MAGDALENA BORSUK-BIAŁYNICKA

ALLACEROPS MINOR BELAYEVA, 1954 (RHINOCEROTIDAE) FROM THE OLIGOCENE OF ULAN GANGA, WESTERN GOBI DESERT

(ALLACEROPS MINOR BELAYEVA, 1954 (RHINOCEROTIDAE) Z OLIGOCENU UŁAN GANGA, ZACHODNIA CZĘŚĆ PUSTYNI GOBI)

(Plates XIX—XX)

Abstract. — *Allacerops turgaica minor* BELAYEVA,1954 from the Oligocene of Tatal Gol (Mongolia) is regarded as a separate species, different from *A. turgaica* (BORISSIAK, 1915). A fragmentary lower jaw assigned to *A. minor*, from the Oligocene of Ulan Ganga (Western Gobi Desert), is described and figured. The constitution of the Allaceropinae and their geographical range are discussed.

INTRODUCTION

The collection of the Polish-Mongolian Palaeontological Expedition 1964 contains, among others, a single mandible specimen of a primitive rhinoceros (subfamily Allaceropinae). This latter was recovered from a new Oligocene locality Ulan Ganga (GRADZIŃSKI *et al.*, 1968, Text-figs. 13—14) (97°31′ E 44°40′ N), discovered by the expedition in the Western Gobi Desert, south of the Gobi Altai Range (see also KIELAN-JAWOROWSKA & DOVCHIN, 1968). This specimen, in spite of its not very good state of preservation, is a valuable addition to the scarce material of the primitive Rhinocerotidae from the Mongolian Oligocene (Caenopinae: one species from Ergil Obo (Eastern Mongolia); Allaceropinae: one species from Tatal Gol (North-Western Gobi), as well as supplementing the material of the subfamily Allaceropinae in general.

Allaceropinae are characterized by having the structure of the cheek-teeth and body form of the true rhinoceroses (Rhinocerotidae) and by the presence of canine tusks (possibly I_3^3), the tusks of the other subfamilies of the true rhinoceroses being always I^1, I^2. Interpretation of the tusks of Allaceropinae, long a subject of discussion, was partly resolved with STEHLIN's (1930) description of the Oligocene rhinoceros *Engyodon-Eggysodon* sp. (?conspecific with *Allacerops gaudryi*) from Puy Laurant (Tarn), the mandible of which bore four incisors between the tusks, indicating that these latter were enlarged I_3 or canines. STEHLIN (*l. c.*) considered them as canines on the base of their shape and erectness, and also because there is no precedent for

enlarged I_3^3 in rhinoceroses or other perissodactyls, except tapirs (WOOD, 1931). In view of this, the present author interprets the tusks of the here discussed form as C.

The subfamily Allaceropinae is represented by four species of one genus *Allacerops* WOOD, 1932: *Allacerops gaudryi* (RAMES, 1886), *A. osborniana* (SCHLOSSER, 1902) and *A. pomeli* (ROMAN, 1912) from the Middle Oligocene of Western Europe, and *A. turgaica* (BORISSIAK, 1915) from the Middle Oligocene of Kazakhstan. BELAYEVA (1954) erected a new subspecies *A. turgaica minor* for a specimen from the Oligocene of Tatal Gol. The European forms, generally smaller than the Asiatic *A. turgaica* (BORISSIAK), are represented by only very fragmentary remains. The best known is *A. osborniana*. The following remains of this species have so far been described: the almost complete dentition of the upper jaws and a mandible fragment with M_1-M_3 from the Museum in Montauban (ROMAN, 1912), a well preserved mandible of a young individual (FILHOL, 1884, *fide* ROMAN, 1912), as well as several detached teeth; almost all these specimens coming from the Phosphorites of Quercy.

Allacerops gaudryi is represented by only two incomplete mandibles, one from Brons (RAMES, 1886), the other from Latou (Commune de Trémons, Lot-et-Garonne, ROMAN, 1912); (STEHLIN'S, 1930, specimen probably also belongs here). *A. gaudryi*, more primitive than *A. osborniana* and *A. turgaica*, is characterized by comparatively low-crowned teeth, strong and continuous cingulum on the labial side, unmolarized P_2, as well as a considerably longer premolar-row in comparison to the molar one (see ratio in Table 1).

Allacerops pomeli is known exclusively from a fairly well-preserved fragment of palate and both jaws with teeth (Gannat, Musée de Lyon). The length P^2-M^3 of this specimen is 148 mm, which proves it to be the smallest of the Oligocene Allaceropinae. In addition, *A. pomeli* is distinguished from *A. turgaica* and *A. osborniana* in having a longer premolar-row (in this case upper) than molar-row (corresponding ratios according to BELAYEVA, 1954, are 106.4% for *A. pomeli*, 86% for *A. osborniana*, 82.3% for *A. turgaica*).

Allacerops turgaica is represented by exceptionally rich material, including upper and lower jaws with teeth, skull fragments and most of the postcranial bones. It is distinguished from the European forms by bigger measurements, greater degree of molarization of P^2-P^4 and P_3-P_4, as well as by some other characters of dentition, mainly upper. The subspecies *A. turgaica minor* from the Middle Oligocene of Tatal Gol is known from isolated upper teeth, mostly fragmentary, two small mandible fragments with teeth, some detached lower teeth and some postcranial bones (among them epistropheus).

MATTHEW and GRANGER (1924) described some poorly preserved fragments, assigned by them to ?*Epiaceratherium*, from the Oligocene of Khsanda Gol (Inner Mongolia). Besides cited forms, no other remains of Allaceropinae have so far been described.

The specimen described in the present paper is housed (see KIELAN-JAWOROWSKA & DOVCHIN, 1968, p. 12) in the Palaeozoological Institute, Polish Academy of Sciences, in Warsaw, abbreviated as *Z. Pal.* The abbreviation *PIN* is used for the Palaeontological Institute of the USSR Academy of Sciences, Moscow.

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Family RHINOCEROTIDAE Owen, 1845

Subfamily ALLACEROPINAE Wood, 1932

Genus **ALLACEROPS** Wood, 1932

Allacerops minor Belayeva, 1954

(Pls. XIX—XX)

1954. *Allacerops turgaica minor* subsp. nov.; E. J. Belayeva, Novye dannye..., p. 200, Pl. 2, figs. 2-7; Text-figs. 6-8.

Diagnosis. — All parts of the skeleton smaller than those of *Allacerops turgaica* (Borissiak). The anterior ridge of the ectoloph (corresponding to protocone) better developed than in *A. turgaica*. Dens epistrophei flat (dorso-ventrally) at the base and rounded at the top (Belayeva, 1954). The symphyseal region of the mandible and the canines less curved upwards than in *A. turgaica*. The ascending ramus inclined posteriorly. Two foramina mentalia. Formula of the lower dentition 2I, 1C, 4P, 3M.

Material. — Two fragments of a lower jaw and several tooth fragments from the Oligocene of Ulan Ganga (Western Gobi Desert, south of the Gobi Altai Range), all found together and belonging to the same individual (Z. Pal. No. MgM-III/1). The first fragment of the jaw consists of the right horizontal ramus; the symphysis and the anterior part of the left horizontal ramus, two big canine-tusks and fragmentary right P_3 in the alveolus. The second fragment is represented by the posterior part of the left horizontal ramus and the basal part of the ramus ascendens. The middle part of the left mandible, right and left temporal and angular processes are missing; the lower margin of the jaw and the anterior part of the symphysis are damaged. The following isolated fragmentary teeth are preserved: right P_2, P_4, M_1, M_2 M_3, and left P_1 P_4 and M_3 (two fragments).

Dimensions (in mm):

Length of P_1-M_3	176
Length of P_1-P_4	77
Length of M_1-M_3	99
Length of diastema	23
Length of symphysis from above	65
Minimum width between diastemal cristae	35
Width of mandible at the diastemal region	42
Width of mandible at the base of C	44
Thickness of ramus below P_2	22
Thickness of ramus below M_3	33
Height of ramus (right) below P_2	38
Height of ramus (left) below M_3	60

Description. — The mandible rather small in size. The horizontal ramus, relatively long and slender, tapers slightly from M_3 to P_1. The lower margin of the mandible (as can be judged from its preserved posterior and anterior parts, the middle part being damaged) is almost straight, somewhat elevated in the incisive part, and slightly concave at the base of ramus ascendens. Ramus ascendens bends strongly backwards (it does not appear to have been curved forwards to any stronger degree in its superior, unpreserved part, unless in the uppermost part of the coronoid process). Both labial and lingual surfaces of the horizontal ramus rather

flat, except the region of M_3, which is strongly swollen lingually. Two branches of the mandible converge at an angle of about 37. The region of the diastema is the narrowest part of the mandible, the symphyseal region getting somewhat wider anteriorly. The symphysis reaches back the level of the anterior root of P_2. The gently concave dorsal surface of the symphysis slopes backwards, becoming somewhat deeper and wider towards its posterior margin.

Two foramina mentalia are present on each side. The anterior one round, 3 mm in diameter, situated on the ventral side of the symphysis, about 9 mm from the symphysis axis and about 40 mm from its posterior margin. The second one oval, 8 mm long, situated 15 mm under the posterior alveola of P_2.

Teeth. Only one tooth, a big right canine-tusk, broken off at its base, is preserved in situ. The left tusk and right P_3, both strongly damaged, were fitted into their alveoli. On the base of the number of alveoli (thirteen behind the diastema) one can infer the presence of seven cheek-teeth: four premolars and three molars, P_1 with one root only (P_3 situated in its alveolus, see above). Between the right tusk and the symphysis axis, two small, slightly damaged incisive alveoli can be observed (Pl. XX, fig. 1*a*). The formula of the lower dentition should be, therefore, as follows: 2I, 1C, 4P, 3M. The tooth-row extends well backwards, alveola of M_3 being wedged in the basis of the ascending ramus, which is probably due to the relatively young age of the animal (M_3 completely unworn).

No incisors present in the material. Canines represented by the roots only. The right canine relatively large (more than 58 mm long), approximately cylindrical, but curved dorso-laterally. It is almost oval in transversal section, but flattened at its ventro-lateral side. P_1 (left) unmolarized. A pointed protoconid with rudimentary talonid at the back, the anterior and lingual parts of the tooth missing. The remaining cheek-teeth P_2—M_3 built on the rhinoceros pattern, with two crescents fused with one another on the labial side, the well defined furrow being observable at the junction line. The shape of the crescents can be observed only in right M_3, the other teeth being too fragmentary. The transversal parts of the crescents bend backwards at an obtuse angle to the jaw axis. Metalophid is provided with posterio-external, perpendicular ridge projecting outwards (anterior part of the tooth damaged), hypolophid curves gently without any ridge. Hypolophid is lower than metalophid (equals about 2/3 of its height, when dealing with an unused tooth).

Cingulum is weak, at least on the labial side of the teeth, getting, however, stronger anteriorly as well as posteriorly and at the junction of the lobes. Both, anterior and posterior parts of the labial cingulum of premolars raise upwards, which is not the case with the third molar (the first and the second molars being practically unknown). At M_3 cingulum stretches on the posterior transversal wall of hypolophid running at its base, raising somewhat lingually.

No cement present on the surface of the tooth-crowns. Enamel with fine ornamentation.

Discussion. — From the Oligocene of Tatal Gol, BELAYEVA (1954) described some fragmentary isolated upper teeth, two fragments of mandibles, some lower teeth and some bones of the postcranial skeleton, which she assigned to *Allacerops turgaica minor* BELAYEVA. The specimen, described in the present paper, is difficult to compare with that described by BELAYEVA, as it represents the entire (although slightly damaged) horizontal rami with symphysis, canines and incisive alveoli, not preserved in the BELAYEVA'S specimen. On the other hand, the cheek-teeth, well-preserved in the Tatal Gol form, are represented almost exclusively by the outer walls in the here described specimen. The structures preserved in both specimens, which can be compared, show that Tatal Gol and Ulan Ganga specimens are conspecific by having: an identical shape of anterior and posterior lobes in the lower cheek-teeth, the same degree of development of labial cingulum on the lower cheek-teeth, comparable dimensions (the length

of P_3 is 21.5 mm for *A. turgaica minor*, 22.5 for the specimen from Ulan Ganga), as well as presumably a similar degree of molarization of P_2. Additional evidence for the conspecifity of these two specimens is the geographical position. The locality Tatal Gol is situated some 450 km distant from Ulan Ganga. The specimen from Ulan Ganga supplements to some extent BELAYEVA'S material, permitting a more detailed comparison between the Mongolian form and that from Kazakhstan, *Allacerops turgaica* (BORISSIAK) = *A. turgaica turgaica* BELAYEVA. This comparison shows some differences in the dental formula and shape of mandible,

Table 1

Measurements of mandibles in Allaceropinae (in mm)

Species / Measurements	*A. minor* Ulan Ganga here described (Z. Pal. No. MgM-III/1)	*A. minor* Tatal Gol (BELAYEVA, 1954; PIN No. 7—10)	*A. turgaica* Kazakhstan (BORISSIAK, 1918; PIN No. 34—1454)	*A. osborniana* Phosphorites of Quercy (ROMAN, 1912, Pl. 1, figs. 5, 5*a*; Musée de Montauban)	*A. gaudryi* Lot-et-Garonne (ROMAN, 1912, Pl. 6, figs. 1—2; Musée de Bâle)
Length of P_1—M_3	176	—	about 194	—	170
Length of P_1—P_4	77	more than 70	about 84	—	74
Length of M_1—M_3	99	—	about 105	—	80
Length of diastema	23	—	20—25	—	20—25
Width of mandible at the diastemal region	42	—	65	—	—
Height of ramus below M_3	60	—	about 70	—	—
Ratio $\frac{P_1—P_4}{M_1—M_3}$	78%	—	80%	—	92%

which seems to be of specific rank. *A. turgaica* has only one incisor, whereas the specimen from Ulan Ganga possesses two. The incisive part of the mandible and the canines are more erect than those of the specimen from Ulan Ganga. Moreover, the ascending ramus is almost perpendicular (somewhat bent forwards in the upper part), while bent backwards (upper part unknown) in the specimen from Ulan Ganga. Finally, *A. turgaica* (BORISSIAK) differs from *A. minor* in having bigger dimensions (see Table 1).

In view of the above differences, the present author regards BELAYEVA'S subspecies *A. turgaica minor* as a separate species *A. minor* BELAYEVA.

In 1954, GROMOVA described the symphyseal part of the mandible (PIN No. 475-3066) genus indet. This fragment bears two well-developed tusks, broken off at the bases, four incisive alveoli between tusks and alveoli for cheek-teeth (three of them on the left and one on the right) (GROMOVA, 1954, pp. 168—170, Fig. 25). The assignment of GROMOVA'S specimen to the Amynodontidae, mainly on the base of the presumable lost of P_2 (no cheek-teeth present in the material) seems very dubious. In the present author's opinion, it might be assigned to the

Table 2

Comparison of the GROMOVA's (1954) specimen Amynodontidae gen. indet. with *Allacerops minor* BELAYEVA

Measurements (in mm)	Amynodontidae gen. indet. Tatal Gol (GROMOVA, 1954; PIN No. 475—3066)	*Allacerops minor* Ulan Ganga here described (Z. Pal. No. MgM-III/1)
Length of diastema	about 35	23
Length of symphysis (from above)	about 75	65
Distance between diastemal cristae	35	35
Width of mandible at the diastemal region	44	42
Width of mandible at the base of C	about 52	44
Distance b. diast. cristae/width of mand. at diast. region *	80%	83%

* This ratio equals 50—70% in Amynodontidae.

Rhinocerotidae, subfamily Allaceropinae as well. It resembles *Allacerops minor* in having the similar position of the tusks and four incisive alveoli between them; in both forms there is no lateral swelling in the diastemal region (see ratio in Table 2) and the symphysis reaches backwards the level of the posterior part ofthe second alveolus. On the other hand, the symphysis and diastema are considerably longer in GROMOVA's specimen than in that from Ulan Ganga, which can be due, but not necessarily, to the relatively young age of the latter.

Palaeozoological Laboratory
of the Warsaw University
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PLATES

M. BORSUK-BIAŁYNICKA: *ALLACEROPS MINOR* BELAYEVA, 1954

PLATE XIX

Fig. 1. *a* Damaged mandible, in dorsal view; *b* the same specimen, lateral view of the right ramus (Z. Pal. No. MgM-III/1); ×0.66.

(see also Plate XX)

Photo: M. Czarnocka

1a

1b

M. BORSUK-BIAŁYNICKA: ALLACEROPS MINOR BELAYEVA, 1954

Palaeontologia Polonica, No. 19, 1968

PLATE XX

Fig. 1. *a* Symphysis of the specimen figured on Plate XIX, anterior view, nat. size; *b* the same specimen, lateral view of the part of the left ramus, ×0.66. Arrows indicate the position of two incisive alveoles.

Fig. 2. Right cheek-teeth of the same specimen, in lateral view, nat. size: *a* M_3, *b* M_2, *c* M_1, *d* P_4, *e* P_3.

Fig. 3. Left cheek-teeth of the same specimen, in lateral view, nat. size: *a* P_1, *b* P_4, *c* M_3.

(see also Plate XIX)

Photo: M. Czarnocka

2a

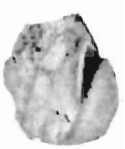
2b

2c

2d

2e

3b



3a

1a

3c

1b