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Quaternary Stratigraphy – palaeoenvironment and humans in Eurasia

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PREFACE

In 2021, we organized the SEQS-INQUA conference “Quaternary Stratigraphy - palaeoenvironment and humans in Eurasia” for the second time. We hoped it would take place in a traditional form. The conference program was to include plenary sessions in the Śnieżnik Massif (the Sudetes), field sessions in the Sudetes caves, in the Karkonosze Mts, and in the Kraków -Częstochowa Jura. Unfortunately, restrictions implemented due to the Covid-19 pandemic once again thwarted our plans and we had to cancel the conference. At first we thought about giving up on holding the conference in any other form. However, after consultations with the authorities of INQUA and Section on European Quaternary Stratigraphy (SEQS), as well as considering the many requests from a large number of potential participants, we decided to organize a virtual meeting this year, in December. The interest to take part in the proposed form of the conference has again exceeded our expectations. At present, at least 90 participants have applied proposing 34 oral presentations and 26 posters.

Here we present a book of abstracts and the conference program. We hope that our virtual conference will only be an introduction to a direct meeting to which we are looking forward to be held next year in Russia.

On behalf of the Organising Committee
Krzysztof Stefaniak

UNDERSTANDING THE VARIABILITY OF EARLY PLEISTOCENE *STEPHANORHINUS* (MAMMALIA, RHINOCEROTIDAE): IMPLICATIONS FOR TAXONOMY AND PALAEOBIOGEOGRAPHY

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Isolated teeth and bones of rhinoceroses are sometimes difficult to identify at specific level because our poor knowledge on the high morphological variability of fossil and, often, of extant species. During the past, several studies have been devoted to highlight morphological and morphometric differences among the fossil Pleistocene species, but only a few of them considered the variability of the extant taxa, in particular *Dicerorhinus sumatrensis*, to support and interpret their results. *Dicerorhinus sumatrensis* is the closest extant relative of the Eurasian *Stephanorhinus*, as recently evidenced by molecular analyses, and it could provide useful data to better understand the variability in extinct Pleistocene Eurasian taxa.

Dicerorhinus sumatrensis is characterized by a relatively wide morphological variability in several features of the cranium, as evidence by Groves (1982). Normally, male individuals are somewhat larger than female and are characterized by wider nasal bones. By the way, relatively young male individuals could display narrow nasal bones, similarly to females. A few characters of the cranium are reliably documented in all specimens, e.g., the ventrally opened external auditory pseudomeatus, the un-ossified nasal septum, the long contact between the lachrymal and the nasal bones. The development of the nuchal crest in *D. sumatrensis* is a little bit variable: in large males the nuchal crest overhangs the occipital condyles but in other specimens, such as NHMUK 1879-6-14-2, it is less posteriorly projected than the occipital condyles (Fig. 1). In dorsal view, several morphological differences can be detected among specimens of *D. sumatrensis*. The width of the nasals is evident and clearly different between sexes. The posterior border of the nuchal crest is normally slightly concave, but it can be also straight in some individuals and well-concave in some younger specimens.

The high morphological variability of *D. sumatrensis* in respect to the other extant rhinoceroses was also highlighted by Guérin (1980). In addition, as reported by Pocock (1946), the maximal width of the nasals in this species is reached when M3 starts to be worn. A similar pattern has been also recognised in the studied sample (Fig. 1). Further, specimens belonging to individuals grow up in optimal environmental conditions display relatively large size even if belonging to females (specimen NHMUK 1.1.22.1, type of *D. lasiotis*). These considerations could clearly affect the validity of some characters considered for species-specific attribution in fossil Pleistocene rhinoceroses. *Stephanorhinus lantianensis* has been claimed as a new species based on a cranium of an adult individual. The specimen is characterized by being smaller than *S. kirchbergensis* and by having sharply tapered nasal bones, and a long toothrow (P2-M3= 250 mm). The morphological characters of the teeth such as protoloph and metaloph parallel, and smooth ectoloph are probably due to the stage of wear of the teeth. The nasal bones in *S. lantianensis* strongly resembles those of the specimen IGF889 belonging to *S. etruscus*, and this character can be interpreted as sexually dimorphic, similarly to that observed in *D. sumatrensis*. At the present, *S. yunchuchenensis* is only recorded in one locality in Yushe Basin (Shanxi Province, Early Pleistocene), and, even if the exact location is uncertain, the age is estimated on regional geological information (Tong, 2012). Anyway, the morphology of the cranium and teeth referred to this species closely resembles *S. kirchbergensis* (as also noted by Chow, 1963). The expanded nasal bones are similar in shape and size to that observed in *S. kirchbergensis* skull SMNS 6617.2.12.67.3 and *S. hundsheimensis* skull MNHN PW 1958-764, and can be regarded as a sexual dimorphic trait. Taking into account the data on the extant Sumatran rhinoceros, the validity of some morphological traits normally used for species-specific attribution in Early Pleistocene fossil rhinoceroses should be revised. Sexual dimorphism and ontogenetic stage seem to drive the development of some important features in Eurasian rhinoceroses and a detailed comparison

among crania could lead to new considerations on taxonomy, and, therefore, on palaeobiogeography and biochronology of the different species.

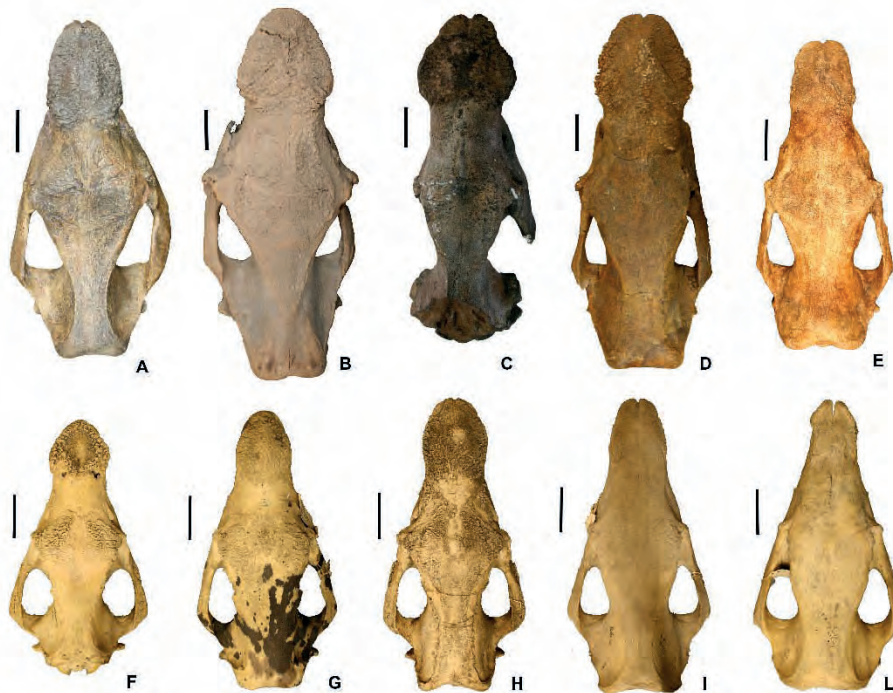


Figure 1. Morphological variability in the crania of selected Eurasian rhinoceroses in dorsal view.

A *S. kirchbergensis*, SMNK PAL 4254, M3 fully erupted; **B** *S. kirchbergensis*, SMNS 6617.2.12.67.3, M3 fully erupted; **C** *S. yunchuchenensis*, IVPP V2879, M3 fully erupted?; **D** *S. hundsheimensis*, MNHN PW 1958 – 764, M3 fully erupted; **E** *S. hundsheimensis*, IGF 1931V, M3 fully erupted?; **F** *D. sumatrensis*, NHMUK 1879-6-14-2, unknown sex, M3 fully erupted; **G** *D. sumatrensis*, NHMUK 1921-2-8-4, female, M3 fully erupted; **H** *D. sumatrensis*, NHMUK 1894-9-24-1, male, M3 fully erupted; **I** *D. sumatrensis*, NHMUK 68-4-15-1, unknown sex, M3 fully erupted; **L** *D. sumatrensis*, NHMUK 1931-5-28-1, male, erupting M3.

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