

630090, . , . . , 3

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27 2006 .

acuta *Spiroplectammina kasanzevi*–*Bulimina rosenkrantzi*; *Brotzenella prae-*
Cibicidoides proprius.
(*Cibicides gankinoensis*; *Brotzenella pseudopapillosa*–*B. complanata*)
Heterolepa hemicompressa (Morozova)
Brotzenella praeacuta.

**FORAMINIFERA AND BIOSTRATIGRAPHY
OF CRETACEOUS-PALEOGENE BOUNDARY DEPOSITS OF WEST SIBERIA**

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Institute of Petroleum Geology, Siberian branch of RAS

Stratigraphic distribution of benthic foraminifera taxa was investigated in most representative sections of Cretaceous-Paleogene boundary interval in West Siberia. Species composition of benthic foraminifera is refined and typical species of the Upper Maastrichtian-Paleocene foraminifera assemblages are recognized. Finds of joint cephalopod molluscs and plankton foraminifera allowed to specify the stratigraphic position of benthic foraminifer-based zones *Spiroplectammina kasanzevi*–*Bulimina rosenkrantzi* and *Brotzenella praeacuta* as well as the beds with *Cibicidoides proprius*. Two layers with foraminifera (*Cibicides gankinoensis* and *Brotzenella pseudopapillosa*–*B. complanata*) have been divided. Systematic description of *Heterolepa hemicompressa* (Morozova) – the *Brotzenella praeacuta* zone typical species – was carried out.

Key words: *foraminifera, Maastrichtian, Paleocene, West Siberia, biostratigraphy.*

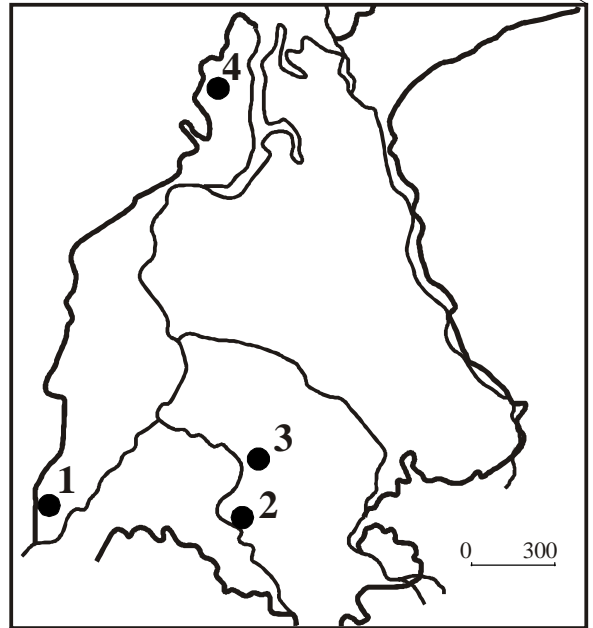
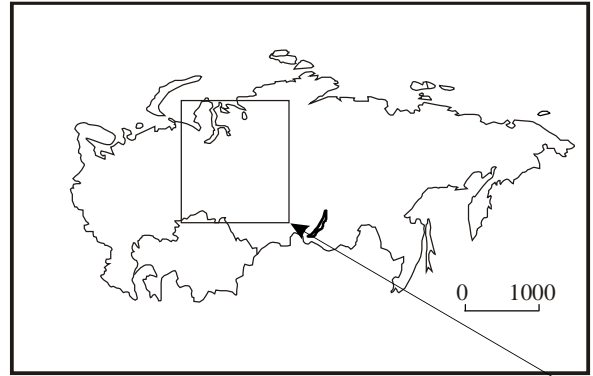
[1948] . . [1955]. -

[, 2000; ., 2003]. -

[., 2003], -

. 2.

1- ; 2- . 1- ; 3- .
1- ; 4- . 4.



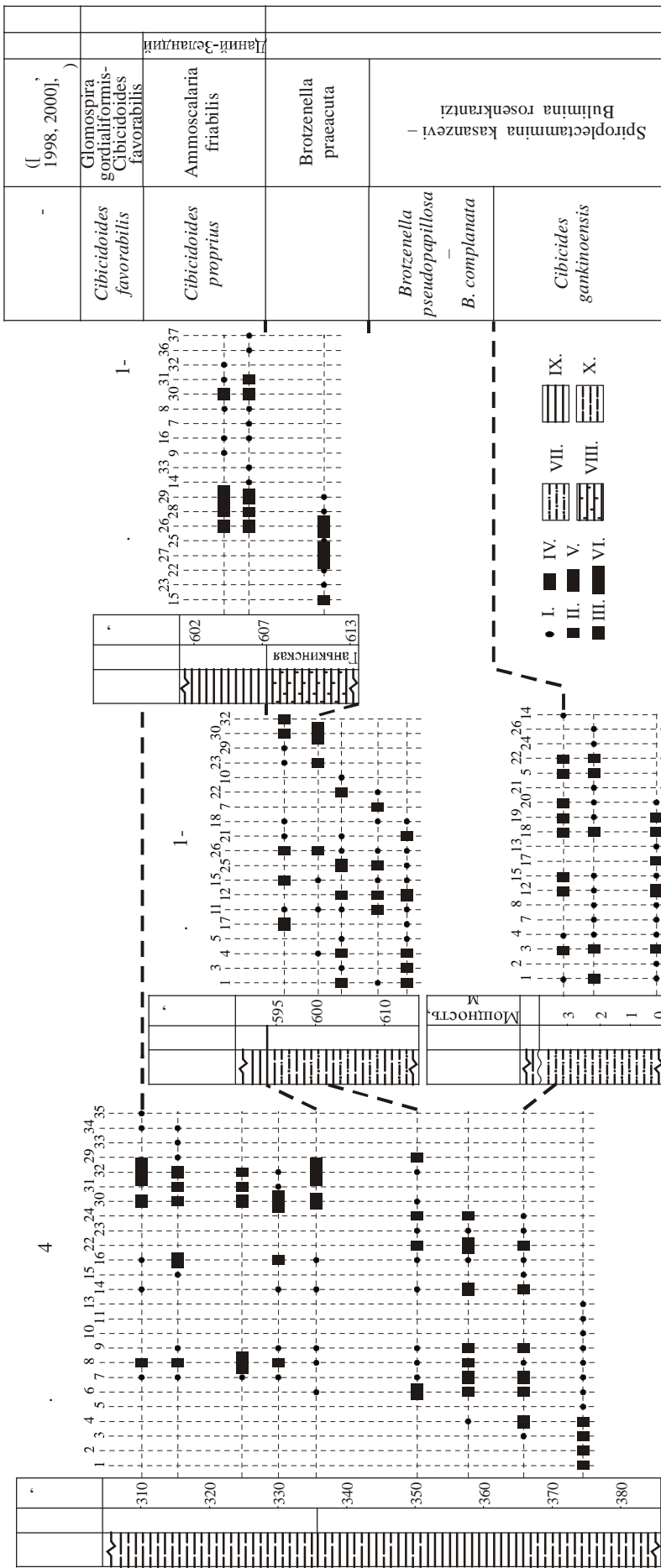
Rotaliida,

(, 5-10 %).
50 %

90 %

(, 2 %
)

10 %



3.

I-VI – ; VIII – ; IX – ; X – ; VII – ; VII – ; VII –
 primus Podobina, 3. *Cibicides globigeriniformis* Neck., 4. *Cibicides gankinoensis* Neck., 5. *Anomalinoidea pinguis* (Jenn.), 6. *Quadrinorhina allomorphinoidea* (Reuss), 7. *Pullenia americana* Cushm., 8. *Pullenia kasakhstanica* Dain, 9. *Bagginoidea quadrilobus* (Mello), 10. *Stensioeina caucasica* Subb., 11. *Spiroplectammima kasanzevi* Dain, 12. *Cibicoides aktulagayensis* (Vass.), 13. *Brotzenella rosenkrantzi* Brotz., 14. *Evolunonion sibiricus* (Lipman), 15. *Cibicoides spiripunctatus* (Galloway et Morrey), 16. *Eponides lunatus* Brotz., 17. *Reussella minuta* (Marss.), 18. *Heterohelix globulosa* (Ehrenb.), 19. *Cibicoides voltzianus* (Orb.), 20. *Cibicoides beaumontianus* (Orb.), 21. *Heterostomella foveolata* (Marss.), 22. *Cibicoides pocurensis* Kiss, 23. *Osangularia navarroana* (Cushm.), 24. *Brotzenella complanata* (Reuss), 25. *Brotzenella pseudopapillosa* (Carsey), 26. *Brotzenella praeacuta* (Vass.), 27. *Clavulina parisiensis* Orb., 28. *Anomalinoidea danicus* Brotz., 29. *Osangularia lens* Brotz., 30. *Heterolepa hemicompresa* (Morozova), 31. *Quadrinorhina halli* (Jenn.), 32. *Cibicoides proprius* Brotz., 33. *Gavelinella wellery* (Plumm.), 34. *Karrerria fallax* Rzehak, 35. *Cibicoides favorabilis* Vass., 36. *Subbotina* sp. ind., 37. *Globocornusa* sp. ind.

[1990] 3

(*Spiroplectammina kasanzevi*, *Brotzenella praeacuta*, *Hanzawaia eklomi*).

53 [., 1990].

(. 3).

Baculites knorrianus Desmarest
Neobelemnella kazimiroviensis (Skolozdrowna). 0-4,5

59, 37 : *Bolivinopsis rosula* (Ehrenb.), *Spiroplectammina variabilis* Neck., *S. cf. brevis* Kiss., *Ataxophragmium compactum* Brotz., *Dorothia pupoides* (Orb.), *Heterostomella foveolata* (Marss.), *Gaudruina pyromidata* Cushm., *Nodosaria zippei* Reuss, *N. sagrinensis* Bagg, *Pseudonodosaria* sp., *Dentalina* ex gr. *megalopolitana* Reuss, *D. filiformis* Reuss, *D. sp. ind.*, *Lagena* ex gr. *sulcata* Walker et Jones, *L. hexagona* (Williamson), *Fissurina* sp., *Lenticulina* ex gr. *comptoni* Sowerby, *Astaculus* sp., *Guttulina trigonula* Reuss, *G. pseudoaustriaca* Kusina, *Globulina lacrima* Reuss, *G. raketa* Kusina, *Discorbis* aff. *planus* Brotz., *Valvulineria* aff. *imitata* Olsson, *V. formosa* Freiman, *V. laevis* Brotz., *Valvulinoides umovi* (Kyprianova), *Gyroidinodes obliquaseptatus* (Mjatl.), *G. turgidus* (Hagenow), *G. aff. subangulatus* (Plumm.), *G. cf. berezoviensis* (Balakhm.), *Eponides sibiricus* Neck., *Alabamina dorsoplana* Brotz., *Stensioeina* cf. *caucasica* Subb., *Cibicides globigeriniformis* Neck.¹, *C. beaumontianus* (Orb.), *C. gankinoensis* Neck., *Anomalinoides pinguis* (Jenn.), *Cibicoides aktulagayensis* (Vass.), *C. spiropunctatus* (Galloway et Morrey), *C. voltzianus* (Orb.), ***C. primus*** **Podobina**, *Brotzenella complanata* (Reuss), *B. praeacuta* (Vass.), *B. monterelensis* (Marie), *Evolutononion sibiricus* Lipman, *Nonionellina pseudoinsecta* Putrja, *Pullenia americana* Cushm., *P. kasakhstani* a Dain, *Bolivina incrassata* Reuss, *B. decurriens* (Ehrenb.), *Bolivinoidea decoratus* (Jones), *B. senonicus* Dain, *Bulimina rosenkrantzi* Brotz., *Praebulimina reussi fulgida* Freiman, ***Reussella minuta*** (Marss.), ***Heterohelix globulosa*** (Ehrenb.), *Globigerinelloides multispinatus* (Lalicker), *Hedbergella* sp. ind.

[1990] *Hanzawaia eklomi*: *Spiroplectammina kasanzevi* Dain, *Stensioeina pommerana* (Brotz.), *S. caucasica* Subb., *Gavelinella welleri welleri* (Plumm.), *G. welleri laevis* Vass., *G. danica* (Brotz.), *Cibicoides bembix* (Marss.), *Cibicoides* cf. *clipeatus* Vass., *Brotzenella praeacuta* (Vass.), *Brotzenella complanata* (Reuss), *Cibicides kurganikus* Neck., *Anomalinoides pinguis* (Jenn.), *Hanzawaia eklomi* (Brotz.), *Bulimina eminenta* Ehrem., *B. omskiensis* Kiss., *Reussella minuta* (Marss.), *R. bacillum* Ehrem., *Bolivina incrassata incrassata* Reuss, *B. incrassata crassa* Vass., *B. plaita* Carsey, *Bolivinoidea draco draco* Marss., *Gublerina robusta* De Klsasz, *Heterohelix* sp., *H. navarroensis* Loebli., *H. globulosa* (Ehrenb.) *Pseudoguembelina kempensis* Esker, *P. palpebra* Broenn. et Brown, *Planoglobulina carseyae* (Plumm.).

[., 1995].

I-

[1960]

Gaudryina rugosa spinulosa (= *Spiroplectammina variabilis*–*Gaudryina rugosa spinulosa*) (795-697) *Spiroplectammina kasanzevi* (= *Spiroplectammina kasanzevi*–*Bulimina rosenkrantzi*) (697-594).

600-613

30

23 : *Spiroplectammina kasanzevi* Dain, *Bolivinopsis rosula* (Ehrenb.), ***Heterostomella foveolata* (Marss.)**, *Dorothia pupoides* (Orb.), *Nodosaria sagrinensis* Bagg, *Dentalina* cf. *megalopolitana* Reuss, *Lenticulina* sp. ind., *Astaculus omskiensis* (Balakhm.), *Conorboina disca* (Mello), *Stensioeina caucasica* Subb., *Valvulinoides umovi* (Kyprianova), *Gyroidinoides turgidus* (Hagenow), *G. beresoviensis* (Balakhm.), ***Eponides sibiricus* Neck.**, *Cibicides globigeriniformis* Neck., ***C. gankinoensis* Neck.**, *Anomalinoides falsiplanctonicus* (Balakhm.), *A. pinguis* (Jenn.), ***Cibicidoides aktulagayensis* (Vass.)**, *C. spiropunctatus* (Galloway et Morrey), *C. pocurensis* Kiss., *Brotzenella pseudopapillosa* (Carsey), *B. cf. praeacuta* (Vass.), *Pullenia americana* Cushm., *Nonionellina* aff. *pseudoinsecta* Putrja, *Praebulimina carseyae* (Plumm.), *Reussella minuta* (Marss.), *Bolivina plaita* Carsey, *B. incrassata* Reuss, *Heterohelix globulosa* (Ehrenb.).

595-600

(37)

32): *Bathysiphon nodosariaformis* Subbotina, *Ammodiscus cretaceus* (Reuss), *Glomospira* sp. ind., *Haplophragmoides* sp. ind., *Cribrostomoides cretaceus exploratus* Podobina, *Evolutinella* ex gr. *trinitatensis* (Cushm. et Renz), *Asanospira glabra* (Cushm. et Waters), *Ammobaculites fragmentarius agglutiniformis* Podobina, *Ammoscalaria* cf. *friabilis* (Ehrem.), *Haplophragmium* sp., *Spiroplectammina kasanzevi* Dain, *S. brevis* Kiss., *Heterostomella foveolata* (Marss.), *Dorothia pupoides* (Orb.), *Pseudoclavulina* sp. ind., *Nodosaria sagrinensis* Bagg, *N. sibirica* Podobina et Orlov, *Lenticulina tchizhapkensis* Podobina et Orlov, *Dentalina megalopolitana* (Reuss), *Conorbina disca* (Mello), *Valvulinoides* sp. ind., *Gyroidinoides obliquaseptatus* (Mjatl.), *G. beresoviensis* (Balakhm.), *Angulogavelinella gracilis* (Marss.), *Osangularia navarroana* (Cushm.), *Cibicides gankinoensis* Neck., ***Cibicidoides proprius* Brotz.**, ***C. spiropunctatus* (Galloway et Morrey)**, *Brotzenella praeacuta* (Vass.), *Heterolepa hemicompressa* (Morozova), *Allomorphinella nonioninoides* Dain, *Bulimina rosenkrantzi* Brotz., ***Reussella minuta***

(Marss.), *Bolivina plaita* Carsey, *B. incrassata* Reuss, *Heterohelix globulosa* (Ehrenb.), *Globigerinelloides multispinatus* (Lalicker).

(.) : -
Haplopragmoididae gen. et sp. ind.

I-

[1960] [1960].

Brotzenella praeacuta (. 613-605), [. , 1962]

- *Cibicides incognitus* (= *Cibicidoides proprius*).

. [1960].

607-613

: ***Clavulina parisiensis* Orb.**, ***Osangularia lens* (Brotz.)**, *O. cf. navarroana* (Cushm.), *Cibicidoides cf. pocuriensis* Kiss., ***C. spiropunctatus* (Galloway et Marrey)**, ***Brotzenella praeacuta* (Vass.)**, *Anomalinoides danicus* Brotz.

602,5-607

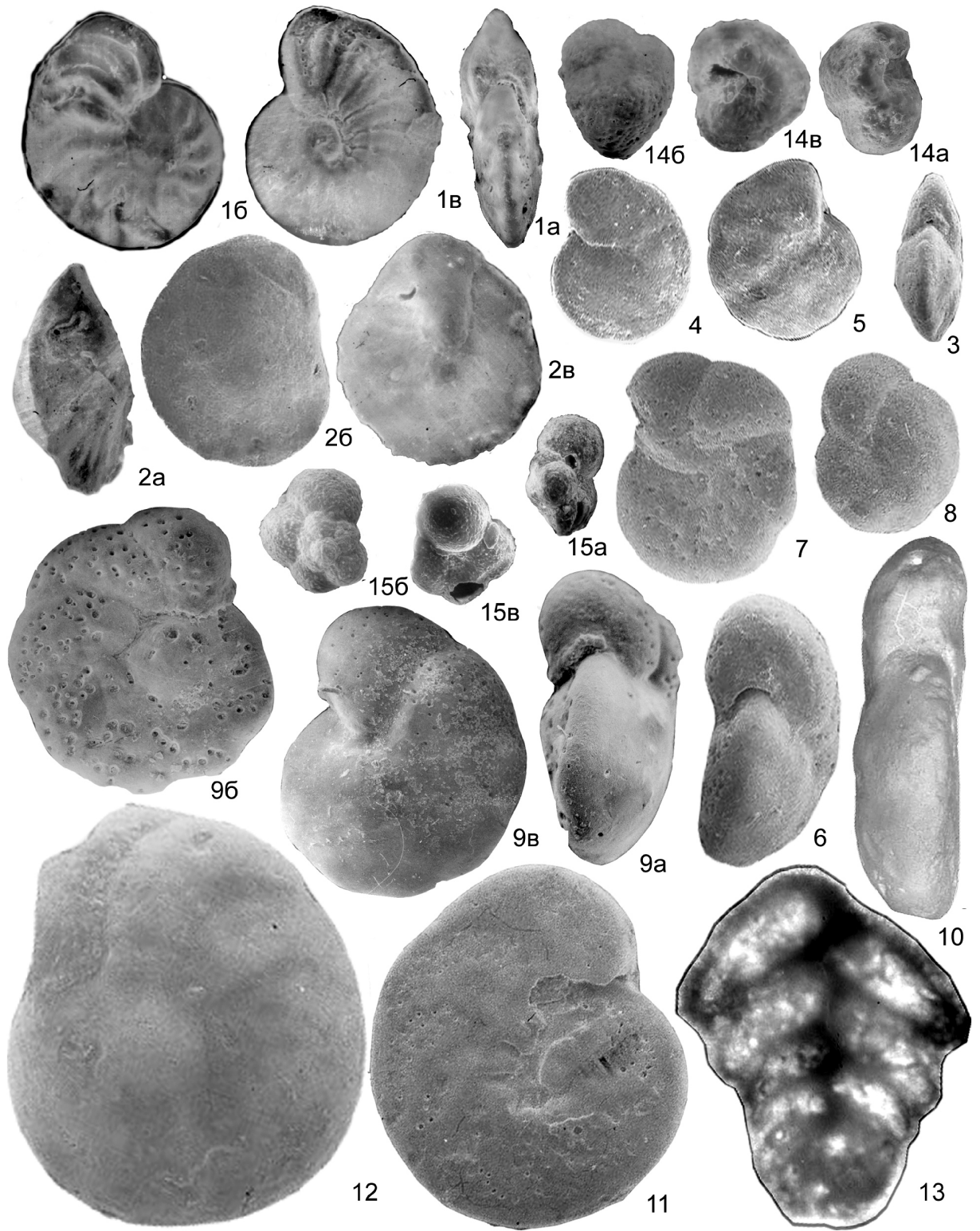
24 23

: *Glomospira* ex gr. *charoides* Parker et Jones, *Ammodiscus glabratus* Cushm. et Jarvis, *Cribrostomoides* sp. ind., *Trochammina pentacamerata* Lipman, *Verneuilinoides paleogenicus* (Lipman), *Nodosaria sagrinensis* Bagg, *N. zippei* Reuss, *Guttulina* sp. ind., ***Valvulineria* sp.**, *Gyroidinoides* aff. *subangulatus* (Plumm.), *Eponides lunatus* Brotz., ***Osangularia lens* (Brotz.)**, *Bagginoides quadrilobus* (Mello), *Alabama* cf. *dorsoplana* Brotz., *Cibicidoides proprius* Brotz., ***Brotzenella praeacuta* (Vass.)**, ***Anomalinoides danicus* Brotz.**, ***Heterolepa hemicompressa* (Morozova)**, *Evolutononion sibiricus* Lipman, *Pullenia americana* Cushm., *Quadrimorphina halli* (Jenn.), *Bolivina plaita* Car-

- sey, *Subbotina* sp. ind. (. I, . 4),
Globoconusa sp. ind. (. I, . 3).
- 4**
- [Ma-
rinov, 1996; Bugrova, 1997].
- 366-374 . -
28 22 : *Glo-*
mospirella sp., *Recurvoides optivus* Podobina, *Spi-*
roplectammina kasanzevi Dain, *S.* aff. *kellery* Da-
in, *S. brevis* Kiss., *Martiniotiella mediamos* (Mel-
lo), *Quinqueloculina sibirica* Putrja, *Dentalina me-*
galopolitana Reuss, *Fissurina* sp., *Globulina lac-*
rima Reuss, *Discorbis connicus* Ehrem., *D. sen-*
onicus Ehrem., *Gyroidinoides turgidus* (Hagenow),
G. obliquaseptatus (Mjatl.), *G. beresoviensis* (Ba-
lakhm.), ***Eponides sibiricus* Neck.**, *Eoeponidella*
linki Wickenden, *Bagginoides quadrilobus* (Mel-
lo), *Stensioeina caucasica* Subb., ***Cibicides ganki-***
***noensis* Neck.**, ***C. globigeriniformis* Neck.**, *Ano-*
malinoides pinguis (Jenn.), ***Cibicidoides primus***
Podobina, *Pullenia kasakhstanica* Dain, *Quadri-*
morphina allomorphinoides (Reuss), *Nonion pav-*
lodaricus Putrja, *Nonionellina* sp. ind., *Bulimina*
rosenkrantzi Brotz.
- 350-366 . -
39 -
30 : *Glomo-*
spirella sp., *Ammodiscus glabratus* Cushm. et Jar-
vis, *Haplopragmoides fastosus* Podobina, *Evolu-*
tinella trinitatensis (Cushm. et Renz), *Recurvoi-*
della sewellensis parvus (Belousova), *Martino-*
tiella mediamos (Mello), *Quinqueloculina stolleyi*
Brotz., *Q. pulchra* Putrja, *Nodosaria sagrinensis*
Bagg, *Dentalina megalopolitana* Reuss, *Lenticu-*
lina truncata (Reuss), *Robulus* cf. *trachy-*
omphalus (Reuss), *Lenticula* cf. *inusitata* (Kiss.),
Marginulina sphaerica Podobina et Orlov, *As-*
tacolus elatus Podobina, *Globulina lacrima* Reuss,
G. sp., *Guttulina trigonula* (Reuss), *Pyrulina*(?)
sp., *Valvulinoides* sp. ind., *Gyroidinoides turgidus*
(Hagenow), *G.* aff. *subangulatus* (Plumm.), *G. oc-*
tocameratus (Cushm. et Hanna), *Osangularia na-*
varroana (Cushm.), *Eponides lunatus* Brotz.,
***Bagginoides quadrilobus* (Mello)**, *Ceratobulimina*
cretacea Cushm. et Harris, ***Cibicides gankinoensis***
Neck. (), *C. globigerini-*
formis Neck., *Cibicidoides pocuriensis* Kiss., *C.*
spiropunctatus (Galloway et Morrey), ***Brotzenella***
complanata* (Reuss)**, ***Quadriformina allo-
morphinoides* (Reuss)**, ***Pullenia americana
Cushm., *Nonion pavlodaricus* Putrja, *Nonio-*
nellina pseudoinsecta Putrja, *N. ovata* (Brotz.),
***Evolunonion sibiricus* (Lipman)**.
- 335-350 . -
20 ,
18 : *Quinqueloculina si-*
birica Putrja, *Q. stolleyi* Brotz., *Nodosaria sagri-*
nensis Bagg, *Dentalina megalopolitana* Reuss,
Guttulina trigonula (Reuss), *Gyroidinoides octo-*
cameratus (Cushman et Hanna), *Eponides lunatus*
(Brotz.), *Bagginoides quadrilobus* (Mello), *Ala-*
bamina sp. ind., *Osangularia navarroana* (Cushm.),
***Osangularia lens* (Brotz.)**, *Ceratobullimina cre-*
tacea Cushm. et Harris, ***Cibicidoides proprius***
Brotz., ***Brotzenella complanata* (Reuss)**, ***He-***
***terolepa hemicompressa* (Morozova)**, *Pullenia*
americana Cushm., *P. kasakhstanica* Dain, ***Quad-***
***rimorphina allomorphinoides* (Reuss)**, *Evoluto-*
nonion sibiricus (Lipman), *Nonionellina ovata*
(Brotz.), *N.* aff. *ovata* (Brotz.).
- 310-335 . -
14 , 11 : *Gyro-*
idinoides aff. *subangulatus* (Plumm.), *G.* sp. ind.,
Alabamina cf. *dorsoplana* Brotz., ***Eponides lu-***
***natus* Brotz.**, *Osangularia lens* (Brotz.), *Bag-*
ginoides quadrilobus (Mello), *Ceratobulimina*
cretacea Cushm. et Harris, *Gavelinella welleri*
(Plumm.), *Cibicidoides* ex gr. *spiropunctatus* (Gal-
loway et Morrey), ***C. proprius* Brotz.**, ***Heterolepa***
***hemicompressa* (Morozova)**, *Evolutononion sibi-*
ricus Lipman, ***Pullenia kasakhstanica* Dain**, *P.*
americana Cushm., ***Quadriformina halli* (Jenn.)**.
- 305-310 . -
: *Gyroidi-*
noides aff. *subangulatus* (Plumm.), *Karrerria* cf.
fallax (Rzehak), *Cibicidoides favorabilis* (Vass.),

I

- . 1 , , . *Brotzenella praeacuta* (Vass.): . 1074-497, ; -
; - ; -
, . 1- , . 602-607 , . 3 ; *Ammoscalaria friabilis*,
Cibicoides proprius,
. 2 , , . *Osangularia lens* (Brotz.): . 1074-496, ; -
- ; - ;
. 1- , . 602-607 , . 3 ; *Ammoscalaria friabilis*, *Cibicoides*
proprius,
. 3-5. *Cibicoides proprius* Brotz.: 3 - . 1074-398, ; , -
, . 4, . 353-358 ; *Spiroplectammina kasanzevi*-*Bulimina rosen-*
krantzi, *Brotzenella complanata*-*B.pseudopapillosa*,
; 4 - . 1074-401, ; ; 5 - . 1074-395, ;
. 6-8. *Cibicides gankinoensis* Neck.: 6 - . 1074-305, ; , -
, . 4, . 369-374 ; *Spiroplectammina kasanzevi*-*Bulimina ro-*
senkrantzi, *Cibicoides gankinoensis*, ;
7 - . 1074-299, ; ; 8 - . 1074-300, ; .
. 9 , , . *Heterolepa hemicompressa* (Morozova): . 1074-378, ; -
; - ; -
, . 4, . 324-328 ; *Cibicoides proprius*, -
.
. 10-12. *Brotzenella complanata* (Reuss): 10 - . 1074-343, ; 11 - . 1074-
351, ; 12 - . 1074-344, ; , , . 53, . 3-3-2,
2,2 ; *Cibicoides gankinoensis*, , -
.
. 13. *Spiroplectammina kasanzevi* Dain: . 1074-229, ; , -
, . 4, . 369-374 ; *Spiroplectammina kasanzevi*-*Bulimina rosen-*
krantzi, *Cibicoides gankinoensis*,
. 14 , , . *Subbotina* sp. ind.: . 1074-489, ; - ; -
; - ;
1- , . 602-607 , . 3 ; *Ammoscalaria friabilis*, *Cibicoides*
proprius,
. 15 , , . *Globoconusa* sp. ind.: . 1074-490, ; - ; -
; - ;
1- , . 602-607 , . 3 ; *Ammoscalaria friabilis*, *Cibicoides*
proprius,
- × 100. , . 13, - -
. 13 .
().



C. proprius Brotz., *Heterolepa hemicompressa* (Morozova), *Evolutononion sibiricus* Lipman, *Pullenia kasakhstanica* Dain, *P. americana* Cushm., *Quadriformina halli* (Jenn.).

Baculites knorrianus Desmarest
Neobelemnella kazimiroviensis (Skolozdrowna). *B. knorrianus*

[Klinger, Kennedy, 2001].

Spiroplectammina kasanzevi –
Bulimina rosenkrantzi

[Birkelund, 1993].

kazimiroviensis

[, 1975].

[1960]

[1975, 2000],

Spiroplectammina kasanzevi–*Bulimina rosenkrantzi*,

Quinqueloquolina fusiformis Putrja, *Praebulimina carsey* (Plammer)

_____. *Spiroplectammina kasanzevi* Dain, 1961 (. I, . 13), *Bulimina rosenkrantzi* Brotz., 1948.

1- , . 605,0-645,0 , [, 2000, . 50].

_____. *Spiroplectammina kasanzevi* Dain, *Heterostomella foveolata* Marss., *Brotzenella pseudopapillisa* (Carsey), *Bulimina rosenkrantzi* Brotz.

– *Cibicides globigeriniformis* Neck., *C. gankinoensis* Neckaja, *Anomalinoidea pinguis* (Jenn.), *Cibicidoides primus* Podobina, *Eponides sibiricus* Neck.

– *Cibicides globigeriniformis* Neck., *C. gankinoensis* Neck., *Eponides sibiricus* Neck.

: *Cibicides* (. *globigeriniformis* Neck., *C. gankinoensis* Neck., *Anomalinoidea pinguis* (Jenn.)), *Cibicidoides* (*C. primus* (Podobina), *C. pocuriensis* (Kiss.)), *Eponides* (*E. sibiricus* Neck.) (. 4).

Brotzenella (*B. pseudopapillosa* (Carsey), *B. complanata* (Reuss))

– *Bagginoides* (*B. quadrilobus* (Mello)), *Quadriformina* (*Q. allomorphinoides* (Reuss)), *Pullenia* (*P. americana* Cushm., *P. kasakhstanica* Dain).

_____. *Spiroplectammina kasanzevi* Dain, *Heterostomella foveolata* Marss., *Bulimina rosenkrantzi* Brotz. *Cibicides gankinoensis* Neck.

Osangularia (*O. navarroana* (Cushm.), *O. lens* (Brotz.)), *Eponides lunatus* (Brotz.), *Anomalinoidea danicus* Brotz., *Heterolepa hemicompressa* (Morozova), *Cibicidoides spiropunctatus* (Galloway et Morrey).

(. 53); . 4 (. 350-374) 1- (. 600-610).

Cibicides gankinoensis Neck.,

Spiroplectammina kasanzevi–*Bulimina rosenkrantzi* (*Heterostomella foveolata* (Marss.), *Bulimina rosenkrantzi* Brotz.), – *Brotzenella praeacuta* (*Cibicidoides spiropunctatus* (Galloway et Morrey), *C. voltzianus* (Orb.), *Brotzenella complanata* (Reuss), *B. praeacuta* (Vass.), *B. monterelensis* (Marie)).

Brotzenella pseudopapillosa –
B. complanata

_____. *Brotzenella pseudopapillosa* (Carsey, 1912), *B. complanata* (Reuss, 1851) (. I, . 10-12).
_____. 1- (. 600-613).

_____.
Cibicides globigeriniformis Neck., *C. gankinoensis* Neck., *Eponides sibiricus* Neck, *Brotzenella pseudopapillosa* (Carsey), *B. complanata* (Reuss) *Bagginoides quadrilobus* (Mello), *Quadrimorphina allomorphinoides* (Reuss), *Pullenia americana* Cushman, *P. kasakhstanica* Dain.

Osangularia navarroana (Cushm.) (. I, . 2), *O. lens* (Brotz.), *Eponides lunatus* (Brotz.), *Heterolepa hemicompressa* (Morozova).

_____.
Brotzenella pseudopapillosa (Carsey), *B. complanata* (Reuss), *Bagginoides quadrilobus* (Mello), *Quadrimorphina allomorphinoides* (Reuss), *Pullenia americana* Cushm., *P. kasakhstanica* Dain,

Osangularia navarroana (Cushm.), *O. lens* (Brotz.), *Eponides lunatus* (Brotz.), *Anomalinoides danicus* Brotz., *Heterolepa hemicompressa* (Morozova), *Cibicidoides spiropunctatus* (Galloway et Morrey).

_____. 4 (. 350-366);
1- (. 600-613).

_____. [1990]

Hanzawaja eklomi.

Stensioeina caucasica Subb., *Gavelinella welleri welleri* (Plumm.), *G. welleri laevis* Vass., *G. danica* (Brotz.), *Cibicidoides bembix bembix* (Marss.), *Cibicidoides cf. clipeatus* Vass., *Brotzenella praeacuta* (Vass.), *Brotzenella complanata* (Reuss), *Cibicides kurganikus* Neck., *Anomalinoides pinguis* (Jenn.), *Hanzawaja eklomi* (Brotz.)

Hanzawaja eklomi *Brotzenella pseudopapillosa*–*B. complanata*.

Heterostomella foveolata (Marss.),
[, 1999]

[, 1960;
., 1960]

Brotzenella pseudopapillosa (Carsey) *B. complanata* (Reuss).

Brotzenella praeacuta

_____. *Brotzenella praeacuta* (Vass., 1950) (. I, . 1).

_____. 1- , . 558,83-552,18 .

Clavulina parisiensis Orb., *Osangularia lens* (Brotz.), *Cibicidoides spiropunctatus* (Galloway et Morrey), *Brotzenella praeacuta* (Vass.), *Heterolepa hemicompressa* (Morozova) (. I, . 9).

_____.
Brotzenella praeacuta [, 1960, . 185] «

S. kasanzevi–*B. rosenkrantzi*;

»
(*Brotzenella praeacuta* (Vass.), *Osangularia lens* (Brotz.), *Eponides lunatus* (Brotz.), *Heterolepa hemicompressa* (Morozova), *Cibicidoides proprius* Brotz.);

(*Clavulina parisiensis* Orb., *Gaudryina gigantea* (Subb.)).

_____. 1- (. 595-600);

4 (. 335-350);

1- (. 607-613).

1961. 3-190. // III , 2005. 203-208.
- (, 1990. 9-25. // 1997. 3. 17-20.
- . 2003. // 11. 1093-1103. // «III» . 2. : , 2000. 372-374.
- , 1957. 190-192. , 1960. 176-188. , 1969. 143 . 1. : () // «III» . 2. : , 2000. 372-374.
- , 1960. 176-188. , 1969. 143 . 1. : () // «III» . 2. : , 2000. 372-374.
- . 116-125. , 1969. 456 . // , 1960. 212-215. : , 1999. 25 . // , 1962. 52-65.
1955. 65-102. *Abramovich S., Almogi-Labin A., Benjamini C.* Decline of the Maastrichtian pelagic ecosystem based on planktic foraminifera assemblages change: implication for the terminal Cretaceous fauna crisis // *Geology*. 1998. V. 26. 1. P. 63-66.
2003. : , 2004. 39-44. *Birkelund T.* Ammonites from the Maastrichtian White Chalk of Denmark // *Bull. Geol. Soc. Denmark*. 1993. V. 40. P. 33-81.
- // , 1975. 91-108. *Bugrova E.M.* Upper Cretaceous-Paleocene foraminiferal assemblages in the West Siberian Arctic Region (Kara sea) // *Applications of micropaleontology in environmental sciences. Abstr. I Intern. Conf. Tel Aviv*, 1997. P. 46.
- , 1948. 211-226. *Keller G.* Extended Cretaceous-Tertiary boundary extinction and detailed population change in planktonic foraminifera from Brazos river, Texas // *Paleogeography*. 1989. V. 4. 3. P. 283-332.
- , 2005. 204 . *Klinger H.C., Kennedy W.J.* Stratigraphic and geographic distribution, phylogenetic trends and general on ammonite family Baculitidae Gill, 1871 (with one annotated list of species referred to the family) // *Annals South African Museum*. 2001. V. 107. Part 1. P. 1-290.
- , 1975. 163 . *Nederbragt A.J.* Late Cretaceous biostratigraphy and development of Heterohelicidae (planktic foraminifera) // *Micropaleontology*. 1991. V. 37. 4. P. 329-372.
1998. 338 .
2000. 388 .

Marinov V.A. The distribution of rotaliids (Foraminifera) in the Cretaceous and Paleogene of Yamal Peninsula // Zbl. Geol. Palaeont. Teil I. 1996. 11-12. P. 1339-1348.

Ollson R.K., Hemleben C., Berggren W.A., Huber B.T. Atlas of Paleocene Planktonic Foraminifera // Smithsonian contribution to paleobiology. Washington: Smithsonian Institution Press. 1999. 85. 252 p.