

Supplementary online materials

Table S1: Measures of one first ambulacral of each dissected specimens. All the measurements were taken in actinal view. The distal height is taken from the tip of the distal process to the top of the *teeth*; the proximal height is the distance between the proximal process to the top of the *teeth* along the proximal edge of the ossicle; the length is the length of the ossicle taken at the bottom of the *teeth*.

Specimen	Distal height (μm)	Proximal height (μm)	Length (μm)
Z1	910	342	650
Z2	985	411	773
Z3	1040	440	870
Z4	1280	600	1026
Z5	1550	800	1080
Z6	2425	1393	1545
Z7	4006	2160	2432

Table S2: Measurements of ambulacrals in actinal view. The height: from the top of *teeth* to the actinal tip of the *base*; *teeth* length: the length at the base of the *teeth*, representing the length of the head; and centrum length: maximum compression area, length of the *shaft* under the *actam*. Each ambulacral is coded as follow: the number of the specimen (i.e. Z1, Z2 ... Z7), plus the number of the SEM images that was used for the measurements (i.e. from 001 to 126). For example, Z1033 means that it is the 33rd images taken of the specimen Z1.

Ambulacrals	Height (μm)	<i>Teeth</i> length (μm)	Center length (μm)
Z1033	783	285	242
Z1034	787	291	230
Z1035	732	307	211
Z1036	644	371	255
Z1037	502	322	201
Z1042	395	244	160
Z2048	961	315	244
Z2049	528	374	191
Z2050	760	369	278
Z2051	823	340	263
Z2052	299	182	117
Z3037	998	318	259
Z3038	983	364	277
Z3043	789	338	275
Z3044	504	301	197
Z3045	429	244	182

Z4017	1198	371	321
Z4018	1277	277	216
Z4019	899	452	326
Z4020	488	301	174
Z5018	1597	323	285
Z5019	1214	476	385
Z5020	809	469	316
Z5032	1034	447	381
Z6023	2194	345	318
Z6024	1651	461	482
Z6025	788	376	293
Z7029	3727	598	504
Z7052	3135	677	664
Z7054	2635	790	766
Z7056	2400	797	703
Z7058	1797	795	736
Z7059	1433	660	613

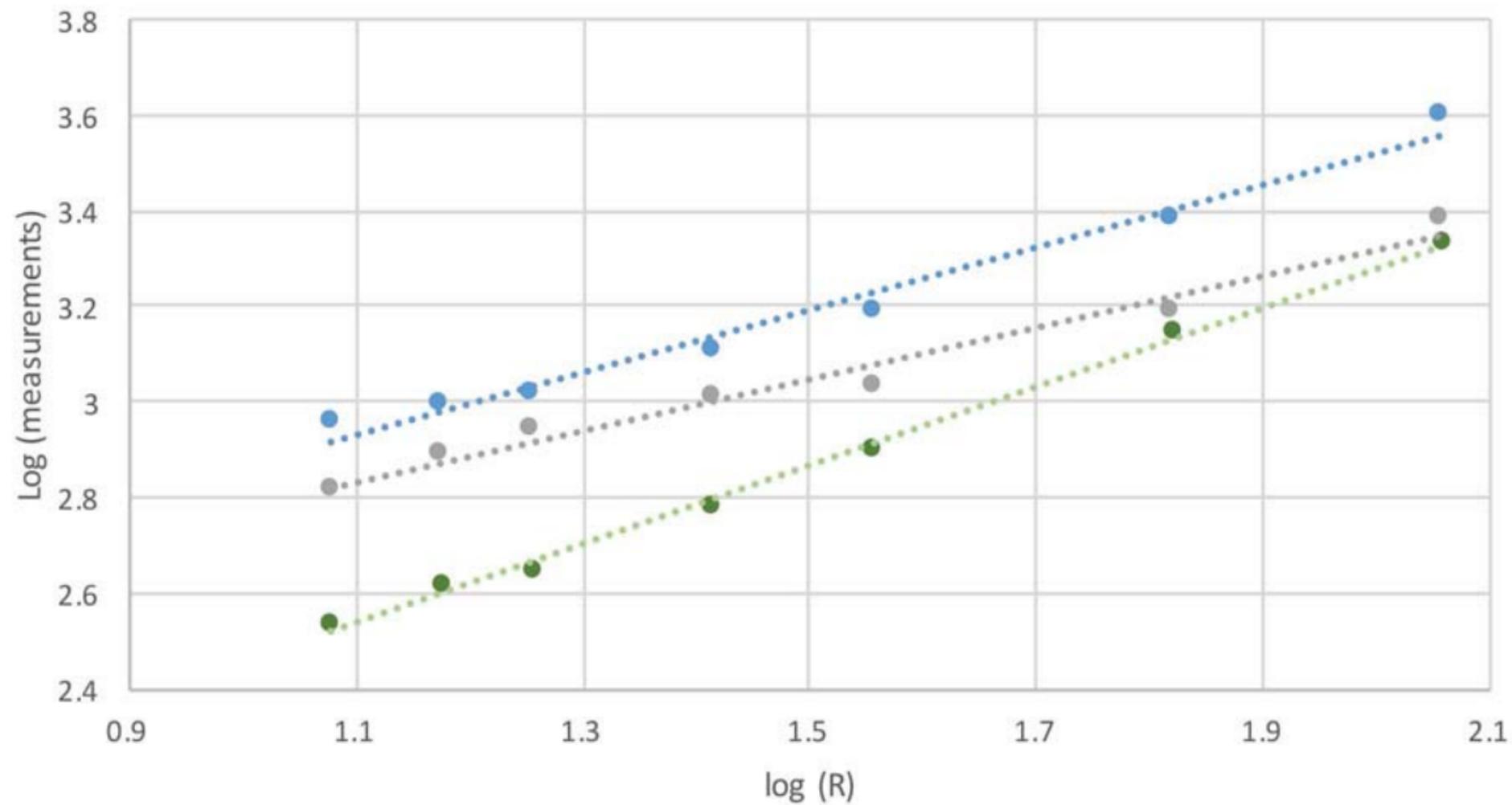
Z7061	1193	682	472
Z7062	1129	498	470
Z7063	1150	641	519

Table S3: Measurements of the seven dissected specimens (see Table 1 for collection numbers of Z1-7), plus 24 individuals (originally from the batch MNHN-IE-2013-12853). The diameter R is taken from the centre of the disc to the tip of the arm (in millimetres). The presence or absence (-) of alternatively carinate adambulacrals, an adoral carina and **straight forcipulate** pedicellariae on adambulacral spines are reported in columns three, four and five respectively. Some specimens present an intermediate state of carinate adambulacrals, i.e. presence of small difference of size of two successive adambulacrals, but not as pronounced as in specimens having **true** carinate adambulacrals. The number of adambulacrals forming the adoral carina is specified on the fourth column (“?” when the preservation does not allow observation of the adoral carina).

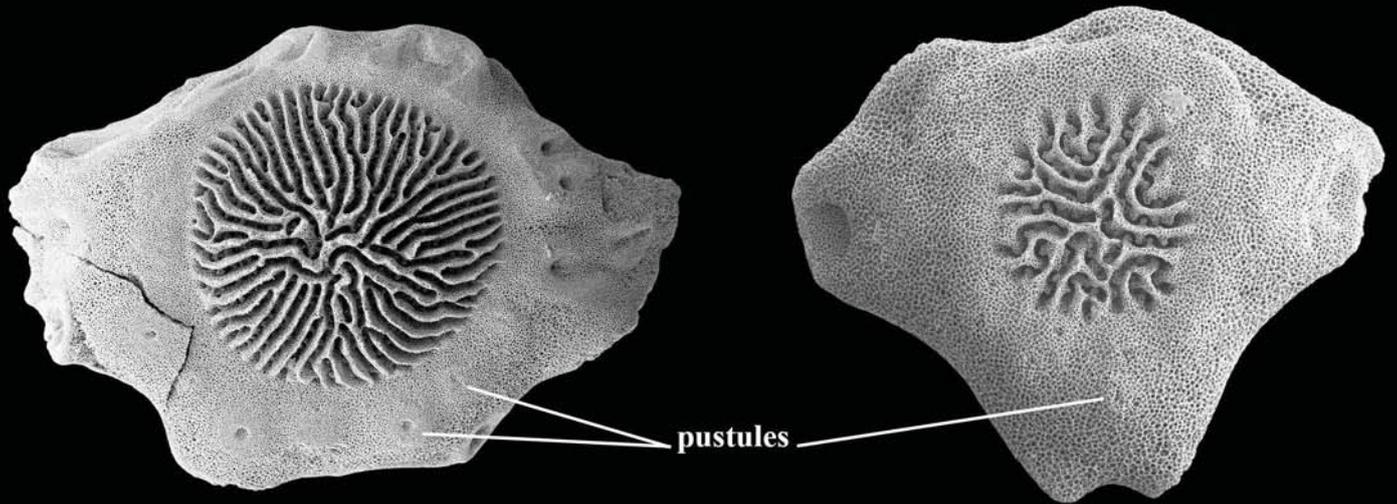
Specimens	R (mm)	Carinate adambulacrals	Adoral carina	Straight forcipulate pedicellariae on adambulacral spines
MNHN-IE-2016-565	9	-	-	present
MNHN-IE-2016-566	11	-	-	-
Z1	12	-	-	-
MNHN-IE-2016-565	13	-	1	-
MNHN-IE-2016-566	13	-	1	-

MNHN-IE-2016-567	14	-	1	present
MNHN-IE-2016-568	15	-	1	present
Z2	15	-	1	present
MNHN-IE-2016-569	16	-	1	present
MNHN-IE-2016-570	17	-	1	-
MNHN-IE-2016-571	17	-	1	present
Z3	18	-	2	present
MNHN-IE-2016-572	24	-	1 or 2	present
MNHN-IE-2016-573	25	-	1	present
MNHN-IE-2016-574	25	-	2 or 3	present
MNHN-IE-2016-575	26	-	1 or 2	present
Z4	26	-	2	present
MNHN-IE-2016-576	27	-	1 or 2	present
MNHN-IE-2016-577	32	intermediate state	1 or 2	present
MNHN-IE-2016-578	35	present	?	present
MNHN-IE-2016-579	35	intermediate state	2 or 3	present
MNHN-IE-2016-580	35	-	?	present
MNHN-IE-2016-581	36	-	2 or 3	present
Z5	36	present	2	present
MNHN-IE-2016-582	37	-	3	present
MNHN-IE-2016-583	39	present	2 or 4	present
MNHN-IE-2016-584	40	present	2 or 3	present
MNHN-IE-2016-585	42	present	3 or 4	present

MNHN-IE-2016-586	47	present	3 or 4	present
Z6	66	present	2	present
Z7	114	present	3	present



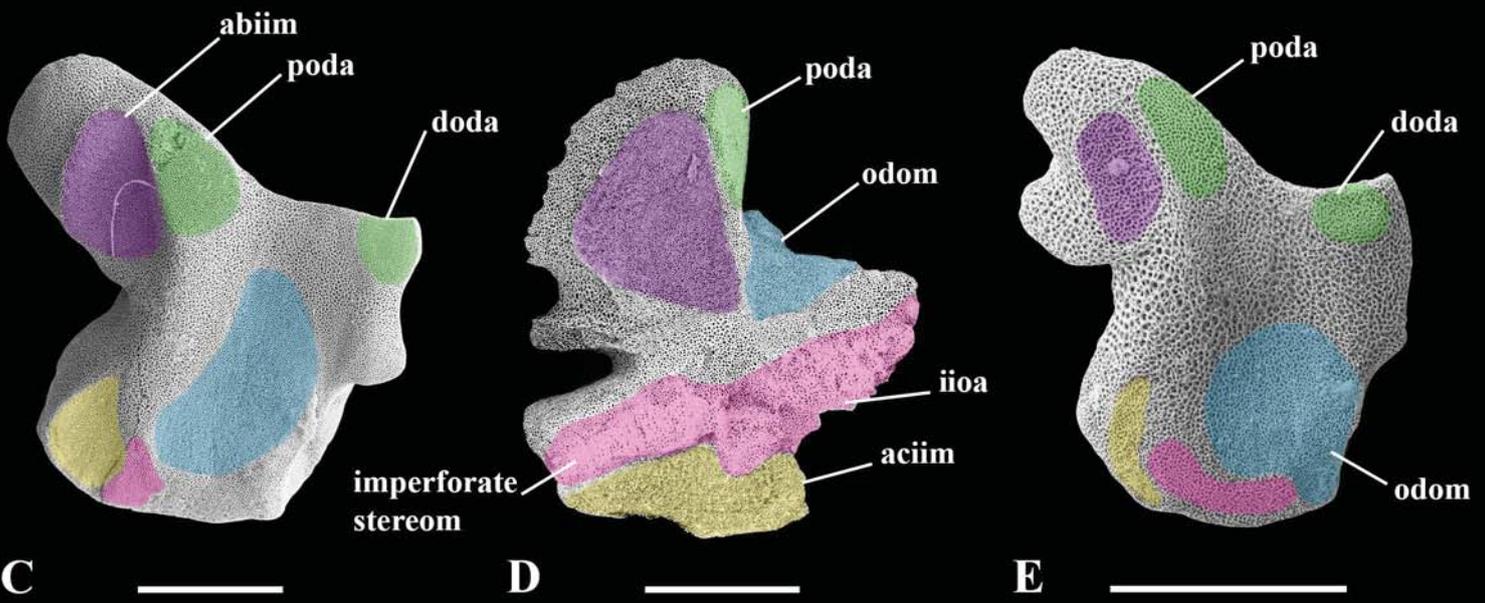
proximal direction



A

B

pustules



C

D

E

imperforate
stereom

aciim

iioa

odom

poda

doda

poda

abiim

doda

odom

poda

teeth

furrow

teeth

teeth

furrow

abtam

F

G

H