

Appendix A. Supplementary data

TABLE 1. Number of conodont elements in samples from the Cát Bà locality in northern Vietnam (*M.* = *Mitrellataxis*, *N.* = *Neopolygnathus*).

Cát Bà		CB- 110	CB- 115/ 2	CB1 115a	CB- 115	CB1 15b
<i>Pelekysgnathus planus</i>	P ₁ P ₂ -M		1 15	2 6		
<i>M. asymmetrica</i>	P- M	15	23	12	4	
<i>M. coronella</i>	P-M		8	4		
<i>Apatognathus varians</i>	P ₁ P ₂ S ₁₋₄ M	1 2 19 2			6 1	
<i>Idiopriodontodus ruptus</i>	P ₁ P ₂ S ₀ S ₁₋₄ M	4 3 2 4 2	1 1 2 4	1 2		1
<i>Lagovidina?</i> sp.	P ₁ P ₂ S ₀ S ₁ S ₁₋₄ M	1 2 1 1 4 3	1 4 1 1 1 1	1 2		
<i>Brammehla inornata</i>	P ₁ P ₂ S ₀ S ₁ S ₂ S ₁₋₄ M	2 4 2 1 4 3 2	8 6 1 4 3 3 3	11 1		
<i>Mehlina strigosa</i>	P ₁ P ₂ S ₀ S ₁ S ₂ S ₁₋₄ M	18 2 1 4 3 7 5	16 5 1 2 3 7 7	16 7 1 2		
<i>Polygnathus znepolensis</i>	P ₁ P ₂ M	3 2 2	1 3	4 1		
<i>Polynodosus diversus</i>	P ₁ P ₂ S ₁	2 1 1	6 1 1	4		
<i>N. communis</i>	P ₁		5	2	1	
<i>Planipolygnathus?</i> sp.	P ₁ P ₄		6 2	4		
<i>Tripodellus expansus</i>	P ₁ P ₂ S ₀ S ₁ S ₂ S ₁₋₄ M	125 3 2 1 1 4 11	230 8 1 1 1 5 10	101 1		1
<i>Dasbergina stabilis</i>	P ₁ P ₂ S ₀ S ₁ S ₂ S ₁₋₄ M		5 1 1 1 1 1 1	8 2		
<i>Dasbergina trigonica</i>	P ₁ P ₂	8 2	4			
<i>Pseudopolygnath . aculeatus</i>	P ₁		2	1		
<i>Protognathodus? D. kowalensis?</i>	P ₁		1			
<i>Rhodulapinis polygnathad</i>	P ₁ S	1 23	3 33			

TABLE 2. Number of conodont elements in newly collected samples from the late Famennian of the Nowiny II Quarry at Kowala, Holy Cross Mountains, Poland.

Kowala		Ko-404	Ko-405	Ko-406	Ko-407	Ko-408	Ko-409	Ko-410	Ko-6	Ko-411	Ko-412	Ko-124	Ko-414	Ko-415	Ko-416	Ko-417	Ko-419	Ko-420
<i>Palmatolepis schindewolfi</i>	P ₁ P ₂ S ₀								2	1	8		9 5	1		10 1 1	2	3
<i>Palmatolepis trachytera</i>	P ₁ P ₂ S ₀						1	4	5	10 2	14 2	1			87		7 1	6
<i>Polygnathus exeplexus</i>	P ₁ P ₂ S ₀ S ₁₋₄ M							14 2 2 2 2	8	22	15 2 1 4 2		59 6 3		33 1	4 1 1 3 1	1 1 1 1 1	10
<i>Polygnathus znepolensis</i>	P ₁											7						
<i>Polymodosus triphyllatus?</i>	P ₁ P ₂															1		1
<i>Polytaphodonta pergyrata</i>	P ₁					2												
<i>Lagovignathus styriacus</i>	P ₁								2									
<i>Lagovignathus dissimilis</i>	P ₁ P ₂ S ₀ S ₁₋₄ M						64 6 3	10		26	11 2 1	15 2						
<i>Pseudopolygnathus jugosus</i>	P ₁	1	1						1									
<i>P. ostrovkensis</i>	P ₁		1	9	3	17												
<i>P. aculeatus</i>	P ₁	42	74	30	1	30	24					15						
<i>Pseudopolygnathus</i> spp.	P ₂ S ₀ S ₁ S ₂ S ₁₋₄ M	8	22 5	4	2		1					1 1 1 2 2 1						
<i>Brammehla inornata</i>	P ₁	10	37	21	1	49	176	60	2	123	68	25	6	2	4	4	2	18
<i>Brammehla</i> spp.	P ₂ S ₀ S ₁ S ₂ S ₁₋₄ M	2	13 2	9 2	1 3	8 1 2	20 6 6 2	8			5 2	6 2			2	1		3
																	1 2 3 1 2	1
		4	6	4	1	3	13	8	7	6	4		2	2		2	3	2
		7	6	1	5	8	12											
<i>Tripodellus gracilis</i>	P ₁	62	184	77	16	61	57	31	12	191	74	27	45	4	10	10	35	79
<i>Tripodellus</i> spp.	P ₂ S ₀ S ₁ S ₂ S ₁₋₄ M	7 1 3	7 4 2	8 2 4		3 1 2	2 2 1	3 2 1	8 1 3	6 7 2	7 2 1	8 5 1				1 1 1	1	1
		2	4	3	1	2	1	3	4	4	3	2	4	5		1	1	1
		1	6	3			1	3	5	4	4	2				1	1	1
<i>Dasbergina stabilis</i>	P ₁ P ₂ S ₀ S ₁₋₄ M	9	48 7	12 4	6	20 3	48 8	40 10		32	19	11	69 25	20 3	8 2	6 4	4 3	30
			6	4	1		6	2					15	1			2	3
		5	5	1			6	6			2			1		1		
<i>Dasbergina keyseri</i>	P ₁	4	19	4		1				1								
<i>Dasbergina micropunctata</i>	P ₁						2		1			1						
<i>Dasbergina marburgensis</i>	P ₁		6	1		9												
<i>Neopolygnathus</i> sp.	P ₁						13	36		65	37							
<i>Neopolygnathus communis</i>	P ₁	26	35	59	10	88						1	14				1	1
<i>Neopolygnathus</i> spp.	P ₂ S ₀ S ₁₋₄ M	4	7 8 5	12 3 2	1	9 2 4											2	
<i>Idioproniodus ruptus</i>	P ₁ P ₂ S ₀ S ₁ S ₂ S ₁₋₄ M		5				2	1		1							1 1 1 3	2
<i>Pandorinellina fragillisi</i>	P ₁			5		7	6			6								
<i>P. bituberculata</i>	P ₁			1												1		1
<i>Pandorinellina vulgaris</i>	P ₁	72	60	16		4	9	7		24	8		16			1	1	5
<i>Pandorinellina</i> spp.	P ₂ S ₁₋₄ M		11 13 10	13 8 6	3													
<i>Mehlnia strigosa</i>	P ₁ P ₂ S ₁ S ₂ S ₁₋₄ M		18 3	24	18	3	9	22	5	5 2	9	13	14	10		1	1	3
			8				1			2								7
<i>Guizhoudella</i> sp.	MS					3							1					
<i>Sweetodina monodentata</i>	P ₁ S ₁ S ₂ S ₃			1 2 1														
<i>Ligodina</i> ?	P ₁																	
<i>Jablondodus</i> sp.		3	13	3		1	9	11		8	11			1	1		1	5
<i>Mitrellataxis circularis</i>									3			2						
<i>Conopcisus</i> sp.			2	1			1	2										
<i>Vogelgnathus brammehlloides</i>	P ₁ P ₂ S ₁ S ₁₋₄ M	5	4	1		1			7 2 1 1 1									
<i>Ligomodina sudetica</i>	S ₂											1						
<i>Planadina plana</i>	S ₁₋₄								2									

TABLE 2a (continued; *V.* = *Vogelgnathus*).

Kowala	Ko- 118	Ko- 254	Ko- 119	Ko- 322	Ko- 120	Ko- 323	Ko- 324	Ko- 326	Ko- 327	Ko- 328	Ko- 329	Ko- 121	Ko- 330	Ko- 331	Ko- 122	Ko- 332	Ko- 333	Ko- 334	Ko- 336	Ko- 338
<i>Polygnathus pennatus</i>	P ₁	2	2		1							5			3					
<i>Pseudopolygnathus zieglerti</i>	P ₁	5	1																	
<i>P. aculeatus</i>	P ₁	34	36	5	51	31	20	23	59	50	217	10	36	10	17	31	24	18	14	87
<i>Pseudopolygnathus</i> spp.	P ₂			1	6	1	7	4	6		17	2		4	6	2	8		4	6
	S ₀										2			1			2			3
	S ₁												1							
	S ₂															1		1		
	S ₃₋₄			1	3			2	1		9		1			8			3	
	M			5				6	6	4				4		7			4	
<i>Brammehla inornata</i>	P ₁	1	30		14	1	12	8	14	7	63	7	2	8	10	2	22		2	56
<i>Brammehla</i> spp.	P ₂				5				2		2		1			3				10
	S ₀										1				1				2	
	S ₁															1				
	S ₂				2		1	1			3		1	1		1	3			2
	S ₃₋₄					2				2				2					1	1
	M							3	4					1					3	2
<i>Tripodellus goniochymeniae</i>	P ₁	7																		
<i>Tripodellus gracilis</i>	P ₁	7		1	51	1	12	1	22	24	41	10	1	3	26	9	5	7	3	12
	P ₂								6	3	9	1			3		2	1		8
	S ₀				1						1				1		1			
	S ₁				1		2				1				6			1	1	
	S ₂								1		2									1
	S ₃₋₄					1			1	2	5	1		1	6			2	3	
	M								1	1			1					4	1	
<i>Dasbergina stabilis</i>	P ₁				1				1			1		1	2				1	3
<i>Dasbergina marburgensis</i>	P ₁																			8
<i>Dasbergina trigonica</i>	P ₁		2		1	1	1		3		1	1						2		
<i>Neopolygnathus communis</i>	P ₁	14	2		19		5		9	18	57	12	10	5	20	10	12	7	2	4
<i>Neopolygnathus vogesi</i>	P ₁				5		2													1
<i>Neopolygnathus</i> ssp.	P ₂									1				3		1				
	S ₃₋₄				1					2						2				
	M				5				2					1						
<i>Idioproniodus ruptus</i>	P ₁																			
	P ₂	1					1													
	S ₀				1															
	S ₁											1								
	S ₂																			
	S ₃₋₄		1				1		2	2	1			1		2			1	1
<i>Pandorinellina fragilis</i>	P ₁									1										
<i>P. bituberculata</i>	P ₁																	1		
<i>Pandorinellina vulgaris</i>	P ₁				7		12		18	9	25		1	6		12	1	4	15	9
<i>Pandorinellina</i> spp.	P ₂															2				
	S ₂															2				
<i>Mehlina strigosa</i>	P ₁				3		1		3		2		1	1		5	1			2
	S ₁				1															
	S ₃₋₄							1												
<i>Jablonnodus</i> sp.					19		6		6	5	11	1		1	3		1		2	1
<i>Mitrellataxis circularis</i>		2																		
<i>Synchydagnathus</i> sp.									2											1
<i>Alternognathus beulensis</i>	P ₁		9		3			1		1	1						1		4	
<i>Lagonodina sudetica</i>	P ₁															1		2		
	P ₂											1								

TABLE 2b (continued).

Kowala		Ko-243	Ko-313	Ko-244	Ko-245 b	Ko-245 a	Ko-116	Ko-314	Ko-246	Ko-315	Ko-247	Ko-316	Ko-248	Ko-249	Ko-117	Ko-250	Ko-251	Ko-318	Ko-319	Ko-253	Ko-321
<i>Polygnathus pennatus</i>	P ₁						16								1						
<i>Pseudopolygnathus ziegleri</i>	P ₁						34								3						
<i>Pseudopolygnathus aculeatus</i>	P ₁		21	20	16	68	263	30	14	29	50	52	44	10	15	25	33	9	64	13	53
<i>Pseudopolygnathus</i> spp.	P ₂		3				15	4				5			4				9		3
	S ₀						3			1		2					1				
	S ₁						1														
	S ₂						6														
	S ₃₋₄						7	1		7		4				2	2		4		5
	M		1				1	3									1				4
<i>Brannehlia disparilis</i>	P ₁																				
<i>Brannehlia inornata</i>	P ₁		5				21	16	7	9	12	13	18	1		7	4	2	27	6	18
<i>Brannehlia suprema</i>	P ₁																				
<i>Brannehlia</i> spp.	P ₂		1					2		2									9		
	S ₀									1											1
	S ₁						1														
	S ₂									2		2							3		
	S ₃₋₄		1				1	4		4		1							6		2
	M						1			1									5		2
<i>Tripodellus goniochymeniae</i>	P ₁	6	6	6	3	18	12	10		20	10	9	9		1						
<i>Tripodellus gracilis</i>	P ₁	1	3	6	1	6	41	40		6	14	5	14	4	2		7	8	22	2	14
<i>Tripodellus</i> spp.	P ₂	1					1	1		2		2					1				
	S ₀																				
	S ₂																		1		
	S ₃₋₄						1			1											
	M		1							1											
<i>Dasbergina stabilis</i>	P ₁						2					1									
<i>Dasbergina trigonica</i>	P ₁																			1	1
<i>Neopolygnathus communis</i>	P ₁	6	2	11		6	13			29	9	4	15	5	1	6	13		16		18
<i>Neopolygnathus vogesi</i>	P ₁										1		4						2	3	
<i>Idiopriionodus raptus</i>	P ₂						3														
	S ₀																	1	1		
	S ₂				1		1									1					
	S ₃₋₄		2				1			3			1		1			1			1
<i>P. bituberculata</i>	P ₁																6				
<i>Pandorinellina vulgaris</i>	P ₁		5					3		6		4	3					1	8		15
<i>Mehlina strigosa</i>	P ₁	3				8	4	4		4						1				2	2
<i>Guichoudella</i> sp.										1											
<i>Jablonnodus</i> sp.						6			1	5	5		4	1			2	2	3	2	
<i>Mitrellataxis circularis</i>							15								1						
<i>Mitrellataxis coronella</i>							1														
<i>V. brannehlloides</i>	P ₁									1											
<i>Alternognathus beulensis</i>	P ₁		4		2	2		4	3		27	1	38	10		7	3	1	28		2
	P ₂																	7			
<i>Dinodus praesulcatus</i>	P ₁						14														

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TABLE 2c (continued).

Kowala		Ko- 234	Ko- 303	Ko- 235	Ko- 110	Ko- 236	Ko- 304	Ko- 305	Ko- 238	Ko- 113	Ko- 306	Ko- 307	Ko- 239	Ko- 114	Ko- 308	Ko- 240	Ko- 309	Ko- 310	Ko- 311	Ko- 241	Ko- 242
<i>Polygnathus pennatus</i>	P ₁									3											
<i>Pseudopolygnathus ultimus</i>	P ₁				30		1			3											
<i>P. aculeatus</i>	P ₁	122	9	32	90	13	37	9	48	25	7	28	29	19	40	6	13			32	8
<i>Pseudopolygnathus zieglerti</i>		15	42	7		7		44	15		1	12	11	7	25		38	126	77	10	34
<i>Pseudopolygnathus</i> spp.	P ₂		5		6		5	4		3	1	6			7		2		6	1	
	S ₀							2				1									
	S ₁		1		1		3	4		2	1	2			9		2	8			
	S ₁₋₄																2	2			
	M		2							3					1		2	2	5	1	
<i>Brammehla inornata</i>	P ₁	1	15	21	17	1	13	20	27	7	2	12	7	4	9		4	80		1	8
<i>Brammehla</i> spp.	P ₂						2											2	2		
	S ₁																	2			
	S ₂						1					2					2	4	1		
	S ₁₋₄							1				3			1			5			
	M																	1	3		
<i>Tripodellus gonioctymeniae</i>	P ₁				1				7	1						1			1	13	3
<i>Tripodellus gracilis</i>	P ₁		21	5	8	3	20	8	4	5	3		18	8	2	1	3	13	4	2	21
<i>Tripodellus</i> spp.	P ₂		1				2	1				2						3		1	
	S ₀		1																		
	S ₁		1				1										1				
	S ₂											1									
	S ₁₋₄				1		2					1									
	M				1		1								2						
<i>Dasbergina stabilis</i>	P ₁							1													
<i>Dasbergina trigonica</i>	P ₁				2			1													
<i>Neopolygnathus communis</i>	P ₁		1	1				3	10	4		1		1		1	2	8	5		1
<i>Neopolygnathus vogesi</i>	P ₁				6								7								
<i>Idioproniodus ruptus</i>	P ₁				2																
	S ₀							1									1				
	S ₁							1				1									
	S ₂				1																
	S ₁₋₄		1	1				2				2							1		
	M				1																
<i>Pandorinellina vulgaris</i>	P ₁						3	4			2	3			8		1	1	8		
<i>Mehlinia strigosa</i>	P ₁									7		2							1		
<i>Tubomnodus</i> sp.			1	2			2		3		1	3			1		1	6	3	4	2
<i>Mitrellataxis circularis</i>									2												
<i>Alternognathus beulensis</i>	P ₁												3			1	1	1	1	9	3
<i>Dinodus praesulcatus</i>	P ₁				1	1	1		2			2	1	1		2		2	5		
	S ₁																				
	S ₂																	1			

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TABLE 2e (continued).

Kowala		Ko-220	Ko-98	Ko-285	Ko-221	Ko-286	Ko-222	Ko-100	Ko-223	Ko-288	Ko-289	Ko-225	Ko-101	Ko-291	Ko-226	Ko-102	Ko-227	Ko-292	Ko-79	Ko-293	Ko-80
<i>Polygnathus pennatus</i>	P ₁		2					2								2			3		
<i>Pseudopolygnathus zieglerei</i>	P ₁																		63		2
<i>Pseudopolygnathus ultimus</i>	P ₁		152			13		5					5	5		89		29		17	
<i>P. aculeatus</i>	P ₁	49		11	33	50	168	49	52	71	65	54	27	37	117	3	139	100	11	61	24
<i>Pseudopolygnathus</i> spp.	P ₂		8			2			2	4						2			5	4	1
	S ₀								1					1		2		4			
	S ₂									2						1					
	S ₃₋₄					1				3								17	4		3
	M								1	1				1				5	3		
<i>Brammehla disparilis</i>	P ₁																1				
<i>Brammehla inornata</i>	P ₁	4					9		10		12	4		8	1			72	1	22	1
<i>Brammehla suprema</i>	P ₁	81		3	78		86		7								11				
<i>Brammehla</i> spp.	P ₂										3										
	S ₀																	2			
	S ₁																				
	S ₂																	8			
	S ₃₋₄											1		4				12		1	
	M																	2			
<i>Tripodellus gonoclymeniae</i>	P ₁	7			11																
<i>Tripodellus gracilis</i>	P ₁	34	14	2	33	21	95	7		6	17	32	8	1	24	25	21	18	18	11	11
<i>Tripodellus</i> spp.	P ₂		1						2							2		3	1	2	1
	S ₀					1	1														
	S ₁																				
	S ₂					1					1							2			
	S ₃₋₄					1												2			
	M		1	1	2			1								1		2		1	1
<i>Dasbergina trigonica</i>	P ₁	1			1	1			2	1	2	1				1	1	1	1		
<i>Neopolygnathus communis</i>	P ₁				1	3	13			1	1		1	1		6		6		1	
<i>Idioproniodus ruptus</i>	P ₂																		1		
	S ₀				1										1				1		
	S ₁					1															
	S ₂		3																		
	S ₃₋₄		3		2						1										1
<i>P. guizhouensis</i>	P ₁						1		4										1	1	
<i>Fungulodus</i> sp.?	P ₁																				
<i>Pandorinellina vulgaris</i>	P ₁						3				7							14			
<i>Mehlina strigosa</i>	P ₁				6		12					8			1	1		3			
<i>Guizhouella</i> sp.	P ₁																				
<i>Sweetodina monodentata</i>	P ₁	1																2		1	
	S ₂																1				
	M														1		1				
<i>Jablonnodus</i> sp.	P ₁	15					32			1		1			4			13			
<i>Mitrellataxis circularis</i>	P ₁																				3
<i>Conopiscius</i> sp.	P ₁																	1			
<i>Alternogonathus beulensis</i>	P ₁	1			1		2		3	1											
<i>Dinodus praesulcatus</i>	P ₁				2		1				1						2				
	P ₂																				
	S ₀																				
	S ₁																				
	S ₂																				
	S ₃₋₄																				
	M																				
<i>Planadina plana</i>	S ₀				2																
	S ₁																				
	S ₂																				
	S ₃₋₄																				
	M																				
	P ₁																				
<i>Dolymae peregrina</i>	P ₁																	2			
<i>Immognathus rhabdotus</i>	P ₁											4			3						
	P ₂																				
	S ₀																				
	S ₁																				
	S ₂																				
	S ₃₋₄																				
	M																				

TABLE 2f (continued).

Kowala		Ko- 266	Ko- 55	Ko- 281	Ko- 215	Ko- 92	Ko- 282	Ko- 283	Ko- 284	Ko- 216	Ko- 267	Ko- 217	Ko- 218	Ko- 93	Ko- 219	Ko- 97
<i>Polygnathus extralobatus</i>	P ₁					1										
<i>Polygnathus pennatus</i>	P ₁					3										3
<i>Pseudopolygnathus ultimus</i>	P ₁		81	7		7								37	2	45
<i>Pseudopolygnathus aculeatus</i>	P ₁	3		123	22	31	38	240	136	29	40	17	67		17	
<i>Pseudopolygnathus</i> spp.	P ₂ S ₀ S ₁ S ₂ S ₃₋₄ M		7 1 1 4 2 2	8 2 4			3 5 3	22 3	7 3	3 2 1		5 2 5 3				4 2
<i>Branmehla disparilis</i>	P ₁								3							
<i>Branmehla inornata</i>	P ₁			9	2		4	2	5			2	12			1
<i>Branmehla suprema</i>	P ₁	7		31	35			1	1	42	13	5	129			11
<i>Branmehla</i> spp.	P ₂ S ₀ S ₁ S ₂ S ₃₋₄ M			4						3 2 2 2		3 1				
<i>Tripodellus gracilis</i>	P ₁	10		50	16	7	19	87	45	19	22	21	32	10	40	9
<i>Tripodellus</i> spp.	P ₂ S ₁ S ₂ S ₃₋₄ M			2			2	2 1	2		2		4 2 3 3		3	
<i>Dasbergina stabilis</i>	P ₁															1
<i>Dasbergina trigonica</i>	P ₁	1		13							3			3	1	1
<i>Neopolygnathus communis</i>	P ₁						2	2					1			
<i>Idiopriionodus</i> sp.?	P ₂ S ₀ S ₁ S ₂ S ₃₋₄			1	1			1 1		1 1 1	2 1 1				1 1	
<i>Pelekysgnathus guizhensis</i>	P ₁			4	1				2	1	1					
<i>Pandorinellina fragilis</i>	P ₁								2							
<i>Pandorinellina vulgaris</i>	P ₁			7	3				3			1				
<i>Pandorinellina</i> spp.	S ₀ S ₂ S ₃₋₄												1 2 2			
<i>Mehlina strigosa</i>	P ₁		1	3					1	3			14		2	
<i>Guizhoudella</i> sp.										1						
<i>Sweetodina monodentata</i>	P ₁ P ₂					1								2		
<i>Ligodina</i> sp.?	P ₁													34		
<i>Jablonodus</i>				9	1		2		1							3
<i>Mitrellataxis conoidalis?</i>													1			
<i>Conopiscius</i> sp.								1								
<i>Alternognathus beulensis</i>	P ₁			9				3					2			
<i>Dinodus</i> sp.	P ₁							3								
<i>Dinodus praesculatus</i>	P ₁ S ₀ S ₁			2			1 1 1	3 1	1 1	1		1				
<i>Immognathus rhabdotus</i>	P ₁				1			1								

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TABLE 2g (continued).

Kowala		Ko- 276	Ko- 261	Ko- 210	Ko- 263	Ko- 82	Ko- 209 a	Ko- 209	Ko- 264	Ko- 213	Ko- 54	Ko- 214	Ko- 280
<i>Polygnathus extralobatus</i>	P ₁										1		
<i>Polygnathus pennatus</i>	P ₁										3		
<i>Pseudopolygnathus altimus</i>	P ₁	18				7					149	12	
<i>P. aculeatus</i>	P ₁	15	1		60		6	51	65	66	37	50	22
<i>Pseudopolygnathus</i> spp.	P ₂ S ₀ S ₁ S ₂ S ₁₋₄ M				6 1 5 2				6		14 2 5 10 12 12		1
<i>Branmehla disparilis</i>	P ₁	88	1	3									
<i>Branmehla inornata</i>	P ₁	65	14	8	15		7					1	
<i>Branmehla suprema</i>	P ₁	210	12	5	62	3		9	74	74		43	42
<i>Branmehla</i> spp.	P ₂ S ₀ S ₁ S ₂ S ₁₋₄ M	16 9 8 19 53 18	1 1 2 2 3		6 2 1 6 2 5				4 4 5 6				6 1 3
<i>Tripodellus gracilis</i>	P ₁	861	23	16	36	8	3	1	38	38	89	46	18
	P ₂ S ₀ S ₁ S ₂ S ₁₋₄ M	55 4 17 14 39 39	3 1 3 3 6		1 1 3 3 1				2 1 1 1 1 1		19 1 5 1 8 7		2 2 2
<i>Dasbergina stabilis</i>	P ₁	1							1				
<i>Dasbergina keyseri</i>	P ₁											1	
<i>Dasbergina zieglerti</i>	P ₁												
<i>Dasbergina trigonica</i>	P ₁	21	2		3	1		2	2			4	7
<i>Neopolygnathus communis</i>	P ₁	26						1					
<i>Neopolygnathus</i> spp.	S ₁₋₄	6											
<i>Idioproniodus ruptus</i>	P ₁ P ₂ S ₀ S ₁ S ₂ S ₁₋₄ M	1 5 13 7 12 15 4		1 1 1 1 1 2	1 1 1 1			1	1 2 3 5				
<i>Pandorinellina fragilis</i>	P ₁				5				7				
<i>Pandorinellina vulgaris</i>	P ₁	92		5								4	
<i>Pandorinellina</i> spp.	P ₂ S ₂ S ₁₋₄ M	6 2 15 2			1				2				
<i>Mehlina strigosa</i>	P ₁ P ₂ S ₂ S ₁₋₄ M	109 17 4 2			2				1		33 8		
<i>Guizhouella</i> sp.									1				
<i>Sweetodina monodentata</i>	P ₁ S ₁ M		1			1 1			1				
<i>Ligodina</i> sp.?	P ₁				1					1			
<i>Jablonnodus</i> sp.	MS P	74					2	12		1			4
<i>Alternognathus beulensis</i>	P ₁			2			3						4
<i>Dinodus</i> sp.	P ₁											3	2
<i>Dinodus praesulcatus</i>	P ₁ P ₂ S ₂ S ₁₋₄	15 9 5 8		3		3	2						
<i>Planadina plana</i>	S ₀ S ₁ S ₂ S ₁₋₄ M P ₂					4 2 2 1				1	2		

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Appendix

Ammonoid samples from Kowala

- Ko-102 *Glatziella glaucopis* (Renz, 1914) (1 specimen)
 Ko-107 *Kosmoclymenia* cf. *similis* (1 specimen)
 Ko-212 orthoceratid (1 specimen), *Eocanites* sp. (1 specimen ZPAL AmVII/1897)
 Ko-265 *Epiwocklumeria bohdanowiczi* (1 specimen)
 Ko-267 *Epiwocklumeria* (*Kielcensia*) *bohdanowiczi* (Czarnocki, 1989)
 (6 specimens ZPAL AmVII/1868, 1869, 1872, 1873, 1874, 1875, and 1876)
 Ko-268 *Epiwocklumeria bohdanowiczi* (2 specimens ZPAL AmVII/1870, 1871)
 Ko-272 *Cymaclymenia* sp. (2 specimens), *Prionoceras* sp. (2 specimens)
 Ko-277a *Cyrtochlymenia* sp. (1 specimen ZPAL AmVII/1891)
 Ko-294 *Parawocklumeria distorta* (1 specimen ZPAL AmVII/1867)
 Ko-282a *Epiwocklumeria* sp. (1 specimen ZPAL AmVII/1892)
 Ko-312 *Prionoceras* sp. (1 specimen), *Cymaclymenia* sp. (7 specimens), *Kosmoclymenia* sp. (1 specimen), *Kiaclymenia*? (1 specimen)
 Ko-338 *Kosmoclymenia* sp. (1 specimen)
 Ko-342 *Cymaclymenia* sp. (2 specimens), *Wocklumeria plana* (5 specimens ZPAL AmVII/1884, 1884)
 Ko-344 *Cymaclymenia* cf. *costellata* (3 specimens ZPAL AmVII/1881), *Kosmoclymenia* cf. *xenostriata* (2 specimens), *Wocklumeria sphaeroides* (Richter, 1848) (4 specimens ZPAL AmVII/1879)
 Ko-345 *Prionoceras* sp. (or *Sporadoceras* sp.) (1 specimen), *Kosmoclymenia* sp. (1 specimen), *Gonioclymenia* cf. *speciosa* (1 specimen ZPAL AmVII/1886)
 Ko-347 *Wocklumeria sphaeroides* (4 specimens ZPAL AmVII/1889), *Cymaclymenia* sp. (3 specimens)
 Ko-351 orthoceratid (2 specimens), *Prionoceras* sp. (1 specimen), *Kosmoclymenia* sp. (2 specimens), *Epiwocklumeria bohdanowiczi* (1 specimen ZPAL CVII/1896)
 Ko-359 *Prionoceras* sp. (1 specimen)
 Ko-360? *Cymaclymenia* sp. (1 specimen)
 Ko-362 *Prionoceras* sp. (1 specimen)
 Ko-365 *Posttornoceras fallax* (1 specimen), *Cymaclymenia* sp. (1 specimen), *Kosmoclymenia* sp. (1 specimen)
 Ko-366 *Discoclymenia cucullata* (1 specimen)
 Ko-368 *Cymaclymenia* sp. (1 specimen)
 Ko-373 *Cymaclymenia* sp. (1 specimen)
 Ko-376 *Kosmoclymenia* sp. (4 specimens)
 Ko-377 (383?) *Cymaclymenia* sp. (1 specimen), *Kosmoclymenia* sp. (1 specimen)
 Ko-383 (386?) *Cymaclymenia* sp. (2 specimens), *Kosmoclymenia* sp. (1 specimen)
 Ko-384 (386?) *Cymaclymenia* sp. (4 specimens), *Kosmoclymenia* sp. (2 specimens)
 Ko-386 (390?) *Cymaclymenia*? sp. (2 specimens)
 Ko-387 *Prionoceras* cf. *lineare* (1 specimen), large *Discoclymenia cucullata* (1 specimen ZPAL AmVII/1888), *Cymaclymenia* cf. *costellata* (5 specimens), *Kosmoclymenia* sp. cf. *xenostriata* (6 specimens ZPAL AmVII/1887)
 Ko-388 *Kosmoclymenia* sp. (1 specimen)
 Ko-389 *Kosmoclymenia* sp. (1 specimen)
 Ko-390 (394?) orthoceratid (1 specimen), *Discoclymenia cucullata* (1 specimen), *Cyrtochlymenia*? sp. (1 specimen), *Cymaclymenia* sp. (1 specimen)
 Ko-390 orthoceratid (1 specimen), *Prionoceras* sp. (3 specimens), *Sporadoceras* cf. *terminus* (2 specimens), *Cymaclymenia costellata* (20 specimens), *Kosmoclymenia* sp. (3 specimens)
 Ko-392 (394?) *Discoclymenia cucullata* (1 specimen), *Cymaclymenia* sp. (1 specimen)
 Ko-393 (397?) *Cymaclymenia* sp. (1 specimen)
 Ko-394 (397?) *Discoclymenia cucullata* (1 specimen), *Cymaclymenia* sp. (2 specimens)
 Ko-394 *Discoclymenia cucullata* (1 specimen), *Cymaclymenia* sp. (1 specimen)
 Ko-397 (400?) *Discoclymenia cucullata* → *D. zigzag* (1 specimen ZPAL AmVII/1895), *Kosmoclymenia* cf. *undulata* (or *K. galeata*) (2 specimens)
 Ko-400 *Cymaclymenia* sp. (4 specimens)
 Ko-401 *Kiaclymenia laevis* → *Biloclymenia* sp. (3 specimens), *Kosmoclymenia* sp. (1 specimen)
 Ko-404 *Pachtoceras*? sp. (1 specimen), orthoceratid (4 specimens), *Prionoceras* sp. (5 specimens), *Posttornoceras posthumus* (1 specimen), *Cymaclymenia* cf. *silesiaca* (12 specimens), *Kosmoclymenia* cf. *undulata* (1 specimen)

Ko-415 orthoceratid (2 specimens), *Prionoceras* sp. (1 specimen), *Kosmoclymenia* sp. (1 specimen)

Ko-416/417 *Cymaclymenia* sp. (1 specimen)

black matrix orthoceratid (1 specimen), *Epiwocklumeria* (*Kielcensia*) *bohdanowiczi* (1 specimen ZPAL AmVII/1837), *Wocklumeria plana* (5 specimens ZPAL AmVII/1892, 1894)

reddish matrix *Epiwocklumeria* (*Kielcensia*) *bohdanowiczi* (1 specimen ZPAL AmVII/1819)