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Emmanuel M.E. Billia
Júlia Zervanová

SOME OTHER OCCURRENCES OF *STEPHANORHINUS KIRCHBERGENSIS* (JÄGER, 1839) (MAMMALIA, RHINOCEROTIDAE) FROM EURASIA. ADDENDA TO OTHER PREVIOUS WORKS

ULTERIORI SEGNALAZIONI DI *STEPHANORHINUS KIRCHBERGENSIS* (JÄGER, 1839) (MAMMALIA, RHINOCEROTIDAE) IN EURASIA. UN'INTEGRAZIONE.

Riassunto breve - A integrazione di quanto già precedentemente pubblicato (Billia 2011; Billia & Zervanová 2015), viene proposto un ulteriore aggiornamento relativo a segnalazioni di ritrovamenti di *Stephanorhinus kirchbergensis* (Jäger, 1839) sul territorio eurasiatico.
Parole chiave: Rhinocerotidae, *Stephanorhinus kirchbergensis*, Pleistocene, Europa, Asia.

Abstract - *An updated report concerning some other* Stephanorhinus kirchbergensis *(Jäger, 1839) discoveries on Eurasian territory is proposed here as an integration of two other previous papers (Billia 2011; Billia & Zervanová 2015).*
Key words: *Rhinocerotidae*, Stephanorhinus kirchbergensis, *Pleistocene, Europe, Asia.*

Introduction

This work follows two other previous ones (Billia 2011; Billia & Zervanová 2015) published in Acta Palaeontologica Romaniae as well as in Gortania-Geologia, Paleontologia, Paletnologia. It regards an updated integration containing some other data on discoveries of the Pleistocene rhinoceros *Stephanorhinus kirchbergensis* (Jäger, 1839) in Eurasia based on further investigation (2015-2017). The reports come from the following eight countries: Germany, Italy, Poland, Ukraine, Russian Federation (Asian area), Tajikistan, China, and Iran. As to the *S. kirchbergensis* remains, Iran is cited for the first time in literature.

The paragraph numbers used here in the text correspond to the same used in Billia (2011).

1. Europe

Germany, § 1.4, pp. 20-22

From last interglacial sediments of Groß-Rohrheim bei Darmstadt (49° 42' N - 8° 26' E) come *S. kirchbergensis* remains (Koenigswald 1988, 1995; Koenigswald & Heinrich 1999; Koenigswald & Menger 1997, 2002).

Italy, § 1.7, p. 23

The Cretone lacustrine basin near Rome (Tiber valley, central Italy) yielded rhinoceros lower teeth together with a good number of other mammalian taxa referable to both Galerian and Aurelian Mammal Age at least (Marra et al. 2016). The rhinoceros teeth have been recovered in two different localities within the basin:

- from the Fosso Casa Cotta locality come a fourth and a third lower premolars ascribed to *S. kirchbergensis* (Marra et al. 2016: fig 6-D);
- a third lower molar attributed to *Stephanorhinus* cf. *S. kirchbergensis* comes from the Marzolano locality (Marra et al. 2016: fig 6-C).

The three dental remains are figured here in Fig. 1.

The Guado San Nicola site (250 m a.s.l., left bank of the Volturno river, ca 2 km N-W of Monteroduni, Upper Volturno Valley, Isernia, Molise, Central Italy) is dated MIS 11-10 in accordance with radiometric dates ($^{40}Ar/^{39}Ar$ and ESR/U-series).

S. kirchbergensis apart, the faunal assemblage is mainly composed by *Cervus elaphus acoronatus* Beninde, 1937, *Equus ferus* ssp., *Palaeoloxodon* sp., *Bos primigenius* Bojanus, 1827, *Ursus* sp., *Dama* sp. (Peretto et al. 2016).

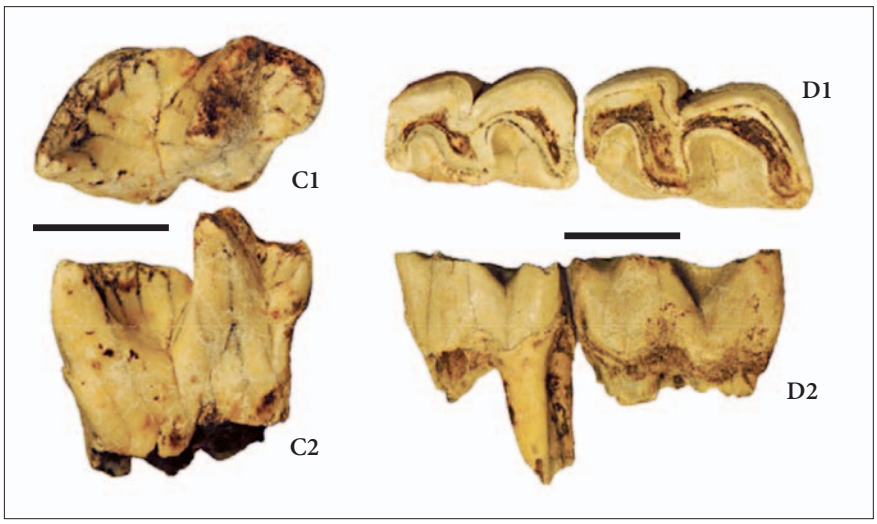

Fig. 1 - *Stephanorhinus kirchbergensis* Jäger (1839) from Cretone basin (scale bar = 2 cm) [after Marra et al. 2016].
- Stephanorhinus kirchbergensis *Jäger (1839) dal bacino di Cretone (scala = 2 cm) [da Marra et al. 2016].*

Some further details regarding the *S. kirchbergensis* fourth upper premolar from Cava Calcàra at Monte di Malo (Vicenza, Veneto, N-E Italy) briefly described and illustrated in Billia & Zervanová (2015: 70-1, fig. 9) have been received. Mr Renato Gasparella reported recently that - already back in 1955 - some workers had found some limb bones, a fragment of an articulation, and some not better identified vertebrae as well as fragments of custulae at the bottom of a karstic well filled with clay. The well - 6 m deep - led into a limestone stratification of Middle Eocene age. At that time, Gasparella - as a young student - collected all these remains (Renato Gasparella, 2017 pers. comm.).

Poland, § 1.13, pp. 24-25

According to Kotowski et al. (2017), near Gorzów Wielkopolski (Landsberg an der Warthe, voiv. Lubusz, near the German border), in april 2016 during the construction of the S3 highway, an almost complete skeleton preliminarly identified as *S. kirchbergensis* was found. About 100 bones were unearthed as well as the complete dentition. The preservation of the ensemble seems to be very good, only the skull appears strongly compacted.

Ukraine, § 1.16, p. 25 (an updated version)

The Synjakovo-1 site is situated near Chortkiv (Ternopil oblast', W-Ukraine). Here, remains referable to 48 fossil species were found. Among them: *Dicerorhinus* aff. *merki* (Jäger), *Spelaearctos spelaeus* Rosenmüller [recte *Ursus spelaeus* Rosenmüller & Heinroth, 1793] (small form), *Crocuta* cf. *spelaea* Goldfuss [recte *Crocuta crocuta* cf. *spelaea* (Goldfuss, 1823)], *Cuon* sp., *Canis* sp., *Felis spelaea* Goldfuss [recte *Panthera spelaea* (Goldfuss, 1810)], *Capreolus* sp., *Megaceros* sp., *Cervus* cf. *elaphus* L., *Bos* sp., *Equus* cf. *caballus* L. and others. Due to the faunistic complex, the site was dated as Early Pleistocene (Tatarinov & Bachinsky 1968), but it looks closer to Middle Pleistocene.

2. Asia

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

A rhinoceros skull [F-4160] previously attributed to the *Stephanorhinus* genus was found above the Arctic Circle on the middle Chondon river (Arctic Yakutya, N-E Siberia, 70° 12' N - 137° E) (Fig. 2) in summer 2014 (Kirillova et al. 2016). Later, the same skull (Fig. 3) has been ascribed to *S. kirchbergensis*. ^{14}C dates and geological evidence indicate that the skull dates between 70-48 ka BP (MOIS 4-3). Till to-day it represents the *S. kirchbergensis* northernmost find extending significantly the species range providing additional information about the diet and environment of *S. kirchbergensis* (Kirillova et al. 2017). Based on the dating provided by the authors, it would be the *S. kirchbergensis* latest record in Eurasia. However, the latitude record was previously due to the Dubrovo (1957) *S. kirchbergensis* discovery along the Vilyuy river in Yakutya [coll.: Ice Age Museum, pr. Mira 119, Pav. 71, 129223 Moscow].

According to Shpansky (2016), *S. kirchbergensis* remnants have recently been discovered in three new Siberian localities (Fig. 4):
- Western Siberia: along the Ob' near Kindal (Tomsk obl.). A hemi-mandible [KF MINC KP-397, Fig. 5-3, 4] with P3-M3 has been found on the Ob' left bank near Kindal (about 370 km N-W of Tomsk, Kargasok district, 59° 08' N - 80° 35' E). Till now, it represents the *S. kirchbergensis* northernmost find in the Tomsk oblast', latitudinally very close to those two *S. kirchbergensis* molars found along the Vilyuy river by Dubrovo (1957);
- Western Siberia: along the Chulym river, east of Asino (Tomsk obl.). A first upper molar [PM TGU 1/396 Fig. 5-1, 2] comes from a terrace on the left bank of the Chulym river east of Asino (Asino distr., 57° 04' N - 86° 10' E);
- Eastern Siberia: confluence of the Amyl and Kazir rivers near Kachul'ka (Krasnoyarsk obl.). A third

Fig. 2 - Localisation of the site along the Chondon river (Arctic Yakutya, 70° 12' N - 137° E) where the *S. kirchbergensis* (Jäger, 1839) skull was found in 2014.
- *Localizzazione del sito lungo il fiume Chondon (Yakutya artica, 70° 12' N - 137° E) dove è stato trovato, nel 2014, il cranio di S.* kirchbergensis *(Jäger, 1839).*

Fig. 3 - The *S. kirchbergensis* (Jäger, 1839) skull from the Chondon river (Arctic Yakutya, 70° 12' N - 137° E); A) *norma verticalis* and B) *norma ventralis* (scale bar = 10 cm) [after Kirillova et al. 2017].
- *Il cranio di* S. kirchbergensis *(Jäger, 1839) dal fiume Chondon (Yakutya artica, 70° 12' N - 137° E); A)* norma verticalis *e B)* norma ventralis *(scala = 10 cm) [da Kirillova et al. 2017].*

Fig. 4 - Map showing the localization of the four Siberian localities which gave back new *S. kirchbergensis* remains: Kindal (Ob' left bank, Tomsk obl.), Krasny Yar (Ob' right bank, Tomsk obl.), Asino (Chulym river left bank, Tomsk obl.) and Kachul'ka (at the confluence of the Amyl and Kazir rivers, Krasnoyarsk obl.).
- *Mappa con la posizione delle quattro località della Siberia che hanno restituito nuovi resti di* S. kirchbergensis*: Kindal (riva sinistra del Fiume Ob, Tomsk obl.), Krasny Yar (riva destra del Fiume Ob, Tomsk obl.), Asino (riva sinistra del Fiume Chulym, Tomsk obl.) e Kachul'ka (alla confluenza dei fiumi Amyl e Kazir, Krasnoyarsk obl.).*

lower premolar [PM TGU 1/395] was recovered at the confluence of the Amyl and Kazir rivers near Kachul'ka (Karatuz distr., Krasnoyarsk obl., 53° 47' N - 92° 53' E). It is the first *S. kirchbergensis* find in this oblast' [coll.: the hemi-mandible KF MINC KP-397: OGAUK TOXM "Muzey Iskusstv Norodov Severa" [Museum of Northern People's Art], ul. Pushkina 21, s. Kargasok (Tomsk oblast'); the first upper molar PM TGU 1/396 as well as the third lower premolar PM TGU 1/395: Paleontologichesky Muzey "V.A. Kakhlov", TGU, pr. Lenina, 36, 634050 Tomsk].

Furthermore, the already well-known Krasny Yar site (Ob' right bank, in front of the Sargulin Island, Krivosheino distr., Tomsk obl., W-Siberia, 57° 06' N - 84° 30' E) yielded some other *S. kirchbergensis* remains lately: a proximal third metacarpal fragment [PM TGU 5/5197] and two naviculars [PM TGU 5/2538

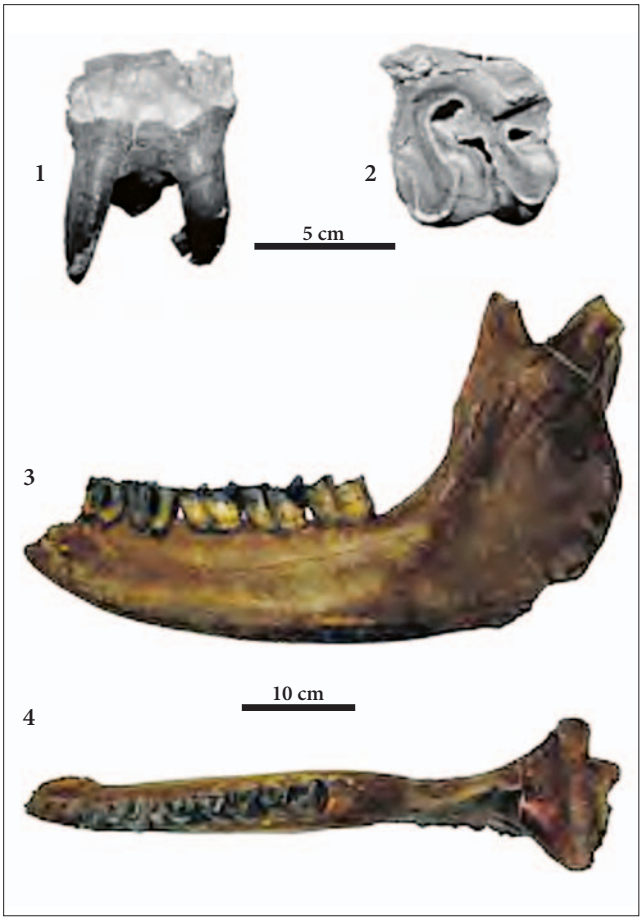

Fig. 5 - *S. kirchbergensis* remains: 1-2) first upper molar [PM TGU 1/396] from Asino (Tomsk obl.); 3-4) hemi-mandible [KF MINC KP-397] from Kindal (Tomsk obl.) [after Shpansky 2016, modified by e.b.].
- *Resti di* S. kirchbergensis*: 1-2) primo molare superiore [PM TGU 1/396] da Asino (Tomsk obl.); 3-4) emimandibola [KF MINC KP-397] da Kindal (Tomsk obl.) [da Shpansky 2016, modificato da e.b.]*

and 5/3063] [coll.: Paleontologichesky Muzey "V.A. Kakhlov", TGU, pr. Lenina, 36, 634050 Tomsk].

Geological data for the six samples (collected on river banks): beginning of Middle Neopleistocene (Tobol horizon, MOIS 9-11).

Tajikistan, § 2.4, p. 26 (an updated version)

Three Tajik localities (Fig. 6) would have gave back *S. kirchbergensis* / *Dicerorhinus mercki* remains:

- Obigarm river (Obigarm village, Obigarm basin, Roghun district, Afghan-Tajik depression, C-W Tajikistan). *Dicerorhinus mercki* no specified remains are reported from the left bank of the Obigarm river at the mouth of the Deshljashkhar tributary near the village of Obigarm (Obigarm basin, Roghun district, Afghan-Tajik depression, C-W Tajikistan) (Sharapov 1980; Forstén & Sharapov 2000: 304-5) in a mixed assemblage with *Dicerorhinus* cf. *D. etruscus* (Falconer) (attribution by G.D. Khisarova), *Equus caballus mosbachensis* Reichenau, 1903, and *Gazella* sp. (attribution by Babaev 1962). According to Cherdyntsev (1969), Uranium-series datings gave a site age of 370±120 ka BP, while according to Penkov (1971) the site is older than 0.7 Ma. In any case, on the basis of Khisarova's data, Kozhamkulova (1969) assigned the remains to the (? Russian) Early Pleistocene;
- Ogzi-Kichik, N-E of the Dangara village, S-E part of the Afghan-Tajik depression). Excavations at Ogzi-Kichik (an Upper Palaeolithic site situated 20 km N-E of the Dangara village, southeastern part of the Afghan-Tajik depression) yielded 26 species of mammals, birds and reptiles: *Hemiechinus auritus* (Gmelin, 1770), *Hystrix* sp., *Marmota* cf. *himalayana* (Hodgson, 1841), *Ellobius talpinus* (Pallas, 1770), *Cricetulus migratorius* (Pallas, 1773), *Meriones tamariscinus* (Pallas, 1773),

Fig. 6 - Index maps of Tajikistan with the localization of the three Tajik localities in which *S. kirchbergensis*/*D. mercki* remains would be found: Obigarm, Kuruksay, and Ogzi-Kichik.
- *Mappa del Tajikistan con indicate le tre località dove sosno stati rinvenuti resti di* S. kirchbergensis/D. mercki*: Obigarm, Kuruksay, and Ogzi-Kichik.*

Blanfordimys afghanus (Thomas, 1912), *Pitymys juldaschi* (Severtzov, 1879), *Nesokia indica* (Gray & Hardwicke, 1830), *Rattus turkestanicus* (Satunin, 1903), *Canis lupus* L. 1758, *Martes foina* (Erxleben, 1777), *Ursus* cf. *arctos* L. 1758, *Equus hydruntinus* Regalia, 1904, *Equus hemionus* Pallas, 1775, *Equus caballus* (from the uppermost levels), *Cervus elaphus* L. 1758, *Capra hircus* L. 1758 (Ranov et al. 1973, emended). Shells and *Testudo* sp. are very common. All the remains are dated to post-Khosar time. Among them, remains of *Stephanorhinus* cf. *kirchbergensis* were also recovered. The age of the site would be comprised between 40 and 15 ka BP (Forstén & Sharapov 2000: 308-9);

- Kuruksay river (Bal'djuan village, Eastern Afghan-Tajik depression, S-Tajikistan).

According to some authors (Sharapov 1980: 237-8; Dmitreva & Nesmeyanov 1982: 99) from both the right and the left banks of the dry bed of the Kuruksay river (? Dashtigulo or ? Shalash point; ? Kuruksay-3; ? 0.97 Ma BP), 18 km N-E of the Bal'djuan village (Eastern Afghan-Tajik depression, S-Tajikistan) some rhinoceros remains were collected together with *Equus stenonis* Cocchi, 1867 and *Equus* cf. *hydruntinus* Regalia, 1904 remains (attributions by Kozhamkulova 1969). Kozhamkulova (1969) ascribed the rhinoceros remains to *D. mercki* while Belyaeva (in Dmitreva & Nesmeyanov 1982:100) assigned the same to *Dicerorhinus* sp. On his turn, Sharapov (Sharapov 1980 and in Dmitreva & Nesmeyanov 1982: 100) opted for *Dicerorhinus etruscus* (Falconer). Even if the stratigraphy of S-Tajikistan (within the Tajik depression, an intermontane basin) - based on data obtained by biostratigraphical, climatostratigraphical, geological-geomorphological, and physical methods (Dodonov 1973, 1980, 1986, *inter alios*) - would seem to be well-known in the interval Late Pliocene/Late Pleistocene, we must consider that in the case of Kuruksay the chronology for *S. kirchbergensis* would be questionable.

China, § 2.7, pp. 28-29

According to Dong & al. (1999), *S. kirchbergensis* is also reported from four northeastern Chinese localities: at Miaohoushan (Benxi, Liaoning), at Jinniushan (near Yingkou, Liaoning), at Yushu (a county-level city of Yushu Tibetan Autonomous Prefecture, southern Qinghai province), and at the palaeolithic site of Xiaogushan (30 km SE of Haicheng county, Anshan municipality, Liaoning, northern Liaodong Peninsula; 40° 34' 53" N - 122° 58' 30" E). A mammalian fauna composed of 40 species associated with Xiaogushan Man was unearthed during the archaeological excavations from 1981 to 2007 at Xiaogushan Paleolithic Site (Haicheng, Liaoning Province). The analyses of the fauna and comparison with other related faunas indicate that Xiaogushan fauna is very similar to that of Shanchengzi, Gulongshan and Yushu. It is a typical fauna of Northern Region. Its age is within the middle to late stages of the Late Pleistocene (80-20 ka). Influenced by cold period MIS 4, the cold forms appeared in the fauna.

Nevertheless the decrease in temperature was not very much and the climate was still a temperate one. The fauna's environment was generally humid, with large forest, some water areas and grasslands. It is suitable for prehistoric human habitation during temperate seasons with considerable food and water resources. The cold period MIS4 might push prehistoric human southward to temperate areas or stimulate them to develop fire using and making techniques Dong et al. (1999). Radiocarbon and luminescence dating techniques were applied to date the Xiaogushan cave site. The cave deposits consist of five layers numbered, from bottom to top, Layers 1, 2, 3, 4 and 5. A total of 27 age values were obtained for these layers. The radiocarbon and luminescence ages are consistent within error limits, and these dates are also in stratigraphic order. These indicate that the age values obtained should be reliable. Based on the age determination, the chronology of the deposit layers was established.

Layer 1, fluvial sediment at the bottom of the cave deposits, is 80 ka. Layer 2 is considered to last from 56 ka to 30 ka. Layer 3 was dated to 20-30 ka. Layer 4 is about 17 ka, and Layer 5 is Holocene deposits (Dong et al. 2010).

Iran

From the Qalehjough fossil site (about 32 km W of Torbat Hydaieh, Faizabad geological province, northern part of the Lut Desert, NE Iran, 1,420 m asl,

Fig. 7 - Localisation of the Qalehjough site near Faizabad (Khorassan Razavi province), and other Quaternary fossil sites in Iran.
- *Localizzazione del sito di Qalehjough presso Faizabad (Khorassan Razavi province), e di altri siti del Quaternario in Iran.*

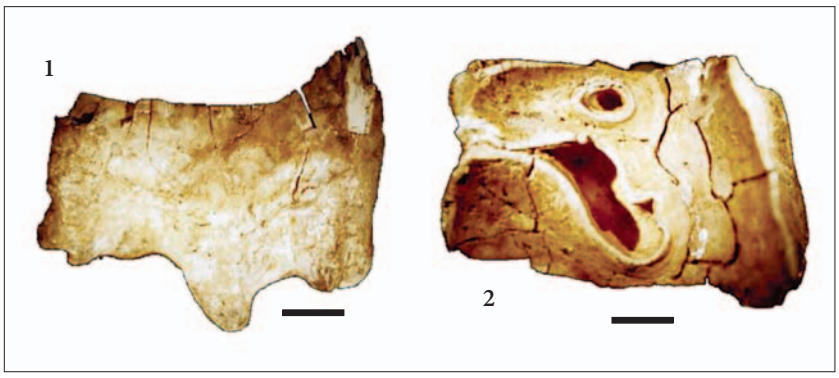

Fig. 8 - *Stephanorhinus* cf. *kirchbergensis* Jäger (1839) from the Qalehjough area, Lut Desert, Eastern Iran (fig. 4.1-2, in the original text) (scale bar = 1 cm) [after Hashemi et al. 2016].
- Stephanorhinus cf. kirchbergensis *Jäger (1839) dall'area di Qalehjough, Deserto di Lut, Iran orientale (fig. 4.1-2, nel testo originale) (scala = 1 cm) [da Hashemi et al. 2016].*

57° 55' E - 35° 18' W) (Fig. 7) - together with other Artiodactyla and Perissodactyla remains belonging to five taxa - would come a right upper premolar [QHJ-45] ascribed to *Stephanorhinus* cf. *S. kirchbergensis* (Jäger, 1839) (Hashemi et al. 2016) (Fig. 8).

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Authors' addresses - Indirizzi degli Autori:
- Emmanuel M.E. Billia
via Bacchiglione 3, I-00199 ROMA
e-mail: e.billia@yandex.ru, eme.billia@alice.it
- Júlia Zervanová
Drobného 16/9, SK-84101 BRATISLAVA
e-mail: lia20lia@gmail.com