter	With 8+ terminal rays.	With 6–8 or more terminal rays.	With 2–3 terminal branches. Cat 2 with 'outer surface of disk bearing turf of many delicate terminal rays provided with terminal disk.	Discohexasters 'hemihexastrales' with 5 terminal rays. Parenchymal discohexasters with 6–9 terminal rays (up to 330 in diameter) Small with up to 15 secondary rays 70–80 in diameter. None.	
Oxyhexasters*— if these are present species should possibly be assigned to <i>Caulophacus</i> (<i>Oxydiscus</i>)		Heterohexactins with tangential rays 35um and radial rays 50um.	Oxyhexactins (rare) with rays 60 long.	None		Oxyhexaster 100 diameter, principal rays 20–25, secondary rays (4 per primary) 25–30.	None.	Present—some branched rays.				