



The skull of *Stephanorhinus kirchbergensis* (Jäger, 1839) (Mammalia, Rhinocerotidae) from Spinadesco (Cremona, Lombardia, Northern Italy): morphological analyses and taxonomical remarks – an opportunity for revising the three other skulls from the Po Valley

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ABSTRACT

The exceptional discovery of a complete and extraordinary well-preserved skull of *Stephanorhinus kirchbergensis* (Jäger, 1839) on an alluvial bar of the Po river near Spinadesco (Cremona, Lombardia, Northern Italy) in July 2013 presented us with the opportunity for reporting on the specimen. The thorough morphometric and morphological analyses carried out on the specimen (dentition included) revealed typical characteristics of *S. kirchbergensis* – also known as “Merck's rhinoceros”. These peculiar tracts highlighted distinctive taxonomic characteristics which are useful for reassessing the classifications of the specimens found in adjacent areas up to now.

In this paper, the distinguishing characters are discussed privileging the morphological features rather than the metrical characteristics also if the dimensions of the skull are significative. The adopted criteria, employed for the first time by Loose (1975), were used also for comparing the skull from Spinadesco with other fossil rhinoceros skulls discovered in the Po Valley adjacent areas: the *Dicerorhinus hemitoechus falconeri* (Azzaroli, 1962) from Mezzana Rabattone (Zinasco, Pavia), the *Dicerorhinus hemitoechus aretinus* (Azzaroli, 1962) from San Colombano al Lambro (Milano), and the *Dicerorhinus hemitoechus intermedius* from the Torrente Stirone studied by Cigala-Fulgosi (1976).

Up to now, *S. kirchbergensis* appears to be a rather rare species on the vast Eurasian landmass as few fossils have been found in a relatively limited number of localities. Furthermore, there are generally not available chrono- or biostratigraphic data.

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1. Introduction

An extraordinary well-preserved fossil rhinoceros skull was accidentally discovered in June 2013 on the alluvial bar of Spinadesco (Cremona, Northern Italy), on the right bank of the Po river downstream from its confluence with the Adda river on territory of Spinadesco (Fig. 1).

The area, which is well-known for its numerous palaeontological Quaternary discoveries, is composed of a long crescent-shaped meander bar (about 3 km), located along the northern side

of Isola Serafini, just upstream from the confluence with the Adda river, towards the south-east, where the Po meets an artificial channel that flows into the meander becoming a single channel.

Ever since the seventies large fossils and palaeontological evidence have been discovered on this bar which do not show signs of having been transported by the river probably due to the intense erosion process generated by the natural morphology of the river, the hydrodynamic context generated by the confluence with the Adda river, the current generated by the functioning of the Isola Serafini hydroelectric power station and the possible presence of surface pleistocenian fossiliferous strata. In fact only the third left upper molar (M^3) is missing from the skull probably due to a post-mortem trauma.

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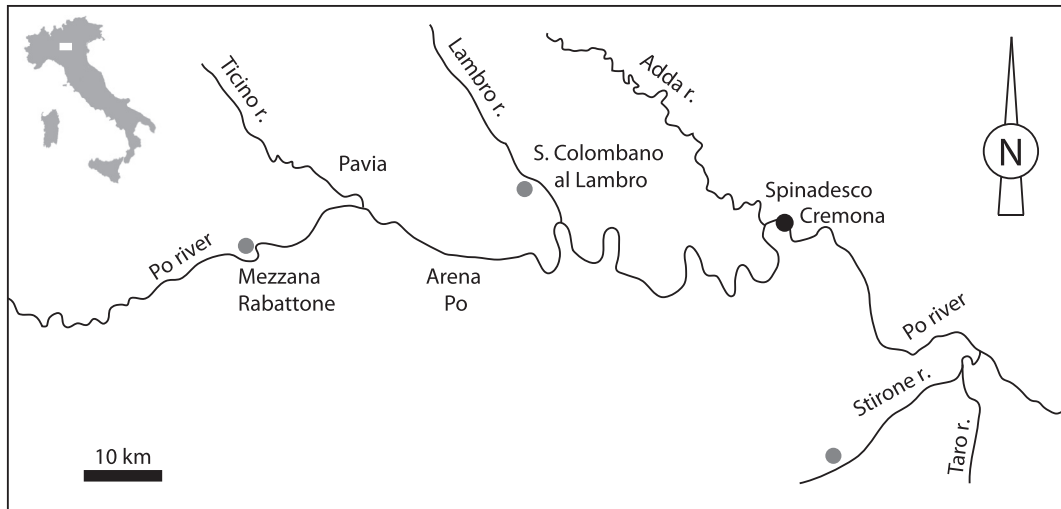


Fig. 1. Index maps of the central-eastern Po plain area and localization of the localities cited in this paper.

The fossil studied in this paper is comparable to three rhinoceros skulls discovered in neighbouring areas of the Po plain. They were found in various localities surrounding of the Po plain. The one found close to San Colombano al Lambro (Milano, Lombardia) was described as *Rhinoceros Merchianus Etruriae* by Caccia (1928) and was later re-documented by Cantaluppi (1969) as *Dicerorhinus hemitoechus aretinus*. Another one was discovered at Mezzana Rabattone (Pavia, Lombardia) by Anfossi and Cantaluppi (1987) who ascribed it to *Dicerorhinus hemitoechus falconeri*. The third one was found in the Torrente Stirone (Salsomaggiore, Parma, Emilia Romagna) by Cigala-Fulgosi (1976), assigned to *Dicerorhinus hemitoechus intermedius*.

As a genus name, *Stephanorhinus* was first introduced by Kretzoi (1942) in honour of Stephan I, the first King of Hungary. *Stephanorhinus* – as a still controversial genus in literature – is here in synonymy with *Dicerorhinus/Dihoplus*.

2. Material and methods

The rhinoceros skull from Spinadesco (Plate 1) was taken to Museo Paleontologico del Po at San Daniele Po (Cremona) from June 2013. Prior to delivery, the skull had been washed by its discoverer, fortunately without causing any apparent damage, yet removing all the information regarding the sediment encasing the skull.

Therefore only a small sample of silt residue was found in the brain cavity and some residuals of peat that had remained between the folds of the tooth enamel with which it was possible to carry out a comparative analyses with sediments collected on site or on other fossils (Persico et al., 2012). The peat sample found in the folds of the tooth enamel only revealed the presence of compact organogenic sediment composed of plant residues. This sediment, considered to be primary, is characteristic of the sedimentary facies in which the bone fossilized.

These vegetal remains are of the great importance for the palaeoecological contextualization of the fossil skull, so that a future thorough investigation correlated to this article is absolutely suitable.

The morphometric study was performed using manual measuring instruments such as a manual gauge, an anatomical compass with curved branches, a level, and a yardstick. The fossil was fully photographed from every angle by using a digital camera

Pentax WG-1 mounted on a stand. Angular measurements were obtained using a manual goniometer.

The data obtained were compiled in a table (Table 1) with the graphic description of the biometric parameters adopted which

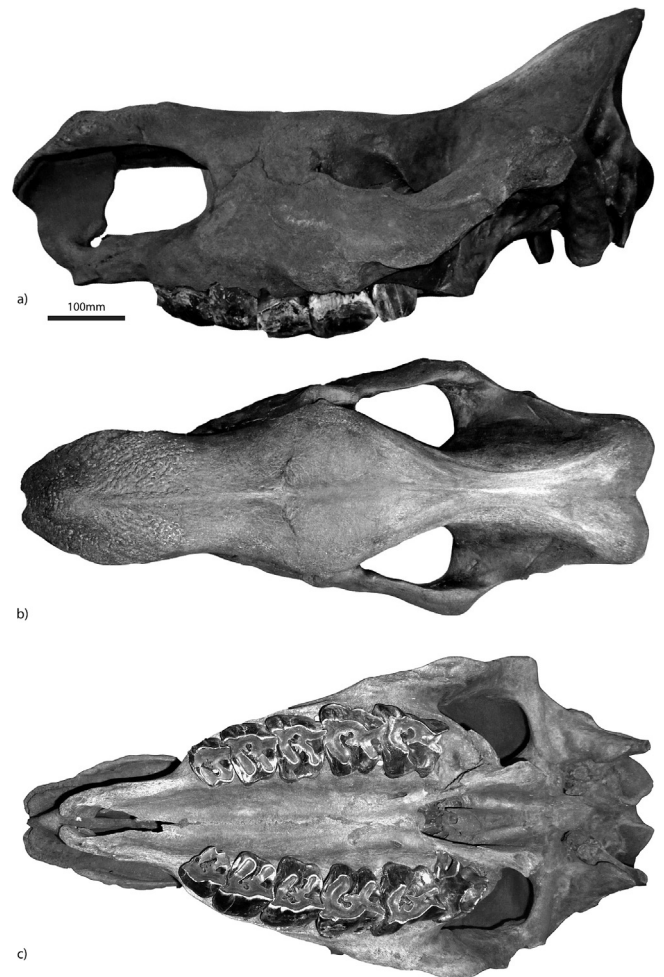


Plate 1. *Stephanorhinus kirchbergensis* (Jäger, 1839) from Spinadesco (Cremona, Lombardia, Northern Italy): a) lateral view; b) dorsal view; c) ventral view (scale bar = 100 mm).

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