

Godos, K., Tyszka, J., Radmacher, W., Goleń, J., 2021. Global Database of Foraminiferal Organic Linings.
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Global Database of Foraminiferal Organic Linings: ForamL Version 1.2

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Summary

This database is a collection of references to illustrations of Foraminiferal Organic Linings (FOLs) published in available scientific literature. FOLs are extracted from recent marine samples and sedimentary rocks worldwide. The analysis of the publications led to the collection of 155 scientific reports that illustrate 614 foraminiferal organic linings. All linings have been assigned to supraordinal groups of Foraminifera (Pawlowski et al. 2013), as well as to basic morphologic types of chamber arrangements. The database consists of three tables that cover the whole Phanerozoic split to the Cenozoic, Mesozoic, Paleozoic, and then to systems/periods, i.e. Quaternary, Neogene, Paleogene, Cretaceous, Jurassic, Triassic and older intervals. For each system, scientific publications are referenced chronologically, according to a publication year. The main principle to collect the data was the preparation method based on palynological procedures. The procedures included treating samples with hydrochloric acid (HCl) to remove carbonates, following with hydrofluoric acid (HF) to remove silicates from the sample. The next step was to sieve the extracted organic matter through a 10 or 15 or 20 µm sieve to separate larger organic particles, including palynomorphs with foraminiferal organic linings, for further preparation of palynological slides. Most researchers identified organic residues in palynological slides under optical microscopes equipped in either analogue or digital cameras. Some authors used a scanning electron microscope (SEM) as a supplementary method of documentation. The purpose of gathering the data is to extend scientific knowledge on the origin, taphonomy, and phylogenetic patterns of these fossilizable organic foraminiferal structures. The most recent review of the knowledge on foraminiferal organic linings is presented by Tyszka et al. (2021). The ForamL database will be further supplemented by available records of foraminiferal organic linings, therefore, any new graphic contribution of published and unpublished specimens of FOLs is welcome.

Pawlowski, J., Holzmann, M., Tyszka, J., 2013. New supraordinal classification of Foraminifera: Molecules meet morphology. *Marine Micropaleontology*, 100: 1-10, <https://doi.org/10.1016/j.marmicro.2013.04.002>

Tyszka J., Godos K., Goleń J., Radmacher W., 2021. Foraminiferal organic linings: Functional and phylogenetic challenges, *Earth-Science Reviews*, 103726, <https://doi.org/10.1016/j.earscirev.2021.103726>

This research is supported by the National Science Centre (NCN) - grant DEC-2020/37/B/ST10/01953)

PERIOD	Monothalamids	Globothalamids	Tubothalamids	Lagenida	Indetermined / unidentified	ALL FORAM. ORGANIC LININGS	Publication number	Publication	Publication page/s	Original Date / figure	Database Figure(s)	high trochospiral/triserial & more			Uniserial	Spiral-to-uniserial	Spiral-to-biserial	Undetermined or single chambers	ALL FORAM. ORGANIC LININGS		
												spiral	biserial	uniserial							
QUATERNARY	3	1		4	1	Veen (1957)	74	text-figures. 1-4	Q1-4	2	1			1				4			
	1			1	2	Muller (1959)	31	pl. I fig. 13	Q5	1								1			
	5			5	3	Traverse & Ginsburg (1966)	435	pl. I fig. 11-15	Q6-10	4							1	5			
	1			1	4	Bakker & van Smeerdijk (1982)			Q11	1								1			
	16		1	17	5	Stancilffe et al. (1991)		pl. 2 fig. 1-10; pl. 3 fig. 1-8	Q12-29	12	1	1				3	17				
	5			5	6	De Vernal et al. (1992)	528	fig. 2 fig. b, f, d, h, j	Q30-34	4	1						5				
	1			1	7	Van Waveren et al. (1994)	94	pl. I fig. 8	Q35	1							1				
	6			6	8	Wrenn et al. (1998)	557, 558	fig. 3 fig. D; fig. 4 fig. a, c, d, e	Q36-41	5						1	6				
	2		2	9	Murray & Alve (1999)	202	pl. II fig. 3, 5	Q42-43	2								2				
	1		1	10	Booth et al. (1999)	81	pl. I fig. 7	Q44	1								1				
	1			1	11	Borromei et al. (2001)	67	pl. I fig. 8	Q45	1							1				
	1			1	12	Sparica et al. (2005)	69	pl. VIII fig. 4	Q46	1							1				
	2		2	13	Roncaglia et al. (2006)	28	fig. h, i	Q47-48	2								2				
	5		5	14	Limaye et al. (2007)	1372, 1373	fig. 2 fig. 1, fig. 3, l	Q49-50	3	2							5				
	1		1	15	Kumaran et al. (2008)	524	fig. 6 fig. m	Q51	1								1				
	2		2	16	Mertens et al. (2009)	652	fig. 5 fig. g, h	Q52-53	2								2				
	1		1	17	Candeil et al. (2009)	115	fig. 3 fig. 11	Q54	1								1				
	1			1	18	Nair et al. (2010)	367	fig. 6 fig. 27	Q55	1							1				
	1			1	19	Pospislova et al. (2010)	44	pl. 2 fig. k	Q56	1							1				
	1			1	20	Kholeif (2010)	148	pl. I fig. 19	Q57	1							1				
	2		2	21	Mudie et al. (2010)	540	fig. 5 fig. 33, 34	Q58-59	1	1							2				
	1			1	22	Cook et al. (2011)	168	pl. 2 fig. 8	Q60	1							1				
	5		5	23	Pierkowski et al. (2011)	845	fig. 5 fig. l-p	Q61-65	3	1	1						5				
	2		2	24	Padmatal et al. (2011)	133, 134	fig. 9 fig. t; fig. 10 fig. z	Q66-67	2								2				
	3		3	25	Mudie et al. (2011)	18	pl. 3 fig. 7, 13, 14	Q68-70	2			1					3				
	3		3	26	Pierkowski et al. (2012)	154	fig. 9 fig. k, l, m	Q71-73	1	1	1						3				
	2		2	27	Montoya et al. (2012)	120, 121	pl. V fig. 94; pl. VI fig. 94	Q74-75	2								2				
	1		1	28	Ni Fhlainhearta et al. (2013)	70	1(a, b, c)	Q76	1								1				
	2		2	29	Srivastava et al. (2013)	7	pl. 1 fig. 16, 17	Q77-78	2								2				
	2		2	30	Padmatal et al. (2014)	168	fig. 9 fig. 28, 29	Q79-80	2								2				
	1		1	31	Yanko-Hombach et al. (2014)	108	fig. 6	Q81	1								1				
	1		1	32	Vishnu et al. (2014)	73	fig. 6 fig. O	Q82	1								1				
	2		2	33	Yao (2015)	72	fig. 5 fig. 1, 2	Q83-84	2								2				
	1		1	34	Banerji et al. (2015)	437	fig. 10 fig. 24	Q85	1								1				
	2		2	35	Shumilovskikh et al. (2016)	175	pl. 1 fig. 1, 2	Q86-87	2								2				
	1		1	36	Pandey (2018)	6	pl. 1 fig. 25	Q88	1								1				
	5		5	37	Hartman et al. (2018)	462, 465	pl. 3 fig. 5; pl. 4 fig. 3, 4, 8	Q89-93	2	1	2						5				
	4		4	38	Adojooh et al. (2019)	190	pl. 3 fig. 70-72, 74	Q94-97	2	1							4				
	1		1	39	Caron et al. (2019)	571	fig. 2 fig. K	Q98	1								1				
	3		3	40	Da Silva et al. (2020)	801	fig. 3 fig. M-O	Q99-101	3								3				
	10		7	2	19	41	Mudie et al. (2020)	19, 20	fig. 12 fig. 3-12; fig. 13 fig. 5-10, 12-16	Q102-120	10		2			7	19				
	5			5	42	Shnyukov et al. (2020)	469	fig. 11.18 fig. 1-7	Q121-125	4							1	5			
	7			7	43	Kumar et al. (2021)	156	pl. 6 fig. 11-17	Q126-132	6		1					7				
	0	123	0	8	3	134	43	TOTAL / QUATERNARY							100	8	3	8	1	0	14
NEOGENE	1			1	1	Ediger et al. (1996)	205	pl. 6 fig. 10	Ng1	1								1			
	2			2	2	Head et al. (1999)	4	fig. 3 fig. 3, 7	Ng2-3	2							2				
	1		1	3	Londeix et al. (1999)	81	pl. 3 fig. 9	Ng4	1								1				
	2		2	4	Carballo et al. (2005)	236	fig. 5 fig. l, m	Ng5-6	2								2				
	1		1	5	Doláková et al. (2011)	68	pl. 1 fig. 1	Ng7	1								1				
	3		3	6	Singh et al. (2011)	60	fig. 4 fig. 1-3	Ng8-10	3								3				
	1		1	7	Hapsari et al. (2012)		fig. 4	Ng11	1								1				
	1		1	8	Ottone et al. (2013)	516	fig. 5 fig. 1	Ng12	1								1				
	1		1	9	El Atfy et al. (2014)	334	pl. II fig. 9	Ng13	1								1				
	2		2	10	Bankole et al. (2014)	57	pl. 3 fig. 19, 20	Ng14, 15	1	1							2				
PALEOGENE	1		1	11	Antonioli et al. (2015)	142	pl. 2 fig. 16	Ng16	1								1				
	10		10	12	Bronstra et al. (2015)	189	pl. IV fig. a-j	Ng17-26	10								10				
	1		1	13	D'Apolito (2016)	168	pl. 26 fig. 3	Ng27	1								1				
	1		1	14	Adebayo et al. (2016)	579	fig. 5 fig. 11	Ng28	1								1				
	10		10	15	Mudie et al. (2017)	132	fig. 2 (L) fig. a, b, d, e, g-j; fig. 3(R) fig. a, c	Ng29-38	10								10				
	4		4	16	Ocakoglu et al. (2018)	516	fig. 10 fig. 14-17	Ng39-42	3			1					4				
	0	42	0	0	0	42	16	TOTAL / NEOGENE						40	1	0	0	1	0	0	42
	4		4	1	1	Olot (1992)	449	pl. 3 fig. 9-12	Pg1-4	2	2						4				
	2		2	2	2	Mahmoud et al. (1993)	245	fig. 3 fig. 10, 11	Pg5-6	2							2				
	12		12	3	Tabaei et al. (2002)		pl. 1 fig. 1-12	Pg7-18	7								5	12			
	2		2	4	Ramirez (2004)		pl. 9 fig. 12, 13	Pg19-20	1	1							2				
	1		1	5	Oreshkina et al. (2007)	218	pl. III fig. 22	Pg21	1								1				
	1		1	6	Jaramillo et al. (2007)	179	pl. 6 fig. 39	Pg22	1								1				
	2		2	7	Bati et al. (2007)	278	pl. 9 fig. 13, 14	Pg23-24	2								2				
	1		1	8	Barski et al. (2010)	126	fig. 4 fig. 15	Pg25	1								1				
	6		6	9	Singh et al. (2010)		fig. 6 fig. k-p	Pg26-31	6								6				
	2		2	10	Digbehi et al. (2012)	35	pl. 2 fig. w, x	Pg32-33	2								2				
PALEOGENE	1		1	11	Rao et al. (2013)	294	pl. 2 fig. 31	Pg34	1								1				
	1		1	12	Prasad et al. (2013)	750	fig. 9 fig. I	Pg35	1								1				
	2		2	13	Starkey (2013)	191	pl. 28 fig. 4, 5	Pg36-37	2								2				
	4		4	14	Singh et al. (2015)	447	5 (i, m-o)	Pg38-41	4								4				
	18		18	15	Monga et al. (2015)	132, 133	fig. 2 fig. 1-3; pl. 1 fig. 1-17	Pg42-59	17		1						18				
	1		1	16	Nicola (2016)	43	pl. VII fig. c	Pg60	1								1				
	1		1	17	Singh et al. (2017)	230	fig. 5 fig. k	Pg61	1								1				
	1		1	18	Chukwura et al. (2017)	6	fig. 3b fig. 10	Pg62	1								1				
	5		5	19	Khan et al. (2018)	98	pl. 2 fig. 4, 5	Pg63-66	5								5				
	0	67	0	0	0	67	19	TOTAL / PALEOGENE						58	3	0	1				

PERIOD	ALL FORAM. ORGANIC LININGS					Publication	Publication pages	Original plate/ figure	Database Figure(s)	spiral	biserial	high trochospiral/ triserial & more	uniserial	spiral-to-uniserial	spiral-to-biserial	Undetermined or single chambers	ALL FORAM. ORGANIC LININGS	
	Monothalamids	Globothalams	Tubothalamia	Lagenida	indetermined/ unidentified													
CRETACEOUS	6		6	1	Góczán (1962)	209	tabla IV fig. 1-6	Cr1-6	6									6
	12	1	13	2	Deak (1964)		tab. VIII fig. 7-11; tab. IX Fig. 12-15; tab. X fig. 16-19	Cr7-19	12			1					13	
	3		3	3	Tyson (1995)		pl. C fig. C9, C10	Cr20,21	2							1	3	
	1	4	El Beialy (1995a)	312		pl. III fig. 8	Cr22	1									1	
	1	5	El Beialy (1995b)	671		pl. 84 fig. 9	Cr23	1									1	
	4	6	Prössl (1996)	91, 95	fig. 4 fig. 5; fig. 6 fig. 6, fig 33, 34		Cr24-27	2	2								4	
	5	7	Lana & Gupta (2001)	99		fig. 2 fig. a-g	Cr28-32	5									5	
	2	8	Carvalho (2001)			pl. 6 fig. 6, 7	Cr33,34	1	1								2	
	1	9	Skupien (2003)	82		pl. VI fig. 13	Cr35	1									1	
	1	10	Céch et al. (2005)	354		pl. V fig. 17	Cr36	1									1	
	1	11	Olusola (2010)	227		pl. 1 fig. 10	Cr37					1					1	
	1	12	Villanueva-Amadoz et al. (2011)	159		fig. 16 fig. b	Cr38	1									1	
	1	13	Al-Ameri et al. (2011)			fig. 12	Cr39	1									1	
	1	14	Peyrot et al. (2012)	28		fig. 3 fig. b	Cr40	1									1	
	1	15	Torices et al. (2012)	166		fig. 5 fig. 31	Cr41	1									1	
	1	16	Alaug et al. (2013)	86		fig. 21 fig. 32	Cr42		1								1	
	1	17	Atta-Peters et al. (2013)	37		pl. II fig. 5	Cr43	1									1	
	2	18	d'Pasquo et al. (2013)	145		fig. 8 fig. AA, z	Cr44,45	2									2	
	1	19	Radmacher et al. (2014a)	119		pl. 3 fig. I	Cr46	1									1	
	1	20	Radmacher et al. (2014b)	317		pl. 9 fig. 11	Cr47	1									1	
	1	21	Vášárek et al. (2014)	155		fig. 8 fig. m	Cr48	1									1	
	2	22	Al-Ameri et al. (2014)	1444		fig. 10 fig. d1, d2	Cr49,50	2									2	
	0	46	0	2	0	48	Shevchuk et al. (2015)	62, 63	tab. I fig. 1-12; tab. II fig. 1-9; tab. III fig. 1-13; tab. IV fig. 1-10abc, 11, 12	Cr51-98	41	3	2	2			48	
	1		24	Radmacher et al. (2015)						Cr99	1							1
	1		25	Unida et al. (2016)	10		pl. I fig. 9	Cr100	1								1	
	1		26	Jayuela et al. (2016)			pl. 5	Cr101	1								1	
	2		27	Mahmoud et al. (2017)	460, 461		fig. 6 fig. m; fig. 7 fig. b	Cr102,103	2								2	
	1		28	McLachlan (2017)	166		pl. 4.25 fig. i	Cr104	1								1	
	1		29	Rodríguez-Barreiro et al. (2018)	586		fig. 6 fig. i	Cr105	1								1	
	1		30	Michels et al. (2018)	793		fig. 7 fig. p	Cr106	1								1	
	4		31	Amiewalan et al. (2018)	1175		pl. II fig. 1, 2, 3, 5	Cr107-110	3			1					4	
	2		32	Mohamed et al. (2018)	140		fig. 5 fig. 23, 24	Cr111,112	2								2	
	5	1	6	Mansour et al. (2019)	12		pl. 4 fig. a-f	Cr113-116	4			1				1	6	
	1	2	34	Edegbai et al. (2019)	6		fig. 5 fig. b	Cr117,118	1			1					2	
	1		35	Jurkova et al. (2019)	32		fig. 8 fig. E	Cr119	1								1	
	2		36	Radmacher et al. (2020)	5		fig. 2h	Cr120,121	2								2	
	1		37	Chafeet et al. (2020)	1075		pl. 4a fig. 5	Cr122	1								1	
	12		38	Godos et al. (2021)- submitted, under revision			fig. 5M-Y	Cr123-134	12								12	
0	132	0	5	0	137	38	TOTAL / CRETACEOUS			119	7	2	5	2	1	1	137	
JURASSIC	1		1	Porter (1988)	32		pl. III fig. 7	J1	1								1	
	1		2	Shahin et al. (1989)	571		fig. 5 fig. 28	J2	1								1	
	17	5	22	Stansiffe (1989)	345, 347, 349		text- figure 6 fig. a, b; text-figure 7 fig. a, b; pl. 1 fig. 1-9; pl. 2 fig. 1-9	J3-24	12	2	1	2	3		2		22	
	13		13	Msik & Sotak (1998)	121		pl. VII fig. a-m	J25-37	10	3							13	
	2		2	Ibrahim et al. (2002)	686, 688		pl. 2 fig. i; pl. 3 fig. f	J38,39	2								2	
	1		1	Koppelman et al. (2003)	807		pl. 4 fig. 3	J40	1								1	
	1		1	Koppelman et al. (2003)	173		pl.7 fig.7	J41	1								1	
	1		1	Hamad et al. (2005)	241		pl. V fig. 17	J42	1								1	
	1		1	Sajjadi et al. (2007)	405		pl. 2 fig. 16	J43	1								1	
	31	2	1	34	10	Gedi (2008)	72, 82, 116, 122, 129, 138, 140, 141, 150, 154, 156, 158, 171, 174, 178, 181		J44-77	30	3					1		34
	1		1	11	Al-Ameri et al. (2012)	24		fig. 13	J78	1								1
	4		4	12	Al-Ameri et al. (2013)	3730, 3732		fig. 3 fig. 4	J79-81	2		1	1					4
	15	1	16	13	Hewaidy et al. (2014)	183, 184		pl. 6 fig. 6-18; pl. 7 fig. 15	J82-95	13	1		2					16
	2		2	14	Gonçalves et al. (2014)	441		fig. 1 fig. e, f	J96,97	2								2
	3		3	15	Al-Ameri et al. (2015)	762, 766		fig. 3 fig. 8; fig. 7 fig. 8	J98,99	2			1					3
	4		4	16	Harkopf-Fröder et al. (2015)	89		fig. 11 fig. a-d	J100-103	4								4
	1		1	17	Ied et al. (2016)	78		fig. 5 fig. 21	J104	1								1
	1		2	18	Correa et al. (2017)	53		fig. 6 fig. 11, 12	J105,106	1			1					2
	1		1	19	Zarei (2017)	32		pl. I fig. 8	J107	1								1
	1		1	20	Kowalewski-Kasprowski et al. (2020)	10			J108	1								1
	12		12	21	Godos et al. (2021)- submitted, under revision			fig. 5A-L	J109-120	12								12
0	114	0	9	1	124	21	TOTAL / JURASSIC			100	9	2	7	3	0	3	124	
TRIASSIC	2		2	1	Ramei et al. (2000)	129	pl. 29 fig. 1, 5	T1,2	1			1					2	
	1		1	2	Roghi (2004)	18	pl. XI fig. 11	T3	1								1	
	1		1	3	Whiteside et al. (2008)	114	fig. 6 fig. qq	T4,5	1							1	2	
	1		1	4	Schneebeli-Hermann et al. (2012)	19	pl. II fig. 17	T6	1								1	
	1		1	5	Stockar et al. (2013)	245	fig. 4 fig. i	T7	1								1	
	2		2	6	Haig et al. (2015)	518	fig. 9 fig. a, b	T8,9	1			1					2	
	2		2	7	Cirilli et al. (2015)	73	pl. II fig. 17, 20	T10,11	2								2	
	2		2	8	Panou (2015)	81	pl. I fig. g	T12,13	2								2	
	2		2	9	Baranyi et al. (2019)	3	fig. 1 fig. 6, 7	T14,15	1	1							2	
	1		1	10	García-Avila et al. (2020)		fig. 4 fig. 40	T16	1								1	
	1		1	11	Azo et al. (2020)	131	pl. I fig. i	T17	1								1	
0	16	0	0	1	17	11	TOTAL / TRIASSIC			11	3	0	2	0	0	1	17	

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