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NEW *STEPHANORHINUS KIRCHBERGENSIS* (JÄGER, 1839) (MAMMALIA, RHINOCEROTIDAE) RECORDS IN EURASIA. ADDENDA TO A PREVIOUS WORK

NUOVE SEGNALAZIONI DI *STEPHANORHINUS KIRCHBERGENSIS*
(JÄGER, 1839) (MAMMALIA, RHINOCEROTIDAE) IN EURASIA.
ADDENDA AD UNA PUBBLICAZIONE PRECEDENTE

Riassunto breve - Viene proposto l'aggiornamento dei dati relativi alle segnalazioni di resti di *Stephanorhinus kirchbergensis* (JÄGER, 1839) in Europa e in Asia. La nota integra quanto già pubblicato (BILLIA 2011a) in precedenza.

Parole chiave: Rhinocerotidae, Pleistocene, *Stephanorhinus kirchbergensis*, Europa, Asia.

Abstract - An updated integration containing numerous other reports on *Stephanorhinus kirchbergensis* (JÄGER, 1839) remains in Europe and Asia is proposed here. The notes follow the previous paper (BILLIA 2011a).

Key words: Rhinocerotidae, Pleistocene, *Stephanorhinus kirchbergensis*, Europe, Asia.

Introduction

This work follows the previous one (BILLIA 2011a), recently published in *Acta Palaeontologica Romaniaae*. It represents an updated integration containing several other data on sites (in both continents) which gave back *Stephanorhinus kirchbergensis* (JÄGER, 1839) remains. These data were acquired later based on further investigation (2011-2015).

Fig. 1 shows the present approximative distribution of the *S. kirchbergensis* Eurasian sites. Denmark apart (country not yet present in BILLIA 2011a), the paragraph numbers used here in the text correspond to the same used in the previous paper.

The present article is strictly correlated with the paper (BILLIA & ZERVANOVÁ in prep.) concerning the *S. kirchbergensis* coming from "Cava Italcementi" (Vernasso, Cividale del Friuli, Udine, Friuli Venezia Giulia, North-Eastern Italy) and other sites in adjacent areas where *S. kirchbergensis*, as well as other rhinoceros remnants, have been found throughout the time.

1. Europe

Denmark

A fragment of a left mandible (believed of Eemian age) from a gravel pit at Seest near Kolding (Southeast Jylland) would represent the only *S. kirchbergensis*

specimen ever found in Denmark (DEGERBØL 1952; AARIS-SØRENSEN 1988, 2009).

England, §1.1, p. 19

The sequence at Crayford (Lower Thames Valley) (SCOTT 2009) shows great similarities to the Ilford one and has a similar research history (BRIDGLAND 1994; GIBBARD 1994). Just as at Ilford, the exact provenance of most specimens is unclear. The fauna from the Crayford Gravel underlying the brickearth includes *Stephanorhinus hemitoechus* (FALCONER) and *Coelodonta antiquitatis* (BLUMENBACH). The "lower brickearth" contained specimens of *S. kirchbergensis* and *C. antiquitatis* (SCHREVE 1997). Amino-acid ratios are indicative of a MIS 7 age for the temperate sediments at both sites (PENKMAN et al. 2008).

The Netherlands, § 1.2, p. 20

A *S. kirchbergensis* fragmentary second upper molar (M2), a calcaneum, and a third metacarpus (Mc III) - related with the Eemian interglacial - are reported for the first time from the Eurogeul (North Sea, off the coast of the Zuid-Holland province) (MOL et al. 2012).

Germany, § 1.4, pp. 20-22

Three other exceptionally well-preserved *Rhinoceros Merckii* (= *S. kirchbergensis*) teeth (a fourth upper premolar [29276], [Fig. 2, in this paper], a fourth lower premolar [G.S. 1795], and a second lower molar [G.S.

5120][Fig. 3, in this paper]) - described by HERMANN (1911: p. 14 - fig 1, p. 15 - figs 2, 3) - were found in the environs of Graudenz near Christburg (Westpreußen) (collections: at that time, Geologisch-Paläontologisch Institut der Universität Königsberg and Westpreußisch Provinzial-Museum in Danzig).

Schroeder referred to some *Rhinoceros Merckii* (= *S. kirchbergensis*) remains from Jerxheim in Braunschweig (Niedersachsen) (SCHROEDER 1903) as well as from Heggen (Sauerland, Nordrhein-Westfalen) (SCHROEDER 1905).

Another *Rhinoceros Merckii* (= *S. kirchbergensis*) isolated tooth was found at Westeregeln (Magdeburg) (NEHRING 1878, 1880: p. 473; HERMANN 1911: p. 15).

A *Rhinoceros Merckii* (= *S. kirchbergensis*) second upper molar comes "aus den Sanden von Rixdorf bei Berlin" (POHLIG 1887: p. 801 - fig. 2).

S. kirchbergensis remains come also from the sand pits at Niederlehme ("Rixdorfer Horizont"), 3 km northeast of Königs Wusterhausen, north of the A10 Highway (N 52° 19' 30", E 13° 40' 45") (Landkreis Dahme-Spreewald, Brandenburg, about 40 km south of Berlin) (WINGS et al. 2009: pp. 71-74, figs 2). On the "Rixdorfer Horizont" vide autem in DIETRICH (1932), CEPEK (1986), HEINRICH (2002), HERMSDORF (2000, 2002), WINGS et al. (2009).

Dicerorhinus kirchbergensis (= *S. kirchbergensis*) remains also come from Husarenhof bei Besigheim

(Stuttgart, Baden-Württemberg) (STAESCHE 1941: Pl 5 - figs 4-6, Pl 6 and 7) and from Steinheim a. d. Murr (STAESCHE 1941: Pl 11). These last ones are also cited in the "Steinheim a. d. Murr Interglacial (Holstenian) faunal association" by CZARNETZKI (1983).

Two other deposits with *S. kirchbergensis* are cited in literature: Spardorf bei Erlangen (Nordbayern) where a distal portion of a lower tooth ascribed to *Rhinoceros* cf. *Mercki* Jäger (= *S. kirchbergensis*) was found (Krumbeck 1917) and Schöningen (Ost-Niedersachsen) where both *S. kirchbergensis* and *S. hemitoechus* remains were recovered (BERKHOLST 2011: pp. 39-45, figs 14-16, tabs 3-4).

From "einer Höhle bei Heggen (Westfalen)" come *Rhinoceros Merckii* (= *S. kirchbergensis*) remains: a maxilla with P3-M2, a first upper premolar and some other odontological remains (REEKER 1907: p. 31) (conservation, at least at that time: Museum des Vereins für Heimatskunde des Süderlandes, Altena).

In BILLIA (2011a), the author incidentally omitted of reporting the WÜST (1901) paper, in which the *S. kirchbergensis* remains from Rabutz bei Gröbers, from the "Kalktuff von Weimar", from the "Kalktuff von Taubach bei Weimar" as well as the "*Rhinoceros*? *Merckii* Jäg." (= *S. kirchbergensis*) remains from Bilzingsleben bei Kindelbrück are widely described as well as figured (WÜST 1901: pp. 265-281, Pls IV and V).

According to LANSER (1997) "Bei Grabungsarbeiten in einem östlichen Seitengang der Dechenhöhle bei



Fig. 1 - A map showing the *S. kirchbergensis* Eurasian approximative distribution (also available on internet: http://commons.wikimedia.org/wiki/File:Distribution_of_S._kirchbergensis2.png) drawn after: BILLIA 2008, 2011a; BILLIA & PETRONIO 2009 and VAN DER MADE 2010.

- Mappa con la distribuzione euroasiatica indicativa di *S. kirchbergensis* (disponibile anche su: http://commons.wikimedia.org/wiki/File:Distribution_of_S._kirchbergensis2.png) disegnata sulla base di BILLIA 2008, 2011a; BILLIA & PETRONIO 2009 e VAN DER MADE 2010.

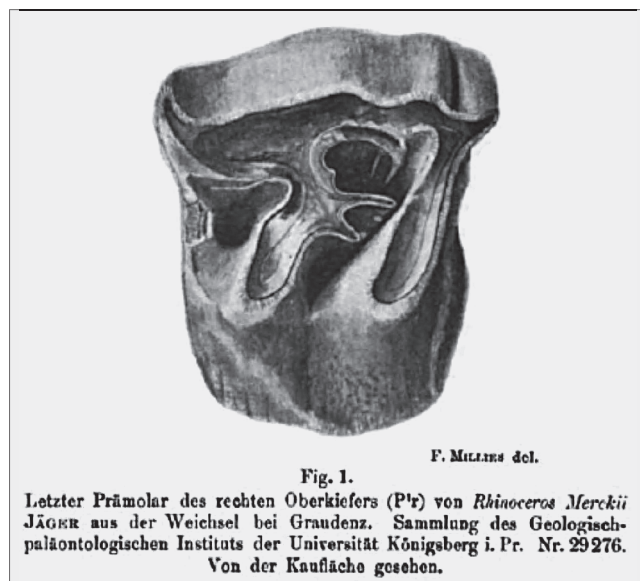


Fig. 2 - *S. kirchbergensis* from Graudenz, Germany: fourth upper premolar (after HERMANN 1911).
- *S. kirchbergensis* proveniente da Graudenz, Germania: quarto premolare superiore (da HERMANN 1911).

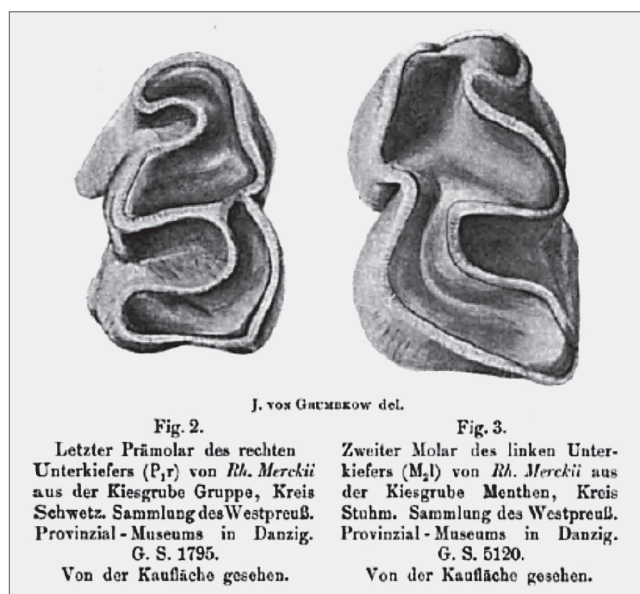


Fig. 3 - *S. kirchbergensis* from Graudenz, Germany: fourth lower premolar and second lower molar (after HERMANN 1911).
- *S. kirchbergensis* proveniente da Graudenz, Germania: quarto premolare inferiore e secondo molare inferiore (da HERMANN 1911).

Iserlohn-Letmathe (nördliche Sauerland), wurde im Frühjahr 1993 ein *Rhinoceros* schädel entdeckt. Die Grabungen wurden außerhalb des Schauhöhlenbereichs durchgeführt, der seinerzeit als Bodendenkmal eingetragen war" (Fig. 4, in this paper).

Italy, § 1.7, p. 23

According to STEHLIN (1930), the rhinoceros remains from the Leffe basin (Bergamo) belong to *Stephanorhinus*



Fig. 4 - Skull of *S. kirchbergensis* from the Dechenhöhle near Iserlohn-Letmathe (Germany), after LANSER (1997).
- *Cranio di S. kirchbergensis rinvenuto nella Dechenhöhle presso Iserlohn-Letmathe (Germania), da LANSER (1997).*

etruscus (Falconer). On the Leffe basin, *vide autem* in TARAMELLI (1898), VENZO (1953-56), VIALLI (1956), LONA (1963a, 1963b), BREDI & MARCHETTI (2003, 2007), RAVAZZI et al. (2009).

In July 2013 (PERSICO et al. 2014), an exceptionally well-preserved *S. kirchbergensis* skull (only the left third upper molar is missing) was discovered on alluvial sediments along the Po near Spinadesco (Cremona, Lombardia, Northern Italy). The skull does not exhibit abrasive signs, conditions which are in accordance with a short fluvial transport. Presently, the specimen is preserved in the "Museo Paleoantropologico del Po" at San Daniele Po (about 12 Km south-east of Cremona, Cremona province).

Slovenia, § 1.8, p. 24

The *D. kirchbergensis* (= *S. kirchbergensis*) remains from Kamnitnik (Skofija Loka, about 20 km northwest of Ljubljana) reported by RAKOVEC (1942: p. 247-250, Pl I - fig 5) consist of a second upper molar.

Croatia, § 1.9, p. 24

Mistakenly, the author (BILLIA 2011a) previously placed Volosko on the Lussino (Losinj) island (*vide* p. 24). Actually, Volosko and the Lussino island represent two different localities. Volosko/Volosco/Volosca (or Preluk/Preluca, such as in FABIANI 1919) lies north of Opatija/Abbazia (Kvarnar/Quarnaro gulf, Istria, Croatia). According to FABIANI (1919: p. 90), from this locality comes a first upper molar (FABIANI 1919: Pl XVII - figs 8a, 8b; Valle private collection, Trieste) ascribed by the same author to *Rhinoceros mercki* (= *S. kirchbergensis*). Later, MALEZ (1961: p. 77, 1963: pp. 112, 179) *sic et simpliciter* mentioned this toponym only. Afterwards, in another paper regarding a systematic revision of the whole Yugoslavian fauna, Volosko is not taken into consideration.



Fig. 5 - *Dicerorhinus kirchbergensis* (JÄGER, 1839) from Bizek (Medvednica Mountains, Zagreb, Croatia), second upper molar, ca. 0,9 natural size; 1: norma occlusalis, 2: norma pulparis (after MALEZ 1961).
 - Secondo molare superiore di *Dicerorhinus kirchbergensis* (JÄGER, 1839) da Bizek (Monti Medvednica, Zagabria, Croazia), ca. 0,9 grandezza naturale; 1: norma occlusalis, 2: norma pulparis (da MALEZ 1961).

On the Lussino/Losinj island (Kvarnar/Quarnaro archipelago, Dalmatia, Croatia) a second and a third upper molars (MCSN-TS s.n.) were found - in excellent conditions - in the first half of the XX century (LEONARDI 1945-47: p. 150-151, Pl VI - fig 1) (collections: Museo Civico di Storia Naturale, Trieste).

An exceptionally well-preserved lower molar (possibly a third) of unknown origin (LEONARDI 1945-47: pp. 151-152, Pl V - figs 1, 3) is showing a fossilization status very close to the two above mentioned molars.

Furthermore, because of both its morphological and biometrical features might belong to the same individual, so that we may assume that it comes from Lussino as well (LEONARDI 1945-47: p. 151).

As to the *S. kirchbergensis* material found in this area (Istria, Kvarnar/Quarnaro, Dalmatia) an overview is available in BILLIA (2011b).

The entire stock of rhinoceros remains collected at Krapina (GORJANOVIĆ-KRAMBERGER 1913b) - belonging to both *S. kirchbergensis* and *C. antiquitatis* - consists of 324 specimens in total.

The *Dicerorhinus mercki* (= *S. kirchbergensis*) third phalanx of Riss-Würm age from the Veternica cave (southwest of Medvednica, Medvednica Mountains, Zagreb, 306 m asl, 45° 50' 36" - 13° 32' 24") is described as well as figured in MALEZ (1958: pp. 5, 19, Pl I - figs 2a, 2b as well as in MALEZ 1963b: p. 109, Pl. XXII). This cave is situated ca 1,5 km north of Bizek. On the cave stratigraphy/speleology/geo-interpretations, vide autem in MALEZ (1963a).

MALEZ (1961: p. 66) also refers to a *D. kirchbergensis* second upper molar of large dimensions belonging to a young-adult individual found at Bizek (Medvednica Mountains), ca 1,5 km south of Veternica and about 9 km west of Zagreb. The exceptionally well-preserved tooth (s.n.) (Pl 1 - figs 1, 2; Pl 2 - figs 1, 2, 3; Pl 3 - fig 1) Fig. 5, in this paper) was found in a calcareous rock crack. MALEZ (1961: p. 65) correlated this upper molar with the Riss-Würm Interglacial (just as for Veternica, MALEZ 1961: p. 65). The remains are preserved at the Palaeontological Museum of JAZU in Zagreb.

Some other remains ascribed to this taxon could come from the Betalov Spodmol cave near Postojna (RAKOVEC 1959) (Riss-Würm Interglacial) and from the ossiferous breccia near Pula (MALEZ 1963b).

The four rhinoceros remains from Veternica (a left M2 [VTR. 199], a first phalanx [VTR. 200], a third phalanx [VTR. 201], and a rib shaft fragment [VTR. 202]), coming from the "j" level, were previously described by MALEZ (1963a: p. 108-112, Pl XXII, Pl XXIV - figs 1a-c) who assigned them to *D. kirchbergensis* (= *S. kirchbergensis*). Later, MIRACLE & BRAJKOVIC (1992: p. 2) "suggest that a more prudent identification of these remains is *Dicerorhinus* sp."

As to the rhinoceros remains from Hvar (WOLDRICH 1882: pp. 455-456; LEONARDI 1947: pp. 17-18), according to TOULA (1902: p. 5 and 1907: pp. 447-448) must be ascribed to *Rhinoceros etruscus* (= *S. etruscus*), not to *S. kirchbergensis*.

From the Vindija cave near Donja Voca (a cave in Tortonian conglomerated limestone, localised ca 55 km northeast of Zagreb and ca 20 km west of Varazdin) possibly come other *Dicerorhinus mercki* (= *S. kirchbergensis*) remains (VUKOVIĆ 1954: pp. 27-28). The cave was described in a previous work by the same author (VUKOVIĆ 1953).

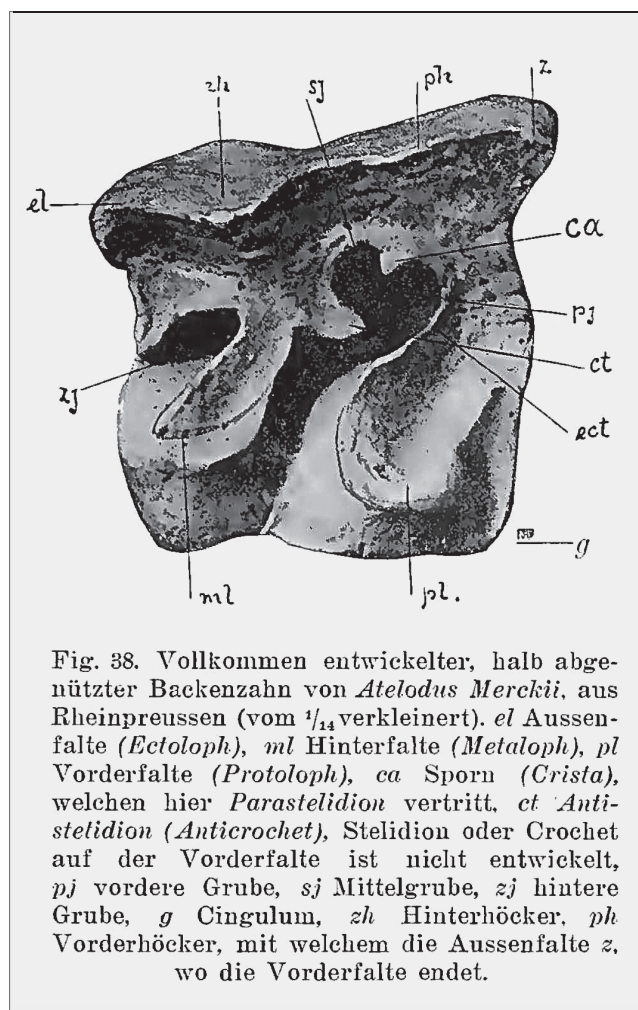


Fig. 38. Vollkommen entwickelter, halb abgenutzter Backenzahn von *Atelodus Merckii*, aus Rheinpreussen (vom $\frac{1}{14}$ verkleinert). *el* Aussenfalte (*Ectoloph*), *ml* Hinterfalte (*Metaloph*), *pl* Vorderfalte (*Protoloph*), *ca* Sporn (*Crista*), welchen hier *Parastelidion* vertritt, *ct* *Antistelidion* (*Anticrochet*), *Stelidion* oder *Crochet* auf der Vorderfalte ist nicht entwickelt, *pj* vordere Grube, *sj* Mittelgrube, *zj* hintere Grube, *g* Cingulum, *zh* Hinterhöcker, *ph* Vorderhöcker, mit welchem die Aussenfalte *z*, wo die Vorderfalte endet.

Fig. 6 - Second upper molar of *Atelodus Merckii* (ancient synonym of *S. kirchbergensis*) from "Rheinpreussen" (after KAFKA 1913).

- Il secondo molare superiore di *Atelodus Merckii* (sinonimo di *S. kirchbergensis*) da "Rheinpreussen" (da KAFKA 1913).

Veternica (MALEZ 1958: p. 7; Smith 1976a; Wolpoff 1979) and Vindija (MALEZ et al. 1980; WOLPOFF 1980; WOLPOFF et al. 1981) - just as for Krapina (GORJANOVIĆ-KRAMBERGER 1904, 1906, 1913a) and Velika Pećina (Ravna Gora) (SMITH 1976a, 1976b) - yielded significant well-known Late Pleistocene fossil hominids (JELINEK 1969; WOLPOFF et al. 1981, *inter alios*) as well as a lot of Late Mousterian-associated artefacts (VALOCH 1968, *inter alios*). Patterns of faunal/climatic changes were provided by MALEZ (1978a, 1978b, 1978c). By the way, another cave with significant Palaeolithic human traces is Crvena Stijena (Crna Gora/Montenegro) (RAKOVEC 1958). *Homo neandethalensis* King, 1864 remains were collected in Krapina, while Veternica and Velika Pećina yielded *Homo sapiens* L., 1758 remains.

Czech Republic, § 1.11, p. 24

MOSTECKY (1966) reported on some *D. kirchbergensis* (= *S. kirchbergensis*) remains from the "Chlupáčova Sluj"

Cave near Koněprusy (Beroun, southwest of Prague, Central Bohemia), a part of the largest Bohemian cave system - Koněpruské jeskyně (about 2 km in length and a about 70 m vertical range), in a limestone region known as "Bohemian Karst". Some *C. antiquitatis* remains were also found into the same cave. However, the *D. kirchbergensis* remnants seem actually to belong to *S. hemitoechus*. As far as to concern an overview on Bohemian Karst, *vide autem* in DIEDRICH & ZAK (2006).

In KAFKA (1913: fig. 38), the *Atelodus Merckii* (ancient synonym of *S. kirchbergensis*) second upper molar from "Rheinpreussen" is figured (Fig. 6, in this paper).

According to some authors (TYRÁČEK et al. 2001, 2004) from Račiněves (Litoměřice okres, Ústecký kraj [Ústí region], Northern Bohemia) would come some *S. kirchbergensis* remains. Actually, *S. kirchbergensis* is listed in a faunal table only.

Slovakia, § 1.12, p. 24

From fluvial deposits along the Váh river at Šaľa (about 60 Km east of Bratislava, Šaľa district, Nitra region, Southwestern Slovakia) comes a right branch of a mandible with five very well-preserved teeth (P2-M2) (SCHMIDT 1969; ĎURIŠOVÁ 1994).

Poland, § 1.13, pp. 24-25

On p. 25 of BILLIA (2011a), GÜRICH (1908) is erroneously cited as a reference. Actually, on page 52 "... ein linker Unterkieferast von *Rhinoceros* sp. (von der Symphise an 5 Zähne umfassend) gefunden worden..." is the only rhinoceros remains cited in all the paper. However, the publication year is 1905 (non 1908) and *S. kirchbergensis* remains are completely absent. The five *Rhinoceros Merckii* Jäger (= *S. kirchbergensis*) teeth collected by Ślósarski between 1880 and 1882 at Szczeslewiec near Warsaw (ŚLÓSARSKI 1884: pp. 357, 370; Pls XIII and XIV) consist of a second upper molar and a first upper molar (Pl XIII - figs 6, 7), a fourth upper premolar, a second and a first upper molars (XIV - figs 5, 8, 9) (three reproductions of them [Pl XIV - fig 5 and Pl XIII - figs 5, 6] from ŚLÓSARSKI [1884] are in Fig. 7 of this paper).

Moldova, § 1.15, p. 25

The right hemimandible (OPS 1640) is also described in BELYAEVA & DAVID (1975: pp. 164-167, fig 4 and Pl II - fig 2). The first who reported the remains was SINZOW in 1900.

Ukraine, § 1.16, pp. 25-26

From a terrace on the left bank of the Kuyal'nik and Khadzhibeev estuaries (north of Odessa, Ukraine) together with *Archidiskodon wüsti* Pavlova, *Bison schoetensacki* Freudenberg, *Bison* aff. *priscus* Bojanus remains outcropped some *S. kirchbergensis* remnants



Fig. 7 - *Rhinoceros Merckii* JÄGER from Szczeslewie near Warsaw (Poland). 5 - fourth upper premolar, 6 - second upper molar, 7 - first upper molar (after SŁÓRSKI 1884).
- *Rhinoceros Merckii* JÄGER da Szczeslewie presso Warsaw (Polonia). 5 - quarto premolare superiore, 6 - secondo molare superiore, 7 - primo molare superiore (da SŁÓRSKI 1884).

as well (STEPANOV 1961; cited also in CHEPALYGA 1967: p. 48).

Russian Federation (European area), § 1.17, p. 26

SATAEV (2008: p. 144) refers to a *Stephanorhinus* sp. third deciduous molar crown (*S. kirchbergensis*, according to the author) from the “Verkhnyaya” Cave (Southern Ural).

In 2012, on a bank of the lower course of the Volga at Cherny Yar (Astrakhan’ oblast’) a fourth metacarpal (Mc IV) probably belonging to *S. kirchbergensis* has been recovered (unpublished material, pers. communication). From Cherny Yar (in literature also known as “Nizhnee Zaymishche”) come other well-known *S. kirchbergensis* material: the full mandible [ZIN 16948] and the right hemimandible [ZIN 29854] described by GROMOVA (1935: pp. 98-101) (*vide autem* in BILLIA 2008: p. 28, fig 2-b, c; 2014: p. 186).

For a new, detailed description concerning all the other Russian-european sites which gave back *S. kirchbergensis* remains *vide autem* in BILLIA (2014).

2. Asia

Russian Federation (Asian area), § 2.1, p. 26

FRIEDEL (1880: pp. 353-354) as well as SCHRENCK (1880: pp. 1-2) referred to a find of *R. Merckii* Jäger (= *S. kirchbergensis*) remains on a bank of the Butantai river (a tributary of the Jana river) in the Vekhoyansky district (North-Eastern Siberia) occurred in 1877. According to CHERSKY (1878: p. 165, 1879: pp. 36-59), those remains must be assigned to *C. antiquitatis*.

The two teeth from Yakutya, previously described by DUBROVO (1957), were later also reported by ALEKSEEV (1970).

In 2013, along the Chumysh river (Kytmanov district, Altaysky kray, Central-southern Siberia) five *S. kirchbergensis* teeth (two fourth upper premolars, two upper molars and a third upper molar) together with a juvenilis mandibular left branch with three deciduous molar (dp2-dp4), and a mandibular right branch with five teeth (P2-M3) have been found. Moreover, along the Chik river (Kochenev district, Novosibirsk region, Central-southern Siberia) a *S. kirchbergensis* third upper molar has also been recovered (LYUBACHEV et al. 2014).

Furthermore, other *S. kirchbergensis* teeth - of remarkable dimensions - come from three other Central-Siberian localities situated along the Ob’ and the Irtysh (unpublished material, pers. communication). Throughout the time, other *S. kirchbergensis* material outcropped along both these rivers (ALEKSSEVA 1980; SHPANSKY & BILLIA 2012, *inter alios*).

Azerbaijan, § 2.3, p. 26

More on the Azykh cave. The cave (about 900 m asl) - a six-cave complex known as a living site of stone-age man - lies about 3 km northeast of the Tugh village in Nagorno-Karabakh (at the boundary with South Azerbaijan where the Araks river cuts the slopes of the Lesser Caucasus and the Mil-Mugan steppes) on the left bank of the Kuruchay river. It was found by M. Guseinov in 1960. Among some others, systematic investigation have been carried out there by A.V. Mamedov and S.D. Aliev.

Extensively studied by scientists in the 1960s, the cave is considered to be the site of one of the most ancient proto-human habitations in Eurasia (a Neanderthal-style jaw bone - found in 1968 - is thought to be over 300,000 years old and thus one of the oldest proto-human remains found in this part of the world. Its discovery gave rise to the term Azykh Man). Despite of the few human remains discovered, evidence shows that the area was occupied by hominids over a period of nearly two million years.

The poor quality of the 1960's excavations led to uncertainty over the chronological position of the layers. In the Azykh cave 3rd layer (correlated with the the Early Mousterian culture), the fossil fauna discovered consists of the following species: *Spelaerctos spelaeus*, *Ursus* aff. *arctos*, *Sus scrofa*, *Capreolus capreolus*, *Dama* cf. *mesopotamica*, *Megaloceros giganteus*, *Cervus elaphus*, *Capra aegagrus*, *Equus hydruntinus*, *Dicerorhinus mercki* (ALEV 1969).

Kazakhstan, § 2.5, pp. 26-28

According to TLEUBERDINA & NAZymbetova (2010), at present “the *Elasmotherium sibiricum*, *Equus* (*Equus*) *mosbachensis*, *E. (Hemionus) hydruntinus*, *Dicerorhinus kirchbergensis* Koshkurgan horizon may be correlated with the end of the Lower Neopleistocene and the Middle Neopleistocene (around 500 kys BP)”.

Several other *S. kirchbergensis* dental - as well as non-dental remains - have recently been discovered at the Koshkurgan village (14.5 Km north-east of Turkestan, Karatau Mountain, Chimkent region, South-Eastern Kazakhstan) (unpublished material, pers. communication). From this locality come other well-preserved twelve *S. kirchbergensis* isolated teeth (KHISAROVA 1963).

China, § 2.7, pp. 28-29

On the Anping locality (Liaoning, Liaoyang, North-eastern China), XU (1986) apart, other *S. kirchbergensis* remains such as a maxilla (LA 7701-424), a mandibula (LA 7701-429), and a fragment of maxilla (LA 7701-521) - all preserving the teeth - were reported by ZHANG et al. (1980: Pl 2 - figs 1a, 1b, 1c, 1d).

From Yingkou near the Bohai Sea (Jinniu mountain, Liaoning province, North-eastern China) come few other *S. kirchbergensis* dental remains (JIN NIU SHAN EXCAVATION TEAM 1976: pp. 122-123; Pl I - figs 3, 4, 5).

A third lower premolar (5L167) comes from the Palaeolithic site of Lingjing (Xuchang, Henan Province, Central-Eastern China) (LI & DONG 2007; fig 4, n° 5) (Fig. 8, in this paper).

From the Migong Cave (Wushan County, Chongqing, Central China) - a late Late Pleistocene palaeoanthropological site (absolute age = 13150±190 BP) - come

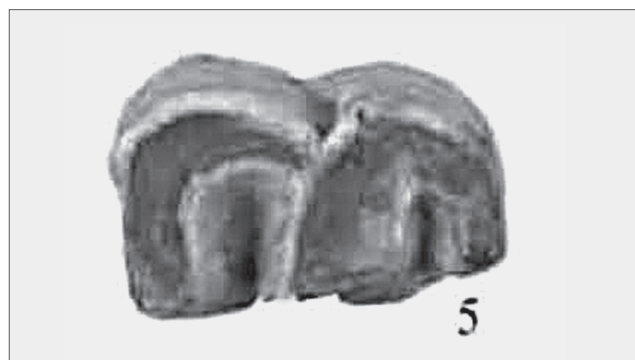


Fig. 8 - Third lower premolar of *S. kirchbergensis* from the Palaeolithic site of Lingjing (Xuchang, Henan Province, Central-Eastern China) (after LI & DONG 2007).
- Terzo premolare inferiore di *S. kirchbergensis* proveniente dal sito paleolitico Lingjing (Xuchang, Provincia di Henan, Cina centro-orientale) (da LI & DONG 2007).

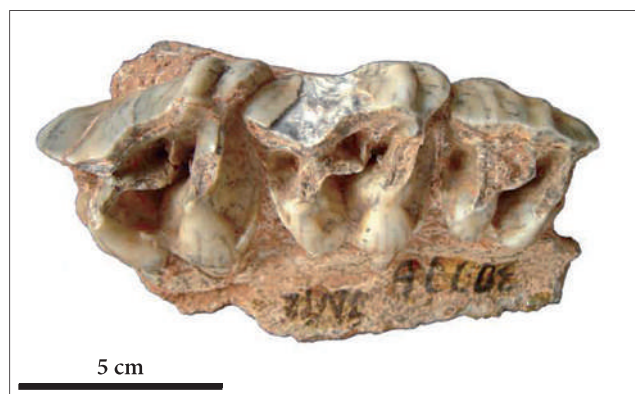


Fig. 9 - A maxillary fragment with three teeth ascribed to *S. kirchbergensis*, from the Tuozidong karst cave deposits (Jiangning District, Nanjing Municipality, Eastern China; after DONG et al. 2013).
- Un frammento di mascella con tre denti, riferito a *S. kirchbergensis*, proveniente dai depositi della Grotta di Tuozidong (Distretto di Jiangning, Municipalità di Nanjing, Cina orientale; da DONG et al. 2013).

cranial fragments, mandibles, teeth and some postcranial bones identified as *S. kirchbergensis*, representing the latest as well as the southernmost record of this species on the whole of Eurasia (CHEN et al. 2012). The related paper is rich in illustrations.

According to the authors (CHEN et al. 2012), “*S. kirchbergensis* migrated to the Yangtze River Valley during the Mid-Late Pleistocene probably because of the cold climate of the Ice Age. Based on *S. kirchbergensis* materials from the Migong Cave and other localities in the Yangtze River Valley, obvious distinctions are found among *S. kirchbergensis* from northern and southern China, and Europe. As a result, this species is divided into three types. Pleistocene rhinos from southern China, especially *Rhinoceros sinensis*, are also clarified”.

From the Tuozidong karst cave deposits (Tuozijian, Humpback Cave, Humpback Hill, Jiangning District,



Fig. 10- Mammals remains from the Jiaojie site (Heilongjiang province, North-eastern China): A-F indicate the *S. kirchbergensis* teeth (after YU & DONG 2011).

- Resti di mammiferi dal sito di Jiaojie (provincia di Heilongjiang, Cina nord-orientale): con A-F sono indicati i denti di *S. kirchbergensis* (da YU & DONG 2011).

Nanjing Municipality, Eastern China; GPS: 32° 03' 17.1" N, 119° 01' 57.6" E, 114 m asl) comes a maxillary fragment with three teeth ascribed to *S. kirchbergensis* (DONG et al. 2013: Fig. 9, in this paper). The great amount of the fossil mammal fauna collected together with the *S. kirchbergensis* remains were dated as Early Pleistocene (FANG et al. 2007).

From the Jiaojie site - discovered in 1996 - located in a karst cave (183 m asl) at Acheng (Haerbin municipality, Heilongjiang province, North-eastern China) come some *S. kirchbergensis* teeth (Fig. 10, in this paper). Up to now, this site represents the oldest palaeolithic site in the province as well as the northernmost one in China (45° 21' 07.7" N - 127° 05' 16.8" E). The deposit is divided into 6 layers. The *S. kirchbergensis* teeth come from the 6th layer composed by reddish yellow clay with breccia. Uranium-series dating performed on the *S. kirchbergensis* teeth gave an age of 175 Ka BP (YU & DONG 2011).

An extraordinary well-preserved *S. kirchbergensis* skull has been discovered in the Heilongjiang province (North-eastern China) (unpublished material, pers. communication). No further data are presently available.

Just as also underlined by TONG & MOIGNE (2000), *Dicerorhinus* (= *Stephanorhinus*), *Coelodonta* and *Elasmotherium* are the rhinoceros species which mostly occurred in Northern China during Pleistocene. *Stephanorhinus kirchbergensis* (*D. kirchbergensis*) appears to be very common on this areal. On the contrary, *Rhinoceros* is actually confined to Southern China.

From the bone deposit of Kuhsiangtun (a site near Harbin, Northern Manchuria, discovered in 1926 and excavated in 1931-34) come *Rhinoceros* sp. remains (possibly *R. mercki* JÄGER) (LOUKASHKIN 1937: p. 331 and 334).

According to TONG et al. (2014), a *S. kirchbergensis* mandible (TNP00315) comes from Daheigou, while a second one (SGT2:1) comes from Shigou where a *S. kirchbergensis* left femur (SGT2:2) has been also found. "Mandibles and femur (fig 2-A, B, and C) (Fig. 11, in this paper) from Daheigou and Shigou were collected from Middle and Early Pleistocene strata, respectively. (omissis). The *S. kirchbergensis* fossils herein reported represent the definite earliest record with certain provenance of this species in China" (TONG et al. 2014: p. 338).



Fig. 11 - *Stephanorhinus kirchbergensis* remains from the Nihewan Basin. A (TNP00315) mandible from Daheigou; B. (SGT2:1) mandible from Shigou; C. (SGT2:2) left femur from Shigou; A1, B1, buccal views; A2, B2, occlusal views; A3, B3, ventral views; C1, anterior view; C2, posterior view; C3, lateral view; C4, medial view (after TONG et al. 2014: fig. 2).

- *Resti di Stephanorhinus kirchbergensis dal Bacino di Nihewan*. A (TNP00315) mandibola da Daheigou; B. (SGT2:1) mandibola da Shigou; C. (SGT2:2) femore sinistro da Shigou; A1, B1, vista boccale. A2, B2, vista occlusale; A3, B3, vista ventrale; C1, vista anteriore; C2, vista posteriore; C3, vista laterale; C4, vista mediale (da TONG et al. 2014: fig. 2).

Lebanon and Israel, § 3.1, p. 29

The rhinoceros remains which “can unhesitatingly be referred to Merck’s rhinoceros, *Dicerorhinus merckii* (Jäger)” (= *S. kirchbergensis*) (HOOIJER 1961: p. 32) coming from Ksâr Akil (Lebanon) - “confined to levels XXVI A down to XXIX A” - consist of twenty-five upper teeth: a first and a third molars from the level XXVIII B, F4 are figured in Pl I - fig 3; a second deciduous molar from the level XXVII B, F5 is figured in Pl I - fig 4; a third premolar from the level XXVII B, F4 is figured in Pl I - fig 5; a third molar from the level XXVIII A, F5 is figured in Pl I - fig 6. Details and measurements of all the teeth are given in tabs 12-13.

The rhinoceros remains from Mugharet el-Emireh (BATE 1927: pp. 12-13) as well as those from Tabun-Mount Carmel (Israel) and the Skhul Cave (on the

slopes of Mount Carmel) (BATE 1937: p. 221 - figs 8j and 8m) were referred to *Rh. cf. hemitoechus* Falc., but - according to some other authors (cf. SCHROEDER 1903: p. 105; BERNSEN 1927: p. 25; SCHROEDER 1930: p. 7; ARAMBOURG 1958: p. 185) - they must be assigned to *R. merckii* (= *S. kirchbergensis*).

The rhinoceros from Oumm Qatafa near Jerusalem (Israel) was attributed by VAUFREY (1931: p. 254, 1951: p. 199) and later by WOLDSTEDT (1958) to “*Rh. Merckii*”.

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