Distribution of selected Campanian and Maastrichtian Ostracoda in Stratigraphic Test Holes of the New Jersey Coastal Plain

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Prepared in cooperation with the New Jersey Geological Survey

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic Code.

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ABSTRACT

This report shows the distribution of 43 biostratigraphically important Campanian and Maastrichtian ostracode species in samples from ten drill holes located in the New Jersey Coastal Plain. The biostratigraphically determined ages of these samples, as inferred from the ostracode faunas, also are indicated.

INTRODUCTION

Since 1983, the U.S. Geological Survey (USGS) and the New Jersey Geological Survey (NJGS) have conducted joint field investigations in the Coastal Plain province and the other geologic provinces of New Jersey with the goal of producing a new geologic map of that state. A major part of the Coastal Plain investigations has been the biostratigraphic and lithostratigraphic study of subsurface Cretaceous and Cenozoic sections in stratigraphic test holes and water wells. The purpose of this report is to document the occurrences of stratigraphically important ostracodes in Campanian and Maastrichtian (Upper Cretaceous) sections in New Jersey Coastal Plain drill holes.

OSTRACODE BIOSTRATIGRAPHY

Previous Work

Relatively little published information is available concerning Cretaceous ostracode faunas in the New Jersey Coastal Plain. The outcropping Maastrichtian sections have received the most attention as detailed descriptions of faunas from the Mount Laurel and Navesink Formations are given in the early report by Jennings (1936) and the unpublished thesis by Nine

(1954). In addition, Adams (1960) listed ostracode species from the outcropping Red Bank Formation, and Brouwers and Hazel (1978) published partial lists of ostracodes from four Navesink and Red Bank outcrops in northern New Jersey.

In the subsurface, Brown and others (1972) used several selected ostracodes as well as other taxa to determine the distribution of Cretaceous and Cenozoic chronostratigraphic units in the New Jersey Coastal Plain and throughout the northern part of the Atlantic Coastal Plain. More recently, Gohn (1992) discussed the composite ranges of 31 stratigraphically important ostracode species in four New Jersey drill holes.

This Study

Cretaceous ostracode faunas from ten drill holes (Appendix 1), including the four discussed by Gohn (1992), were studied as part of the USGS-NGJS cooperative mapping program. These drill holes were continuously or intermittently cored except for the old Mantua drill hole, which probably is represented only by samples of cuttings. Of the drill holes listed in Appendix 1, the USGS/NJGS-Freehold #1 and USGS/NJGS-Clayton #1 holes are continuously cored test holes drilled specifically for the cooperative mapping program. The GL-915, Clayton NJ-GCA-IR, Howell Township #5 (Brown and Zapecza, 1990), Manchester Township, and Woodstown Borough holes are recently drilled wells from which short cores were recovered from selected intervals. Ostracode slides from the Mantua, USGS-Island Beach #1, and Mantoloking Pumping Station #6 drill holes, originally prepared and studied by J.E. Hazel (USGS, now Louisiana State University) during the 1960's, also were available for the present study. Although these slides typically contain only a few

specimens, most of the represented forms are stratigraphically important species. Only a few slides were available for the Mantua and Island Beach wells, whereas numerous closely spaced (5 to 10 feet) slides were available from one 150-ft-thick cored interval in the Mantoloking well.

This report supplements Gohn's (1992) summary of composite ranges for Cretaceous ostracodes in New Jersey by listing the distribution of 43 selected Campanian and Maastrichtian species in individual samples from the ten studied drill holes. One or more charts showing the distribution of species in each of the studied drill holes are given in Appendix A. General ages of the indicated faunas also are shown for each sample on the data charts. Taxon ranges and their associated ages were determined primarily from studies of Gulf Coast ostracodes by Hazel and Brouwers, (1982), Ross and Maddocks (1983), and Chimene and Maddocks (1984), and from my unpublished data for Atlantic Coastal Plain ostracode faunas. My concepts of the identified species are derived in large part from the early reports of Berry (1925), Israelsky (1929), Alexander (1929), and Jennings (1936) and from the more recent reports by Hazel and Paulson (1964), Crane (1965), Brouwers and Hazel (1978), and Hazel and Brouwers (1982). A list of the present nomenclature and original designations of the 43 studied species are given in Table 1.

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Table 1. Alphabetical listing by genus and species of taxa used in this report and corresponding listing of original designations.

This report:	Original:
Alatacythere cheethami	*Pterygocythereis (P.) cheethami* Hazel and Paulson, 1964
Alatacythere saratogana	*Cytheropteron saratogana* Israelsky, 1929
Amphicytherura curta	*Cythereis curta* Jennings, 1936
Amphicytherura pandicosta	*Amphicytherura pandicosta* Crane, 1965
Antibythocypris fabaformis	*Cytherella fabaformis* Berry, 1925
Antibythocypris gooberi	*Antibythocypris gooberi* Jennings, 1936
Antibythocypris minuta	*Cytherideis minutus* Berry, 1925
Antibythocypris punctilifera	*Cytheridea punctilifera* Jennings, 1936
Anticythereis reticulata	*Pseudocythereis reticulata* Jennings, 1936
Ascetoleberis hazardi	*Cythereis hazardi* Israelsky, 1929
Ascetoleberis rugosissima	*Cythereis rugosissima* Alexander, 1929
Brachycythere acuminata	*Brachycythere (B.) acuminata* Hazel and Paulson, 1964
Brachycythere crenulata	*Brachycythere sphenoides crenulata* Crane, 1965
Brachycythere ovata	*Cythereis ovatus* Berry, 1925
Brachycythere pyriforma	*Brachycythere (B.) pyriforma* Hazel and Paulson, 1964
Brachycythere rhomboidalis	*Cythere rhomboidalis* Berry, 1925
Curfsina communis	*Cythereis communis* Israelsky, 1929
Cytherelloidea new species 1	*Cytherelloidea williamsoniana* (Jones) of Jennings, 1936
Cytherelloidea spiralia	*Cytherelloidea spiralia* Jennings, 1936
"Cythereis" bicornis	*Cythereis bicornis* Israelsky, 1929
"Cythereis" hannai	*Cythereis hannai* Israelsky, 1929
"Cythereis" veclitella	*Cythereis bicornis veclitella* Crane, 1965
"Cythereis" new species 1	*Cythereis magnifica* Nine, 1954 [nomen nudum]
Escharacytheridea pinochii	*Cytheridea pinochii* Jennings, 1936

Table 1 continued:

Fissocarinocythere gapensis	*Cythere gapensis* Alexander, 1929
Fissocarinocythere huntensis	*Cythere huntensis* Alexander, 1929
Fissocarinocythere pittensis	*Cythereis pittensis* Swain and Brown, 1964
Haplocytheridea everetti	*Cytheridea everetti* Berry, 1925
Haplocytheridea insolita	*Cytheridea insolita* Alexander and Alexander, 1933
Haplocytheridea renfroensis	*Haplocytheridea? renfroensis* Crane, 1965
Limburgina verricula	*Cythereis verricula* Butler and Jones, 1957
Mosaeleberis(?) reesidei	*Cythereis reesidei* Swain, 1948
Physocythere annulospinata	*Orthonotacythere? annulospinata* Hazel and Paulson, 1964
Planileberis costatana	*Cythereis costatana* Israelsky, 1929
Planileberis pulchra	*Cythereis pulchra* Jennings, 1936
Praephacorhabdotus pokornyi	*Phacorhabdotus pokornyi* Hazel and Paulson, 1964
Schizoptocythere(?) compressa	*Pterygocythereis (P.) compressa* Hazel and Paulson, 1964
Schuleridea parvasulcata	*Cytheridea (Haplocytheridea) parvasulcata* Swain, 1948
Veenia arachoides	*Cythere arachoides* Berry, 1925
Veenia ozanana	*Cythereis ozanana* Israelsky, 1929
Veenia ponderosana	*Cythereis ponderosana* Israelsky, 1929
Veenia spoori	*Cythereis spoori* Israelsky, 1929
Xestoleberis opina	*Xestoleberis opina* Schmidt, 1948

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APPENDIX 1:

DRILL-HOLE DATA SHEETS

DRILL HOLE LOCATION REGISTER:								
County	Township/Borough	USGS #	State Permit #	Latitude	Longitude	Depth (ft)	Remarks	
Camden	Gloucester Township.	--	?	394715	750115	232	drill hole GL-915, GEMS Landfill, Hickstown, NJ	
							land surface = 125 ft	
Gloucester	Mantua Township	15-193	31-01140	394713	751006	317	Mantua Township MUA #3	drilled in 1953
							fossil slides prepared 12/67	land surface = 65 ft
							samples are probably drill cuttings	
Gloucester	Clayton Borough	15-999	15-8013	394032	750607	1675	NJ-GCA-IR "old" Clayton test hole	
							land surface = 140 ft	logged 3/15/86
							on property of Gloucester Admin. Bldg.	
Gloucester	Clayton Borough	--	31-33878	393838	750603	1001	USGS/NJGS-Clayton #1 corehole	
							land surface = 108 ft	logged 1/25/89
							Bernard St. at Washington Ave.	
Monmouth	Freehold Borough	25-566	29-15257	401517	741351	1320	USGS/NJGS-Freehold #1 corehole	
							land surface = 200 ft	logged 10/85
							Freehold water tower on Oak Rise Drive	
Monmouth	Howell Township	25-639	29-18403-7	401105	741202	913	Howell Township #5	land surface = 112 ft
							completed 12/10/88	2-ft Denison cores
							between Peskin Road and Manasquan Reservoir	
Ocean	Manchester Township	?	29-23405-1	4000	7415	>910	observation well for Manchester Twnshp. MUA well 12	
							completed 8/90	
							about 1200 ft north of Pine Lake	land surface = 60 ft
Ocean	Berkeley Township	29-19	--	394829	740535	3891	USGS-Island Beach Test Well #1	
							logged 5/62	land surface = 13 ft
							south end of Island Beach	
Ocean	Mantoloking Borough	29-503	29-01325	400210	740310	1052	Mantoloking Pumping Station #6	land surface = 5 ft
							logged 1/13/55 to 1030 ft	
Salem	Woodstown Borough	--	30-5570-9	393846	751905	206	Borough of Woodstown	land surface = 45 ft
							completed 4/89	2-ft cores
							Millbrook Ave., east of Shoemaker School	

Ostracode abundance code:

VS (very sparse) = 1 - 2 valves
S (sparse) = 3 - 5 valves
F (few) = 6 - 10 valves
C (common) = 11 - 20 valves
A (abundant) = 21 - 50 valves
VA (very abundant) = 51 - 100 valves
EA (extremely abundant) = 100+ valves

CAMDEN COUNTY: DRILL HOLE GL-915				
			Depth (feet):	
Species:			185	
Fissocarinocythere huntensis			S	
Amphicytherura curta			S	
Antibythocypris punctilifera			VS	
			late Campanian to Maastrichtian	

GLOUCESTER COUNTY: MANTUA DRILL HOLE				
			Depth (feet):	
Species:			140-150	110-120
"Cythereis" veclitella			VS	
Brachycythere crenulata				VS
Brachycythere pyriforma				VS
Veenia spoori				VS
			early to middle Campanian	

GLOUCESTER COUNTY: CLAYTON GCA-IR				
			Depth (feet):	
Species:			579	548
Brachycythere crenulata			A	
Physocythere annulspinata			S	
Brachycythere pyriforma			A	C
"Cythereis" veclitella			A	VS
Veenia spoori			S	A
Antibythocypris fabaformis				VS
Schizoptocythere(?) compressa				S
Schuleridea sp.				S
			early to middle Campanian	

GLOUCESTER COUNTY: USGS - CLAYTON #1 COREHOLE - LOWER PART									
	Depth (feet):								
Species:	646	641	627	604	599	577	573	544	540
Alatacythere cheethami	VS								
Mosaeleberis(?) reesidei	VS		F						
Physocythere annulospinata	VS	S	C						
Veenia ozanana	VS		VS						
Brachycythere crenulata	VS	S	C		S				
"Cythereis" veclitella	S	VS	C						
Praephacorhabdotus pokornyi		VS							
Brachycythere pyriforma			C		VA	C	S		
Schizoptocythere(?) compressa				F	S	VS			
Schuleridea parvasulcata				C	S	F			
Veenia spoori				A	S	F	VS		
Antibythocypris minuta						S			
Ascetoleberis rugosissima							VS		
Haplocytheridea insolita								S	
Fissocarinocythere gapensis								S	VS
	early Campanian	early to middle Campanian					middle Campanian		

GLOUCESTER COUNTY: USGS - CLAYTON #1 COREHOLE - UPPER PART								
			Depth (feet):					
Species:			523	507	500	386	381	373
Haplocytheridea renfroensis			S					
Planileberis(?) costatana			VS	F				
Escharacytheridea pinochii			S		S			
Antibythocypris punctilifera			A	F	F	F		
Fissocarinocythere huntensis			VS		VS	VS		
Curfsina communis			S	S	C	S	S	
Xestoleberis opina			S		A	F	F	
Amphicytherura curta			VS			F		VS
Anticythereis reticulata				VS				
Antibythocypris fabaformis				S	C		VS	S
Limburgina verricula				S	A	S		VS
"Cythereis" new species 1						S		
Planileberis(?) pulchra						S	VS	VS
Brachcythere ovata								VS
			late Campanian to early Maastrichtian			middle to late Maastrichtian		

MONMOUTH COUNTY: USGS-FREEHOLD #1 - LOWER PART								
			Depth (feet):					
Species:			566	559	541	505	488	482
Veenia ozanana			VS (cf.)	VS (cf.)				
Schuleridea sp.			VS		VS			
Brachycythere pyriforma			F	S		A	VA	A
"Cythereis" veclitella			F			F	F	C
Alatacythere cheethami					S	F		
Brachycythere crenulata					S	VA	VS	F
Brachycythere acuminata						S		
"Cythereis" bicornis						F		
Mosaeleberis(?) reesidei						S		
Physocythere annulospinata						C		
"Cythereis" hannai							C	F
Schuleridea parvasulcata							C	VS
			early Campanian ?		early Campanian		early to middle Campanian	

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MONMOUTH COUNTY: USGS-FREEHOLD #1 - UPPER PART												
			Depth (feet):									
Species:			225	221	219	207	203	196	190	183	177	171
Ascetoleberis hazardi			VS									
Escharacytheridea pinochii			VS			F	C					
Planileberis(?) pulchra			VS	S	S		F					
Haplocytheridea renfroensis			VS		VS	VS				F		
Amphicytherura curta			VS			VS	S		A	A	C	F
Curfsina communis			F	S	S		S		C	C	C	C
Xestoleberis opina			VS	F	F	F	S	VS	F	S	S	C
Limburgina verricula				VS								
Antibythocypris punctilifera				F	C	A	F	VS		C	VS	
Anticythereis reticulata				VS					S	F	C	
Antibythocypris gooberi				F	VS	VS	VS	VS	C	A	F	F
Brachycythere ovata				F	S		F		F	A	VS	C
Haplocytheridea everetti				S	S	A	A	F	A	A	C	F
Veenia arachoides				VS			S	VS	A	A	C	S
Fissocarinocythere huntensis					VS	S			F	S	VS	
Antibythocypris fabaformis					VS	S	S	S	F	C	C	VS
Escharacytheridea magnamandibulata						S						
Brachycythere rhomboidalis							F				S	
Antibythocypris minuta									F			
"Cythereis" new species 1									S		S	
			middle to late Maastrichtian									

MONMOUTH COUNTY: HOWELL TOWNSHIP #5				
	Depth (feet):			
Species:	620	382	294
Alatacythere cheethami	C		
Brachycythere acuminata	S		
Brachycythere crenulata	C		
Brachycythere pyriforma	A		
"Cythereis" hannai	S		
"Cythereis" veclitella	S		
Physocythere annulospinata	C		
Schuleridea parvasulcata	S		
Antibythocypris gooberi		F	
Planileberis(?) costatana		S	
Antibythocypris punctilifera		A	A
Curfsina communis		VS	F
Limburgina verricula		S	S
Xestoleberis opina		S	F
Amphicytherura curta			S
Brachycythere ovata			S
Fissocarinocythere huntensis			VS
Haplocytheridea everetti			S
Planileberis(?) pulchra			F
	early Campanian	late Campanian to early Maastrich-tian	middle to late Maastrich-tian

OCEAN COUNTY: MANCHESTER TOWNSHIP											
	Depth (feet):										
Species:	910	906	901	850	830	780	762	663	616	541	
Mosaeleberis(?) reesidei	C	S									
Alatacythere cheethami	C	VS	C								
"Cythereis" bicornis	S		C								
Physocythere annulospinata	C		C								
Brachycythere crenulata	F	S	A	F							
"Cythereis" veclitella	A	S	C	S							
Brachycythere pyriforma	A		A	EA	F	F (cf.)	F (cf.)				
Bracycythere acuminata			S								
Schizoptocythere(?) compressa			S								
Veenia ozanana			C								
Schuleridea parvasulcata			F	S	VS						
Fissocarinocythere pittensis				S	VS						
Veenia spoori						S	VS				
Antibythocypris fabaformis						S			VS		
Ascetoleberis rugosissima							F				
Haplocytheridea insolita							A				
Planileberis(?) costatana								VS			
Curfsina communis								VS		VS	
Xestoleberis opina								VS		F	
Antibythocypris gooberi									C		
Limburgina verricula									S	F	
Alatacythere saratogana										VS	
Amphicytherura curta										S	
Antibythocypris punctilifera										A	
Brachycythere ovata										F	
Cytherelloidea spiralia										VS	
Cytherelloidea n. species 1										S	
Haplocytheridea everetti										S	
Planileberis(?) pulchra										S	
	early Campanian			early to middle Campanian		middle Campanian		late Campanian to early Maastrichtian		middle to late Maastrichtian	

OCEAN COUNTY: USGS - ISLAND BEACH #1								
			Depth (feet):					
Species:			1805	1770	1656	1616	1205	
Praephacorhabdotus pokornyi			S					
Brachycythere acuminata				VS				
Physocythere annulospinata				VS				
Mosaeleberis(?) reesidei					VS			
Alatacythere cheethami						VS		
Brachycythere pyriforma						VS		
Veenia ponderosana						VS		
Planileberis(?) pulchra							S	
			Santonian to early Campanian	early Campanian			middle to late Maastrichtian	

OCEAN COUNTY: MANTOLOKING COREHOLE - LOWER PART											
		Depth (feet):									
Species:		1052	1042	1037	1032	1027	1022	1017	1012	1007	1002
Brachycythere crenulata		VS		VS	VS	VS			S		
"Cythereis" hannai			VS								
Brachycythere pyriforma			VS	S		VS	S		VS		VS
Brachycythere acuminata					VS	S	VS				
"Cythereis" veclitella						VS			VS		
Amphicytherura pandicosta							F	S		S	F
Schuleridea parvasulcata							VS			VS	
Fissocarinocythere pittensis								VS			
Antibythocypris fabaformis											
Antibythocypris gooberi											
		early Campanian(?)			early Campanian			early to middle Campanian			

OCEAN COUNTY: MANTOLOKING COREHOLE - LOWER PART continued						
			Depth (feet):			
Species:			997	992	982	
Brachycythere crenulata				VS		
"Cythereis" hannai						
Brachycythere pyriforma				VS	VS	
Brachycythere acuminata						
"Cythereis" veclitella						
Amphicytherura pandicosta						
Schuleridea parvasulcata			VS			
Fissocarinocythere pittensis						
Antibythocypris fabaformis			VS			
Antibythocypris gooberi			VS			
			early to middle Campanian			

OCEAN COUNTY: MANTOLOKING COREHOLE - UPPER PART									
			Depth (feet):						
Species:			967	957	947	932	927	922	912
Veenia spoori			VS			VS			
Veenia ozanana				VS					
Haplocytheridea insolita				VS		S	VS	VS	
Brachycythere pyriforma					VS (cf.)			VS (cf.)	
Fissocarinocythere gapensis									S
			middle Campanian						

SALEM COUNTY: BOROUGH OF WOODSTOWN COREHOLE						
			Depths (feet):			
Species:			210	181	165	150.5
Antibythocypris gooberi			VS			
Limburgina verricula			VS			
Antibythocypris punctilifera				VS (cf.)		
Planileberis(?) costatana				VS		
Antibythocypris fabaformis				VS		VS
Anticythereis reticulata				S	VS	VS
Curfsina communis				S	VS	S
Xestoleberis opina						VS
			late Campanian to early Maastrichtian			