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Сборник содержит материалы IV Международного симпозиума «Эволюция жизни на Земле». Симпозиум был организован работниками Сибирского палеонтологического научного центра Томского государственного университета и привлек внимание специалистов, изучающих самые различные аспекты эволюционной теории. В трудах симпозиума в целом сохраняется сложившаяся рубрикация разделов, соответствующих рабочим секциям: 1. Проблемы эволюции и систематики высших таксонов. 2. Изменение факторов среды и эволюция биот. 3. Генетические и молекулярные основы эволюции. 4. Древняя жизнь (докембрий и ранний кембрий). 5. Органический мир морского палеозоя. 6. Органический мир морского мезозоя и кайнозоя. 7. Флора и палеоландшафты фанерозоя. 8. Позвоночные животные мезозоя и кайнозоя. 9. Органический мир плейстоцена, эволюция экосистем и древний человек. 10. Развитие биосферы по экспонатам палеонтологических музеев и комплексных природоохранных заповедников.

Сборник представляет интерес для биологов, палеонтологов, стратиграфов, аспирантов, студентов естественных факультетов и специалистов широкого профиля.

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E 158 **Evolution of Life on the Earth: Proceedings of the IV International Symposium, November 10–12, 2010 / Editor-in-Chief V.M. Podobina. – Tomsk: TML-Press, 2010. – 704 p.**

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The book constitutes the proceedings of the IV International Symposium «Evolution of Life on the Earth». The Symposium has been organized by the employees of the Siberian Paleontological Scientific Centre of the Tomsk State University and attracted the attention of specialists investigating various aspects of the evolution theory. The proceedings principally keep the previously established partition of the chapters corresponding to the working sections: 1. Problems of evolution and systematics of higher taxa. 2. Alterations in environmental factors and the evolution of biotas. 3. Genetic and molecular essentials of evolution. 4. Ancient life (Precambrian and Early Cambrian). 5. The organic world of the marine Paleozoic. 6. The organic world of the marine Mesozoic and Cenozoic. 7. The Phanerozoic flora and paleolandscapes. 8. The Mesozoic-Cenozoic vertebrates. 9. The Pleistocene organic world, evolution of ecosystems and ancient man. 10. The biosphere development in the displays of paleontological museums and complex nature preserves

The book will be of interest for biologists, paleontologists, stratigraphers, post-graduates, natural science students and experts.

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A BRIEF REVIEW OF THE «WOOLLY RHINO» *COELODONTA ANTIQUITATIS* (BLUMENBACH, 1799) (MAMMALIA, RHINOCEROTIDAE) IN ITALY (SOUTHERN EUROPE)

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Among the Middle and Late Pleistocene large mammals, the “woolly rhinoceros” *Coelodonta antiquitatis* (Blumenbach, 1799) was one of the most widely distributed species in Eurasia. Moreover it was very well-represented in the famous French-Cantabrian rock art.

In the course of the last two centuries, *C. antiquitatis* (better known in vernacular as “woolly rhino”, “rhinocéros laineux” or “rhinocéros à narines cloisonnées” or “rhinocéros à toison laineuse”, “Wollhaarigen Nashorn” or “Fellnashorn”, “rinoceronte lanudo”, “rinoceronte lanoso”, “nosorozec wlochaty”, “sherstisty nosorog”, etc) has also been identified as: *Rhinoceros lenensis* Pallas, 1773 – *Rhinoceros antiquitatis* Blumenbach, 1799 – *Rhinoceros tichorhinus* Fischer v. Waldheim, 1811 (often erroneously attributed to Cuvier, 1812) – *Rhinoceros Pallasi* Desmarest, 1822 – *Coelodonta Bojei* Bronn, 1831 – *Rhinoceros tichorhinus* Cuvier, 1834–36 – *Rhinoceros tichorhinus* Brandt, 1849 – *Rhinoceros tichorhinus* Giebel, 1851 – *Rhinoceros antiquitatis* Falconer, 1868 – *Rhinoceros jourdani* Lortet & Chantre, 1876 – *Rhinoceros (Tichorhinus) antiquitatis* Brandt, 1877 – *Rhinoceros tichorhinus* M. Pavlova, 1892 – *Rhinoceros antiquitatis* Schroeder, 1900 – *Rhinoceros antiquitatis* Blumenbach *tichorhinus* Fischer Lubicz Niezabitowsky, 1914 – *Tichorhinus antiquitatis* (= *tichorhinus*) Wüst, 1922 – *Rhinoceros antiquitatis* Hilzheimer, 1924 – *Rhinoceros antiquitatis* Osborn, 1929 – *Tichorhinus antiquitatis* Zeuner, 1934 – *Tichorhinus antiquitatis* Thenius, 1955 – *Rhinoceros (Tichorhinus) antiquitatis* Friant, 1961–63, and others.

At present, as far as the Italian peninsula is concerned – on the basis of the fossil evidence – *C. antiquitatis* is certainly recorded from seven localities only (fig. 1).

The available material on the whole has recently been revised by the author.

LOCALITIES AND MATERIAL

1. At Opicina (Carso Triestino, Trieste, Venezia Giulia, North-Eastern Italy) an upper molar (MCSN-TS n.n.) and a fragmentary upper premolar (MCSN-TS n.n.) of large dimensions were found by G. Carrara in 1901 [26]. Being not worn, the two *C. antiquitatis* teeth belong to a young individual. Unfortunately, neither chrono- nor biostratigraphical data on this discovery are available (collections: Museo Civico di Storia Naturale, Trieste).

2. From Fadalto nel Polesine (Rovigo, Southern Veneto, North-Eastern Italy) [27] come two very

well-preserved large dimensions *C. antiquitatis* upper teeth (IGUP n.n.; illustrations in 27). Unfortunately, neither chrono- nor biostratigraphical data are available. Moreover – at least at present – the material is not traceable (previously, they were in the collections of the Museo dell’Istituto di Geologia of the Università Statale, Padova).

3. In 1993, in Aurignacian levels of a cave named Grotta-Riparo di Fumane (Valle di Manune, Monti Lessini, Verona, Southern Veneto, North-Eastern Italy) (about 350 m asl) in addition to more than 5,000 skeletal remains belonging to 23 mammalian and 47 bird species [5] a *C. antiquitatis* isolated second upper deciduous molar (MNPEP-GRF 93/1) was also discovered. It is showing a very rare dental structural abnormality of genetic origin (amelogenesis imperfecta of hypoplastic type autosomic-dominant) (fig. 1, a, b, c, d) [7–9]. A series of ¹⁴C dates place the Aurignacian occupation of the cave between 37,000–35,000 and 32,000 years B.P. [5]. Until today, this may be considered the “oldest” case of amelogenesis imperfecta in mammals (collections: Museo Nazionale Preistorico Etnografico “Luigi Pigorini”, Roma).

For more details on the amelogenesis imperfecta and its classifications vide autem in Witkop [34] and in Billia & Graovac [7, 9].

4. At Settepolesini di Bondeno (Eastern Po Valley, Ferrara, Emilia, Northern Italy) [31], a *C. antiquitatis* radius distal epiphysis (MPUF n.n.) was recovered. The ¹⁴C dates provided by Lister (2007, personal communication) testify an age of 49,100 ys BP (collections: Museo di Paleontologia, Dipartimento delle Risorse Naturali e Culturali, Università Statale, Ferrara).

5. From a deposit in a slope – related to the “post-Thyrrhenian” – at Monte Circeo (Latina, Southern Latium, Central Italy) [30] comes the only *C. antiquitatis* skull (MPUR/V 2832) found in Italy. Without accompanying fauna, it is characterized by relatively large dimensions and a massive character (collections: Museo di Paleontologia, “Sapienza” Università di Roma).

6. Some *C. antiquitatis* remains have been discovered in a karst deposit named Cava della Ferrovia along the Ferrovia del Gargano at Ingarano (Apricena, Foggia, Gargano, Northern Apulia, Southern Italy) [6] together with several other Late Pleistocene vertebrate remains [6, 10] (*C. antiquitatis* remains supposed age: MIS 2; illustrations in Billia [6]; collections: Museo di Paleontologia, “Sapienza” Università di Roma).

7. In the Grotta di Cardamone (Terra d’Otranto, Lecce, South-Eastern Apulia, Southern Italy) [11, 32, 33] two

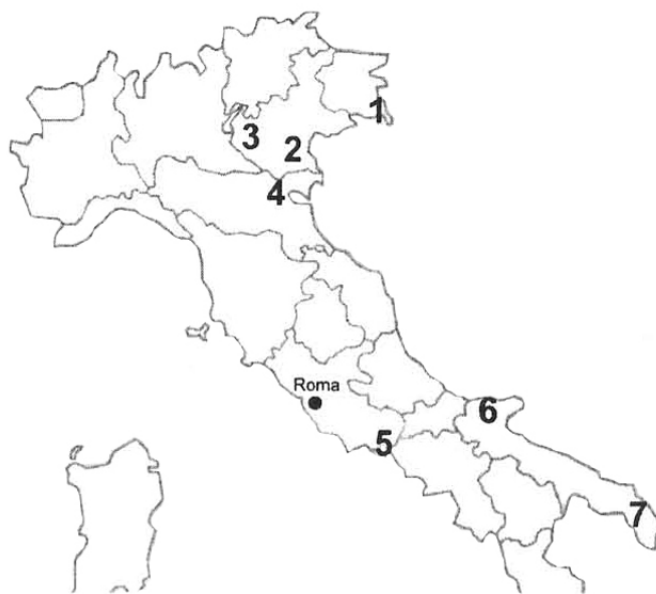


Fig. 1. Geographical map showing the seven Italian localities where *C. antiquitatis* remains were discovered: 1 – Opicina (Carso Triestino, Trieste); 2 – Fadalto nel Polesine (Rovigo); 3 – Grotta-Riparo di Fumane (Verona); 4 – Settepolesini di Bondeno (Ferrara), 5 – Monte Circeo (Latina); 6 – Cava della Ferrovia, Ingarano (Foggia), 7 – Grotta di Cardamone (Lecce)

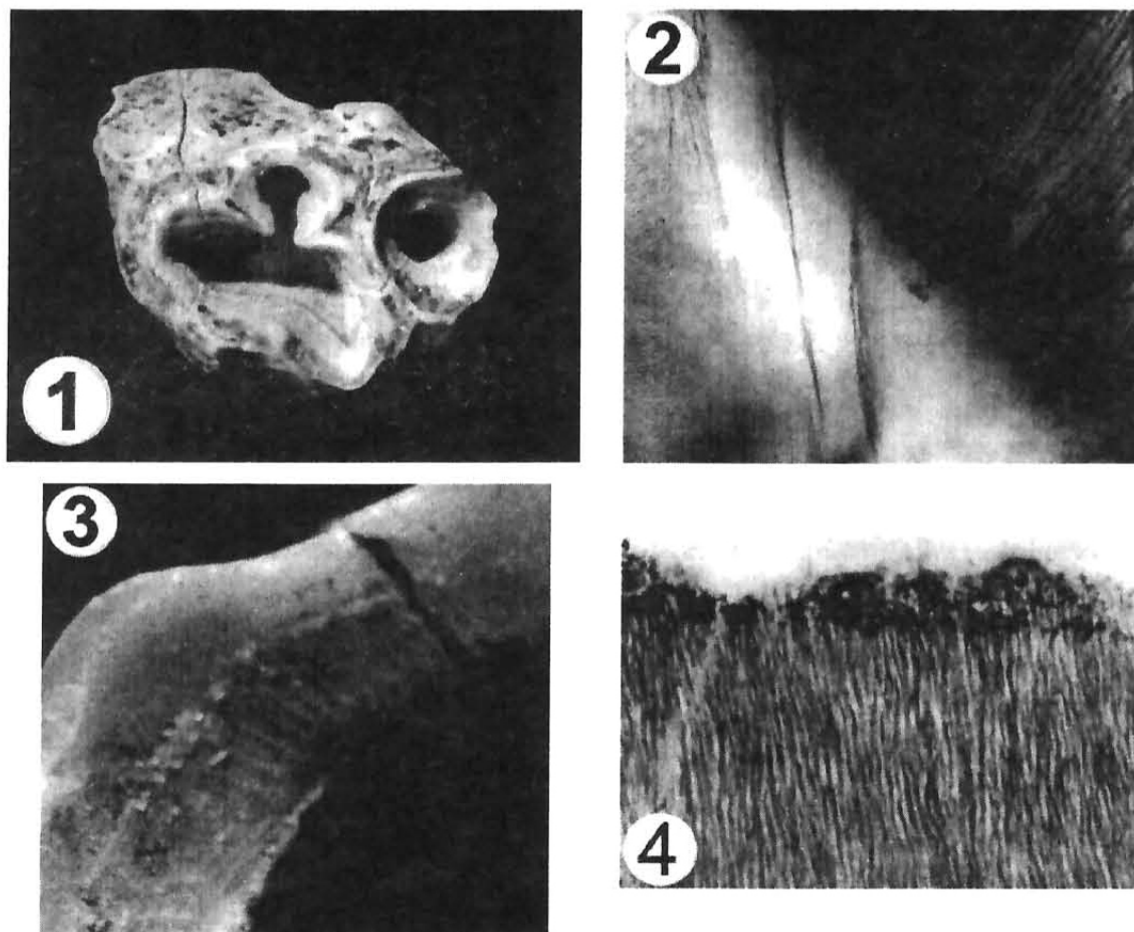


Fig. 2 *Coelodonta antiquitatis* (Blum., 1799), Late Pleistocene; Grotta-Riparo di Fumane (Valle di Manune, Verona); second upper deciduous molar (MNPEP-GRF 93/1) showing amelogenesis imperfecta of hypoplastic type autosomic-dominant; 1 – occlusal view (max length 27.5 mm); 2 – occlusal-distal section, EDJ (enamel-dental-junction, 20x); 3 – thickness of the enamel in the distal fossetta; 4 – distal-cervical section, dentine (40x)

C. antiquitatis juvenile lower jaws were allegedly found. No accompanying faunal complex and stratigraphical data are mentioned.

At least at present, these remains are untraceable in the museum collections.

Another report on discovery of *C. antiquitatis* fragmentary basin in the Grotta dei Pipistrelli (Matera, Lucania, Southern Italy) is also known [19, 24]. Nevertheless these remains probably belong to another rhinoceros species. In any case the specimen is unavailable at present.

REMARKS

C. antiquitatis is a species of East-Asian origin. At present, its West-European first occurrence is represented by the remains from the pre-Rissian gravels of Frankenhausen (Thüringen, Germany) [12]. Afterwards the species survived in Western Europe disappearing at the end of the last glacial (MIS 2).

Until to day, despite of its being widely spread in the vast Eurasian landmass *C. antiquitatis* still seems to be decidedly less numerous in the Southwest European regions (just as in Italy) than in the Central-Northern ones [1–4, 13–20, 22, 25, 27–29, 32, 33]. Furthermore, in Southwestern Europe about the 90% of the *C. antiquitatis* remains are referred to the second half of the Late Pleistocene.

As a general rule, the Asian Middle Pleistocene form *C. antiquitatis praecursor* erected by Guérin [23] appears not accepted by the specialists as well as the Asian geographical synchronous (in comparison to *C. antiquitatis*) species *Coelodonta lenensis* (Pallas, 1772) proposed by Garutt [21].

In author's opinion, the vastness of the *C. antiquitatis* spreading areal as well as some morphological features of its skull (sexual dimorphism apart) could justify the existence of some geographical variants. This does not necessarily refers to other species and/or subspecies.

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References

1. Aguirre Enriquez E. de. Vertebrados del Pleistoceno continental // Mapa Cuaternaria de España. Madrid, 1989. P. 47–69.
2. Agustí J. Continental mammal unit of the Plio-Pleistocene from Spain // Memorie della Società Geologica Italiana. 1986. Vol. 31. P. 167–173.
3. Altuna Echave J. Fauna de mamíferos de los yacimientos prehistóricos de Guipúzcoa, con catalogo de los mamíferos cuaternarios del Cantábrico y del Pirineo occidental // Tesis doctoral, Munibe. 1972. Vol. 24 (1–2). P. 1–464.
4. Arsuaga Ferreras P.M., Aguirre Enriquez E. de. Rinocerontes lanudos en la provincia de Madrid (Coelodonta antiquitatis Blumenbach) // Boletín de la Real Sociedad Española de Historia Natural (Geol.). Madrid, 1979. Vol. 77. P. 23–59.
5. Bartolomei G., Broglio A., Cassoli P.-F. et al. La Grotte de Fumane – Un site aurignacien au pied des Alpes // Preistoria Alpina (Museo Tridentino di Scienze Naturali). Trento, 1994. Vol. 28. P. 131–179.
6. Billia E.M.E. First find of the "woolly rhino" Coelodonta antiquitatis (Blumenbach, 1799) in Gargano (Apulia, Southern Italy) // «Evolution of Life on the Earth» Tomsk November 12–15 2001: Proceedings of the II International Symposium / Eds. by V.M. Podobina, S.A. Rodygin, N.I. Savina & G.M. Tat'yanin. Tomsk, 2001. Vol. 2. P. 471–474.
7. Billia E.M.E., Graovac S.M. Amelogenesis imperfecta on a deciduous molar of Coelodonta antiquitatis (Blumenbach, 1799) (Mammalia, Perissodactyla, Rhinocerotidae) from Grotta-Riparo di Fumane (Verona, Northern Italy) – A rare case report (in Mayhall, J.T. & Heikkinen, T., eds: Proceedings of the XI International Symposium on "Dental Morphology", Oulu, Finland, August 26–30 1998) // Dental Morphology 1998. Oulu University Publishing House, 1999a. P. 179–186.
8. Billia E.M.E., Graovac S.M. Amelogenesis imperfecta in un molare deciduo di Coelodonta antiquitatis (Blumenbach, 1799) (Mammalia, Perissodactyla) (in Dolci G., De Stefano Dorigo E. & Goracci G., eds: Atti del 6° Congresso Nazionale del Collegio dei Docenti di Odontoiatria – "L'Odontoiatria Europea verso il 2000", Roma-Palazzo dei Congressi April 21–24 1999 // Clinica Odontoiatrica dell'Università di Roma "La Sapienza" Publishing House, Roma, 1999b. P. 68 (abstract).
9. Billia E.M.E., Graovac S.M. Amelogenesis imperfecta on a deciduous molar of Coelodonta antiquitatis (Blumenbach, 1799) (Mammalia, Rhinocerotidae) from the Late Pleistocene levels of Grotta di Fumane (Verona, Northern Italy) – A rare case report // Paleontologia i Evolució, Sabadell (Barcelona). 2001. Vol. 32–33. P. 93–97.
10. Billia E.M.E., Petronio C., Capasso Barbato L. et al. The Late Pleistocene fauna from Ingarano (Gargano, Italy) – Biochronological, palaeoecological, and geochronological implications // INQUA International Congress, Berlin 1995. Terra Nostra, Freie Universität Berlin. P. 239 // Bollettino della Società Paleontologica Italiana, Modena, 1996. Vol. 34 (3), P. 333–339.
11. Botti V. La grotta ossifera di Cardamone in Terra d'Otranto // Bollettino della Società Geologica Italiana, Roma, 1890. Vol. 9. P. 659–716.
12. Bouchud J. Les Rhinocéros (in Lavocat R., ed: Atlas de Préhistoire – Faunes et Flores Préhistorique de l'Europe Occidentale) // Boubée éd.. Paris, 1966. Vol. III. P. 174–193.
13. Boule M. Les grottes de Grimaldi (Baoussé-Roussé) // Géologie et Paléontologie. Monaco, 1910. Vol. 1 (3). P. 167–173.
14. Calderon S. Enumeracion de los Vertebratos fosiles de España // Annales de la Sociedad Española de Historia Natural. Madrid, 1877. Vol. 5. P. 3–35.
15. Crusafont Pairo M. Le quaternaire espagnol et sa faune de mammifères – Essai de synthèse // Anthropos (Mammalia pleistocenica). Brno, 1960. Vol. 1. P. 55–63.
16. Crusafont Pairo M. El Cuaternario Español y su fauna de mamíferos – Ensayo de síntesis // Speleon. 1961. Vol. 12 (3–4). P. 3–21.
17. Crusafont Pairo M., Casanovas Cladellas L. Rhinocerotidae (in: Mammalia Tertiaria Hispaniae) // Fossilium Catalogus (Animalia). 1973. Vol. 1 (121). P. 113–123.
18. Donner J.J., Kurtén B. The floral and faunal succession of Cueva del Toll, Spain // Eiszeitalter und Gegenwart. Ohningen, 1958. Vol. 9. P. 72–82.

19. *Flores E.* Catalogo dei mammiferi fossili dell'Italia meridionale continentale // Atti dell'Accademia Pontiniana. Napoli, 1895. Vol. 25 (18). P. 3–48.
20. *Fuentes Vidarte C., Meijide M.* El Rinoceronte lanudo (*Rhinoceros tichorhinus* Cuvier = *Coelodonta antiquitatis* Blumenbach) de la cueva de Nando (Ajo, Santander) // Cuadernos de Espeleología. Santander, 1979. Vol. 9–10. P. 87–98.
21. *Garutt N.V., Boeskorov G.G.* Sherstistye nosorogi – K istorii roda ["Woolly rhinos" – On the History of the Genus] (in Rozanov A.Yu., ed.: Mamont i ego Okruzhenie – 200 Let Izucheniya). Skt-Peterburg: GEOS, 2001. P. 157–167 [in Russian, English abstract].
22. *Gervais P.* Mémoire sur le Rhinocéros fossile à Montpellier // Académie des Sciences et Lettres de Montpellier (sect. Sciences). 1851–54. Vol. 2. P. 59–73.
23. *Guérin C.* Les trois espèces de rhinocéros (Mammalia, Perissodactyla) du gisement pléistocène moyen des Abîmes de la Fage à Noailles (Corrèze) // Nouvelles Archives du Muséum d'Histoire naturelle de Lyon. 1973. Vol. 2. P. 55–84.
24. *Guérin C.* Les Rhinocéros (Mammalia, Perissodactyla) du Miocène terminal au Pléistocène supérieur en Europe occidentale – Comparaison avec les espèces actuelles // Thèse Doctorat d'Etat et Sciences, Université de Lyon I. Documents des Laboratoires de Géologie de Lyon, 1980. Vol. 79 (1-2-3), P. 1–1185 [with English, German, and Russian summ.].
25. *Harlé E.* Essai d'une liste des mammifères et oiseaux quaternaires connus jusqu'ici dans la Peninsule Ibérique // Bulletin de la Société Géologique Française. Paris, 1909. Vol. 9. P. 355–370.
26. *Leonardi P.* Resti fossili di rinoceronti nel Museo di Storia Naturale di Trieste // Atti del Museo Civico di Storia Naturale di Trieste, Del Bianco Editore. Udine, 1945–47. Vol. 17 (12). P. 145–160.
27. *Leonardi P.* Resti fossili inediti di rinoceronti conservati nelle collezioni dell'Istituto Geologico dell'Università di Padova // Memorie dell'Istituto Geologico dell'Università di Padova. 1947. Vol. 15. P. 1–30.
28. *Melentis J.K.* Die fossilen Rhinocerotiden, Hippopotamiden und andere Säugetiere aus dem Becken von Megalopolis im Peloponnes // Praktika Akad. Athenon, Athinai, 1964. Vol. IXL. P. 388–400.
29. *Melentis J.K.* Studien über fossilen Vertebraten Griechenlands – Die pleistozänen Nashörner des Beckens von Megalopolis in Peloponnes (Griechenland) // Annales de Géologie des Pays Helléniques. Athinai, 1965. Bd. 16. S. 1, P. 363–402.
30. *Palmarelli A., Palombo M.R.* Un cranio di *Coelodonta antiquitatis* (Blumenbach) (Rhinocerotidae) del Pleistocene Superiore del Monte Circeo (Lazio meridionale) // Bollettino del Servizio Geologico Italiano. Roma, 1981. Vol. 102. P. 281–312.
31. *Sala B.* I mammiferi del Quaternario italiano (in: Tugnoli C., ed: I Segni del Tempo – Memoria delle Origini e Icone del Primordiale). Trento, 1992. P. 209–227.
32. *Vaufrey R.* Le mammoth et le rhinocéros à narines cloisonnées en Italie méridionale // Bulletin de la Société Géologique Française. Paris, 1927. Vol. 4. P. 163–171.
33. *Vaufrey R.* La répartition du *Rhinoceros tichorhinus*-*Hippopotamus minutus* et la phylogénie des hippopotames // L'Anthropologie. Paris, 1940. Vol. 49. P. 458–461.
34. *Witkop C.J. jr.* Amelogenesis imperfecta, dentinogenesis imperfecta, and dentinal displasia revisited – Problems in classification // Journal of Oral Pathology. 1988. Vol. 17. P. 547.