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ON SOME PLIOCENE AND LOWER QUATERNARY RHINOCEROS CURATE AT THE OLTENIA MUSEUM

ASUPRA CÂTORVA PIESE DE RINOCERI PLIOCENI ŞI CUATERNARI TIMPURI DIN COLECŢIA MUZEUL OLTENIEI

***VLAD CODREA, **AURELIAN POPESCU**

Rezumat

Sunt descrise câteva piese fosile aparţinând unor rinoceri plioceni şi cuaternari timpurii descoperiţi în diverse situri din Oltenia. Pentru majoritatea pieselor, locul descoperirii este problematic, dar ele sunt importante din punct de vedere sistematic. Toate piesele descrise aparţin genului Stephanorhinus.

Cuvinte cheie*: paleontologia vertebratelor, rinoceri plioceni şi cuaternari timpurii, Muzeul Olteniei*
Key words*: vertebrate paleontology, Pliocene and Lower Quaternary rhinos, Oltenia Museum*

INTRODUCTION

Dolj district, as well as the whole territory of Oltenia are famous for numerous and significant fossil-bearing sites, originating either from the Pliocene or the Quaternary formations. Along the time, several field missions took place and a large number of vertebrate fossils (primary large land mammals) had been labelled in the Oltenia Museum Natural Sciences Branch (abbreviated OMNSB) collections, increasing the site census from this region. As an example, it worth to be mentioned mainly the field missions carried on by C. S. NICOLAESCU-PLOPŞOR and I. FIRU in the past decades at Tetoiu (= Bugiuleşti), an outstanding site nor only for our country, but for the whole Europe.

Other discoveries are originating from fortuitous discoveries. Such finders brought the fossils to the museum, but unfortunately in some situations a lot of details concerning the discovery (stratigraphy, assemblage etc) were lost.

Among the large mammals collected in this manner, some rhinoceros bones and teeth are present in these collections too. Although a thesis was published on this topic (CODREA, 2000), these fossils remained until now unstudied, in spite of their value for the paleontological heritage from Oltenia. For this reason, we decided to shortly describe and illustrate the most representative items of this kind.

PALEONTOLOGY

Genus ***Stephanorhinus*** KRETZOI, 1942

Stephanorhinus etruscus (FALCONER, 1868)

Tetoiu (= Bugiulesti; Vâlcea district), Grăuceanu Valley
(Pl. 1, Figs. 1-3; Pl. 2, Figs. 1-2)

The first material (labeled "Bug. 862 Gr. C2") consists on a left nearly complete mandible, belonging to a non-mature individual (only milk teeth form the tooth row and the symphysis was unfused). The condyle, as well as the coronoid process is damaged.

The horizontal ramus is low and slender. On the opposite, the vertical ramus is robust. The maximum thickness of the horizontal ramus is located in d4 rear area. The lateral outline is fair convex, with a maximum convexity below d4. The diastema is very short. Two mental foramina seem to be present on the lateral side. The anterior, located under the diastema is small. The posterior one, now enough indistinct due to a crack affecting the bone, was however obviously wider, located bellow d1/d2 commissure. Even broken, the coronoid process was clearly higher compared to the condyle. The sigmoidal incisure was not very large.

On medial view, one can notice that the mandible foramen is too damaged to allow an estimation of its level compared to the alveolar border. It was either at the same level or even higher.

The rostral end is narrow, but a spatula-shaped outline in dorsal view can however, be guessed. No incisor alveoli can be seen. The symphysis rear end is located at the level of d1/d2 commissure.

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In cross section, the horizontal ramus outer wall is thick and convex, with a maximum under d3-d4, but it flattens immediately before d3. The inner wall was probably flat, but now it locks depressed, as the mandible channel collapsed.

All milk teeth are preserved. Cingula and cementum are completely lacking. The d3 and d4 with "V" shaped transverse valleys, separed by low-leveled difference. For all these teeth, the wear is only incipient.

Measurements (mm; teeth measured according GUÉRIN, 1980; mandible after GUÉRIN, 1980 and MAZZA, 1988):

Length	d1	d2	d3	d4
mesio-distal	22.0	31.8	41.0	39.5
Width				
- anterior	10.7	14.8	17.5	23.0
- posterior	11.5	16.8	21.6	24.2
Height				
- protoconid			+ 28.0	+ 31.5
Hypsodonty index			68.30	79.75
Mandible length	333			
Length from the gonion caudale to the oral border of the alveolus of d1	292			
Length from the aboral border of d4 to the infradentale	175			
Length from the gonion caudale to the aboral border of the alveolus of d4	154			
Length of diastema	38.5			
Middle height of the vertical ramus: gonion ventrale-sygmoidal incissure	126.5			
Height of horizontal ramus before d1	37			
Idem, between d2/d3	52			
Idem, post d4	56			

The second fossil (labeled "Bug 1962 Gr car 4, 9695") is a crushed palate fragment of a non-mature animal too, preserving fragments of both tooth rows. On the left side, D2-D4 are well preserved; on the right side, very damaged D2-D3 and just a small fragment from the D2 postero-mesial side is preserved. Al these teeth are low-crowned.

D2 is very damaged on the postero-palatal side. It has a waved outer wall, with a fair mesostyle and a fainter metacone fold. Protocone constriction cannot be observed. Crochet and crista present, forming a closed elliptical-outlined mediofossette. The anticrochet is missing. Palatal cingulum reduced to a remnant at the opening of the median valley. The anterior cingulum is strong the posterior cannot be noticed. No cingulum on the outer wall.

D3 is well preserved. Its wear is just incipient. The outer wall is waved, with a strong paracone fold and a mesostyle fold embryo. A moderate protocone constriction exists. The crochet is present, but the crista and the anticrochet are lacking. The postfossette is triangular and shallow, compared with the median valley. Cingula are similar to the previous tooth.

D4 is well preserved too. The outer wall is somewhat similar to D3, but the paracone fold is stronger. The mesostyle is better expressed, but a metacone fold is lacking. A thin but long crochet is present. Crista and anticrochet are missing. The postfossette is similar to D3, as well as the cingula, and protocone constriction.

Measurements (mm):

	D2	D3	D4
Length	38.5	43.0	48.5
Width			
- anterior	37.0	46.0	47.0
- posterior	40.0	41.0	44.0
Height			
- paracone		27.5	32.2
Hy index		63.95	66.39

Discussion. Several fossil-bearing sites were described from Tetoiu (former Bugiuleşti). Valea Grăuceanu belongs to the so-called „Lower faunal horizon (T1)" from Tetoiu area (RADULESCO & SAMSON, 1990). Due to its outstanding mammal assemblage, it was before assigned to the Earliest Pleistocene (FERU et al., 1983), but later to the Latest Pliocene (RADULESCU & SAMSON, 1990; RADULESCO et al., 1998). In this assemblage, „*Dicerorhinus* sp." (large-sized) was mentioned, with *Mammuthus meridionalis, Paradolicopithecus geticus, Eucladoceros* sp., *Mitilanotherium inexpectatum* and so on.

It is interesting to be pointed out that from a site located immediately below, some artifacts were mentioned, belonging to the Olduwan culture (SAMSON & RADULESCO, 1963; RADULESCO & SAMSON, 1990, 1991).

Stephanorhinus sp.

Busuioci-Gilort (found in 1967)
(Pl. 3, Figs. 1-3)

It is a right horizontal ramus of a mandible. The ramus is high. The symphysis is missing the bone had been broken immediately before p2. Even in this condition, it is enough clear that the rear margin of the symphysis was located before p2. The ventral margin is partly damaged, beginning with the sector located below m1 toward the posterior. The maximum width of the ramus was probably situated at the m1/m2 commissure. The maximum convexity of the ventral margin in lateral view was probably located bellow m2/m3 commissure.

Only p4-m3 are preserved, the p2-p3 roots are still into the sockets. The m2 is damaged postero-lingual, as well as the m3 entoconid.

Both p4 transverse valleys have "V" shaped profiles, with high-level differences between them. Mesial cingulum present. The distal cingulum is practically absent. On the outer walls, a trace of a cingulum is clearly visible.

The m1 has a heavy worn aspect. The transverse valleys profiles cannot be distinguished. Between them, a low-level difference can be however noticed. On the inner and outer walls, the cingula are missing.

The m2, with anterior "U" shaped transverse valley and "V" shaped posterior one. There is a low-level difference between the transverse valleys. Only a mesial cingulum is present, lengthened on the outer wall of the anterior prism.

The m3, with "U" and "V" shaped transverse valleys. The cingulum is similar to the previous tooth, but a faint distal cingulum is present too.

Measurements (mm):

Length	p4	m1	m2	m3
mesio-distal	37.0	39.5	46.0	45.5
m1-m3	139			
p4-m3	178.0			
p2-m3	238 (estimated)			
Width				
- anterior	26,2	29.5	32.4	31.2
- posterior	29.0	29.5	30.0	29.0
Mandible height				
ante-p4	85.0			
p4/m1	87.0			
m1/m2	89.5			

Discussion. This mandible fragment preserves only too scarce characters to allow a designation to a species. It could belong either to *Stephanorhinus jeanvireti* (GUÉRIN, 1972), or to *S. etruscus*, two Upper Pliocene species, closely related between them (FORTELIUS et al., 1993). In these circumstances, without the ascending ramus and the symphysis, it would be too injudicious to make a determination to one or another of the species, as MAZZA (1988) already pointed out.

Other fossil mammals are completely unknown from this site.

Cernăteşti, Dolj (found in 1974)
(Pl. 4, Figs. 1-3)

Only the right mandible horizontal ramus is preserved. The vertical ramus, as well as the symphysis, is missing. Only m1-m2 are preserved, but the p2-p3 and m3 roots are still visible into the sockets.

The horizontal ramus is slender and low. It thickens from the mesial part toward m3, where it reaches the thickest transversal section. Its ventral profile is rather flat, with only a faint convexity. The inner wall is flat, the outer one slight convex. No mental foramina occur. The mandibular foramen margins are broken, so it is difficult to

appreciate if it was located above, below or at the level of the alveolar border. Even not preserved, it is obvious that the symphysis leveled the p2 with its rear margin. The masseterine fossa is shallow.

The molars are brachydont. The external walls are rough, but the cement is completely missing.

The m1 has "V"-shaped anterior and posterior valleys, with low-level difference between them. The m2 has a "V"-shaped anterior valley and a "U"-shaped posterior one, with medium difference between. Cingula are missing on the lingual sides, excepting a faint prolongation of the mesial m1 cingulum toward the anterior valley. On both molars, the mesial cingula have prolongations on the anterior prism. Distal cingula exist on both teeth.

The fossil has a red-grayish color and seem to originate from limonitic sands.

Measurements (mm):

Length	m1	m2
- mesio-distal	44.0	43.5
Width		
- anterior	29.5	32.4
- posterior	29.5	30.0
Mandible height		
ante- p3	49.0	
p3/p4	56.0	
p4/m1	89.5	
m1/m2	63.0	
m2/m3	72.5	
post- m3		

Discussion. Cernăteşti is a well-known Pliocene mammal site, assigned to the Middle Romanian (MN 16, Late Pliocene) accordingly to FERU et al. (1983). There, two rhinoceros are already mentioned: *Stephanorhinis* cf. *etruscus* and *S*. cf. *jeanvireti*, among a larger assemblage including micro- and large mammals. It is interesting to be mentioned that two mastodons (*Anancus arvernensis* and *Mammut borsoni*) and the first true European elephant (*Mammuthus rumanus*), all exist in the mammal assemblage. Even a sketchily look on the previous researches carried on the Cernăteşti mammals point out the difficulty of a clear assignation for the rhinos from this assemblage, due to the lack of a complete and well-preserved fossils. The mandible we have at our disposal is not an exception to this rule, preserving too poor caracters for a species assignement.

Dobreşti-Toceni, Dealul Gânsacului, Dolj (found in March 1, 1978)

(Pl. 5 , Figs. 1-3)

The preservation status of this fossil is nearly identical to the previous one: it is a right horizontal ramus, preserving nearly the same characters as the Cerăteşti mandible, with an identical slender and low shape of the horizontal ramus. All the molars are excellently preserved, excepting the m2 entoconid. The roots of p4 and the posterior p3 root are preserved into the sockets. Probably these teeth were damaged recently, after the finding of the fossil.

The symphysis rear margin was probably located either below p3, or at p2/p3 commissure. The mandibular foramen was clearly located below the alveolar border.

As a difference from Cerăteşti mandible, here the most width molar is m1, m2 and m3 being longer but narrower. It seems that the molars were even more brachydont, compared with Cernăteşti. The outer walls are also enough rough, mainly toward the base of the teeth.

The m1 has „V" shaped transverse valleys with medium level difference. The internal cingulum is missing, except a faint prolongation of the mesial one toward the anterior transverse valley. The outer cingulum is completely missing. The mesial and the distal cingula, if ever existed, were destroyed trough contact with the corresponding teeth from the tooth row.

The m2 has "V" shaped anterior valley and "U" shaped posterior one. The level difference is high. Internal cingulum is missing. On outer wall, only on the anterior prism can be seen a small and discontinuous cingulum.

The m3 has "U" shaped transverse valleys, with medium level difference. Internal and external cingula are similar as in m1. Mesial and distal cingula are present.

The fossil could originate either from sands or gravel deposits.

Discussion. Dobreşti-Toceni is not a famous vertebrate site as Cernăteşti is. However, in OMNSB collections there are also fossil proboscidean items belonging to *Mammuthus meridionalis*. In these circumstances, one can think about Lower Pleistocene deposits.

As at Cernăteşti the same difficulties arose if tempting to assign this mandible to a rhino species. Even so, if thinking to the slender and low aspect of the both mandible horizontal rami, as to the estimation of the extension

of the mandibles (probably neither did not exceed in total length 500 mm), one can presume that probably the both fossils belonged rather to *Stephanorhinus etruscus* but *S. jeanvireti*.

Measurements (mm):

Length	m1	m2	m3
- mesio-distal	40.0	44.0	46.5
- m1-m3	132.5		
Width			
- anterior	30.4	31.5	29.0
- posterior	32.4	30.0	29.0
Mandible height			
p3/p4	57.0		
p4/m1	73.0		
m1/m2	76.0		
m2/m3	79.0		
post-m3	83.0		

Izvoare-Corlate (Dolj district)
(Pl. 6, Figs. 1-4)

Two mandible fragments belonging to the same mature, old individual, are originating from this site. The first fragment concerns the symphysis and the anterior part of the left horizontal ramus. The second one is a fragment of the right horizontal ramus. Both had been found in 1979.

The horizontal rami are high and thick. Only a small section of the ventral profile can be observed, the rest being damaged. This one shows a fair convexity below p4-m3. The inner side is flat, the outer is convex, with maximum convexity just above the ventral margin. On the left side several mental foramina can bee seen: the wider is located near the ventral margin, below p2/p3 commissure. Another one, somewhat smaller, together with two other smaller ones, is situated below the diastema.

The symphysis is spatula-like. Its widest section is not on the incisors border, but somewhat posterior, where two ridges, one of each side, are developing from the diastema, bending ventrally. Two spongious bone filled alveoli indicate the place of residual incisors. On the ventral side, the symphysis shows a lot of foramina (four on the right side and six on the left one), either separated by extremely thin walls of bone, or already coalescent.

On the left side, p3-m1 are preserved, as well as the p2 sockets. The p1 did not existed. On the right side, p3-m3 are also well preserved.

The two last premolars are heavy worn, as the transverse valleys are nearly abraded. There are no cingula on the inner sides. On the outer sides, both show nearly continuous faint cingula.

The m1 is drastically worn, mainly on the paralophid area. This tooth is devoid of lateral cingula.

The m2 have “V” shaped transverse valleys, with low-level difference between them. The inner cingulum is missing. On the outer wall, a cingulum is developed only on the anterior prism, as a prolongation of the mesial one.

The m3 has “U” shaped transverse valleys, with low-level difference between them. The cingula are identical distributed as in the previous molar.

Measurements (mm):

Length	p3	p4	m1	m2	m3
mesio-distal	32.5	36.0	36.0	43.0	47.0
p3-p4	57.0				
m1-m3	126.0				
Width					
- anterior	22.2	24.0	27.4	28.4	26.5
- posterior	24.2	27.5	28.0	27.2	26.0
Heigh of ramus below					
p4/m1	83				
m1/m2	89				
m2/m3	94				
Length of symphysis	63				
Width of symphysis	54				

Discussion. According to the geological map of Romania (1: 200 000, sheet Craiova), at Izvoarele-Corlate there are Lower Quaternary exposures. This rhinoceros seems to be a large-sized one, anyhow difficult to be assigned to *Stephanorhinus etruscus*. Such a form is mentioned also at Tetoiu by RADULESCO et al. (1998). Unfortunately, very few rhino fossils from our country allow a doubtless species assignment. It is the same situation in this case, as the mandible is too fragmentary, and no other element (especially skull and limb bones) is available.

CONCLUSIONS

Several sites spread on the whole Oltenia territory yielded a lot of interesting rhinoceros fossils. A lot of them originate from assemblages illustrating the faunal turnover that took place at Pliocene/Quaternary boundary. All these rhinos belong to *Stephanorhinus* genus. The fragmentary state of preservation as well as the limited samples, don't allow a species assignation. Probably, future discoveries will add more elements to the knowledge of this group of Perissodactyls originating from this area

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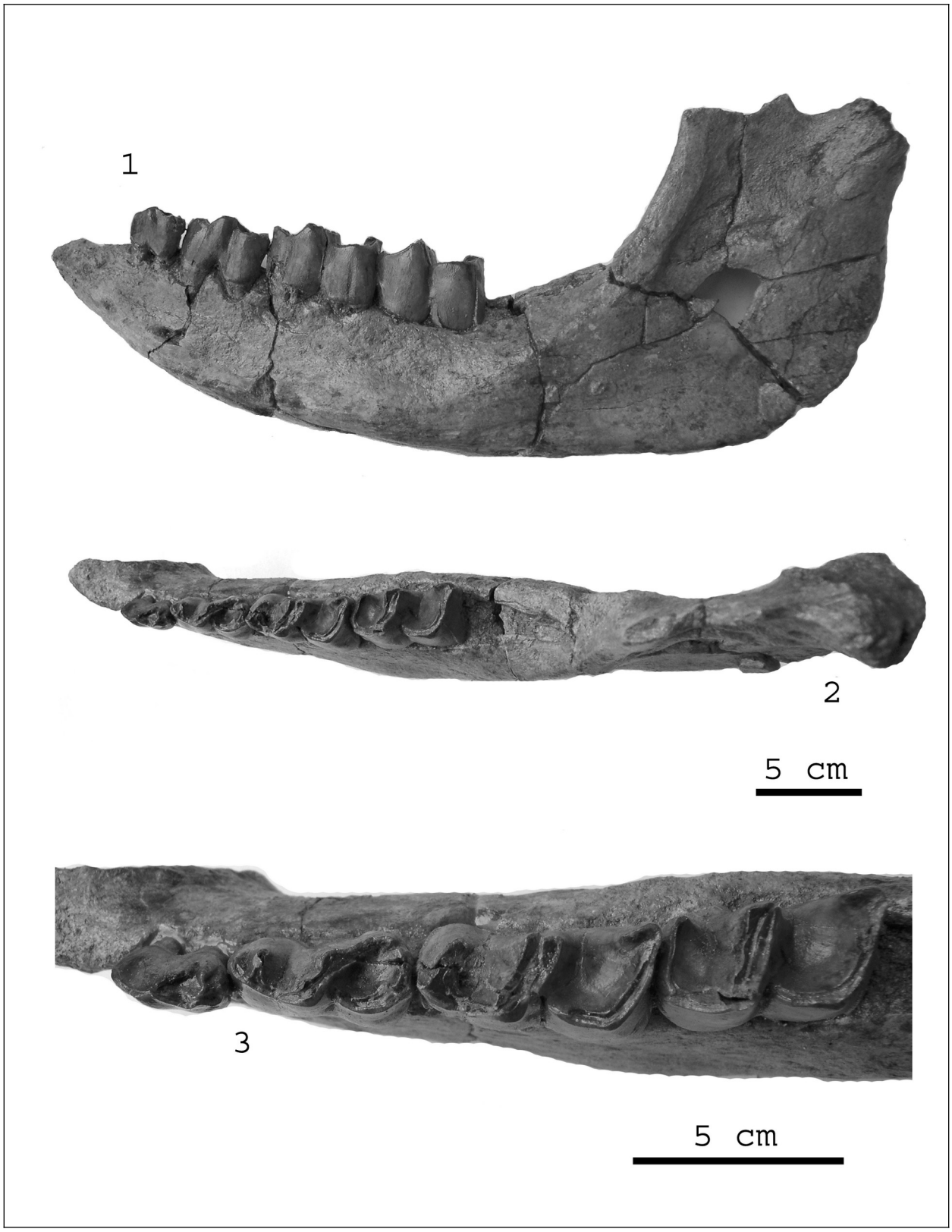
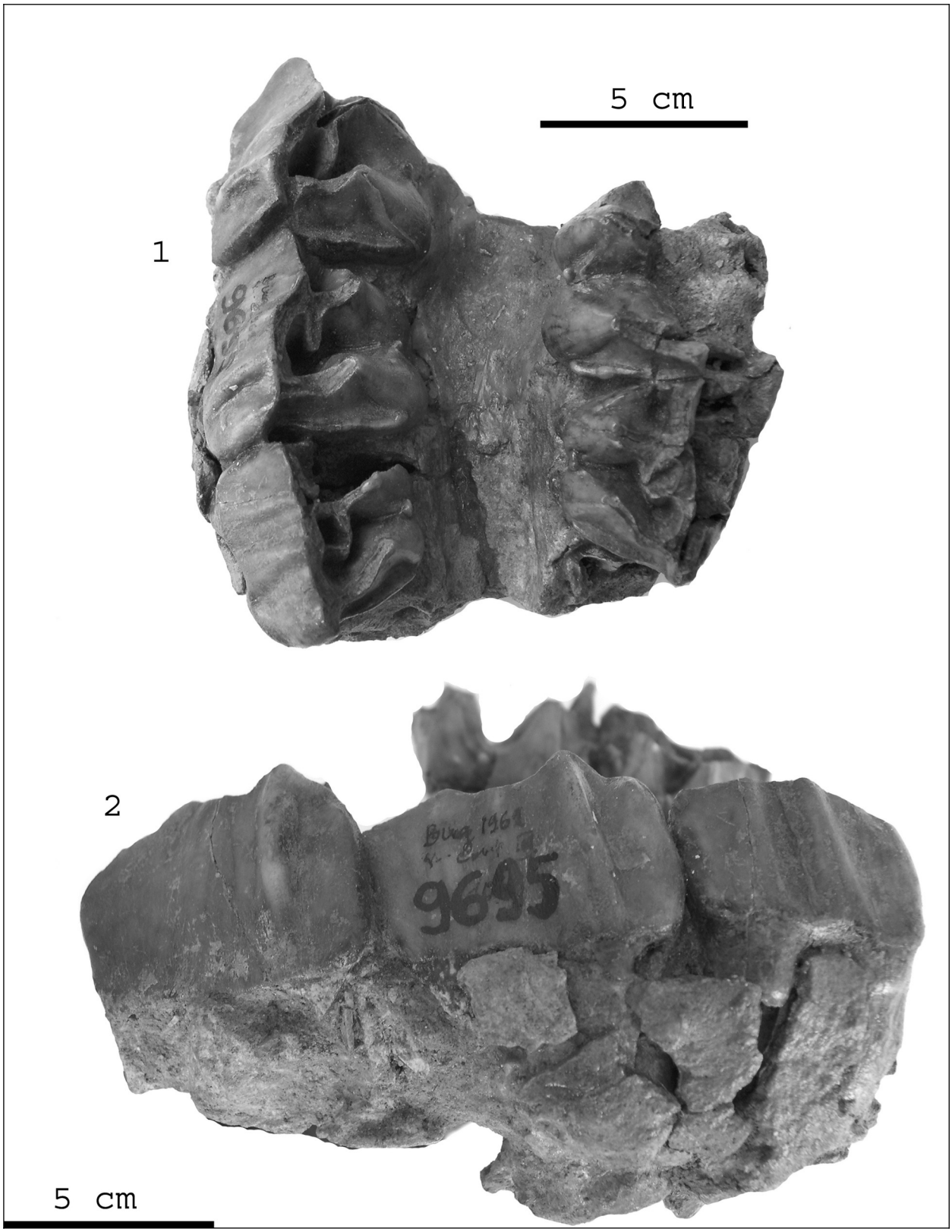
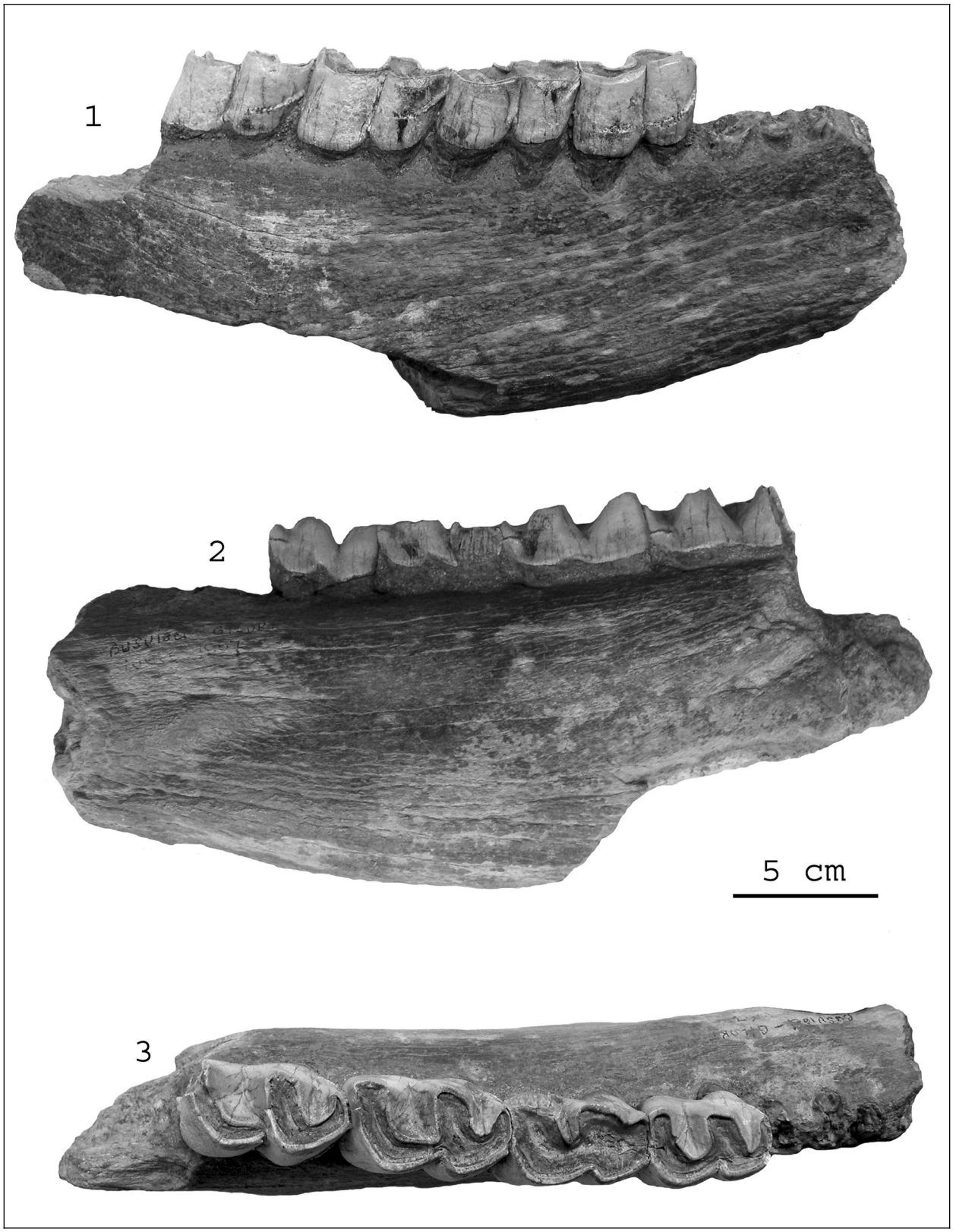


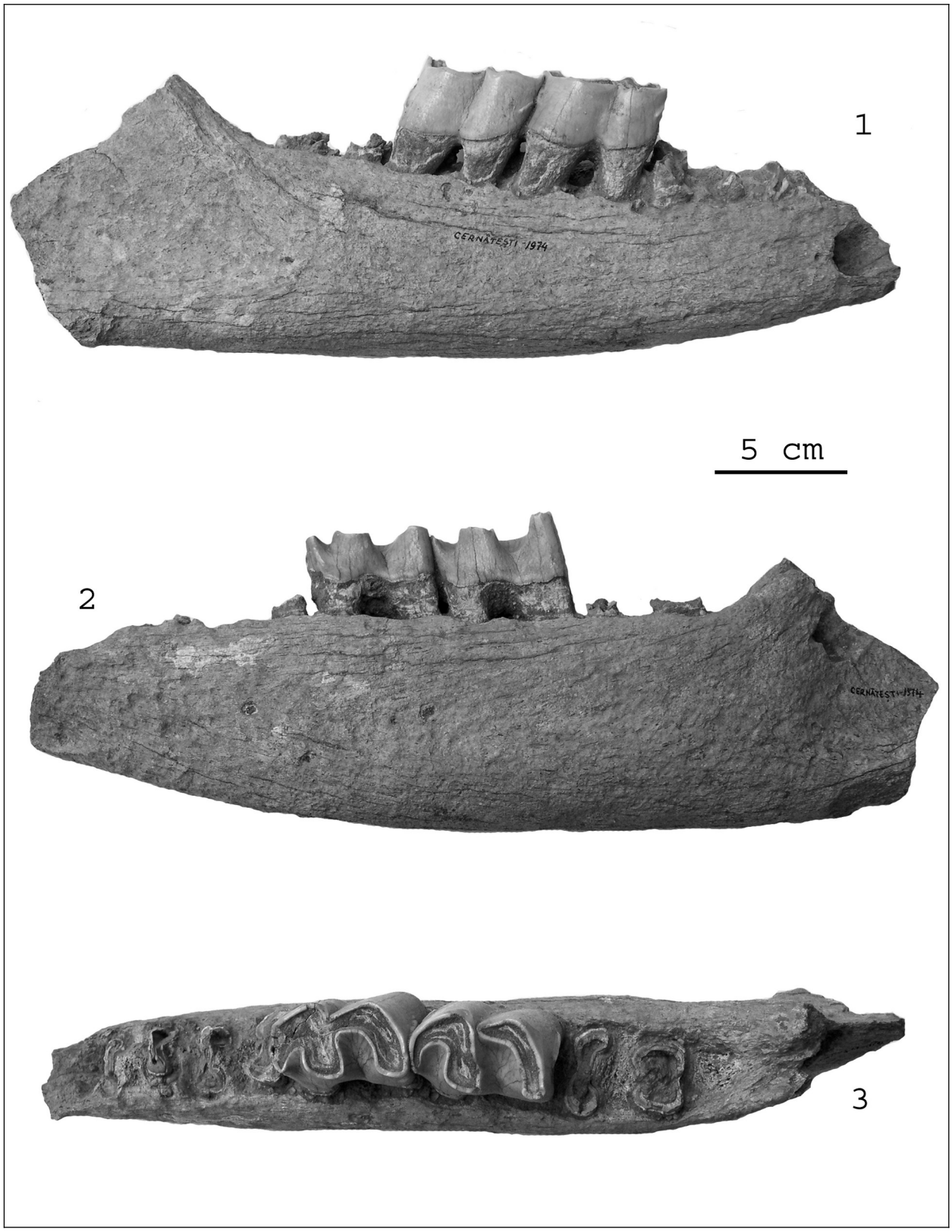
Pl. 1. *Stephanorhinus etruscus* (Falconer), left hemimandible with d1-d4, Tetoiu, Valea Grăuceanu (T1). Fig. 1: lateral view. Fig. 2: dorsal view. Fig 3: crown view of tooth row.



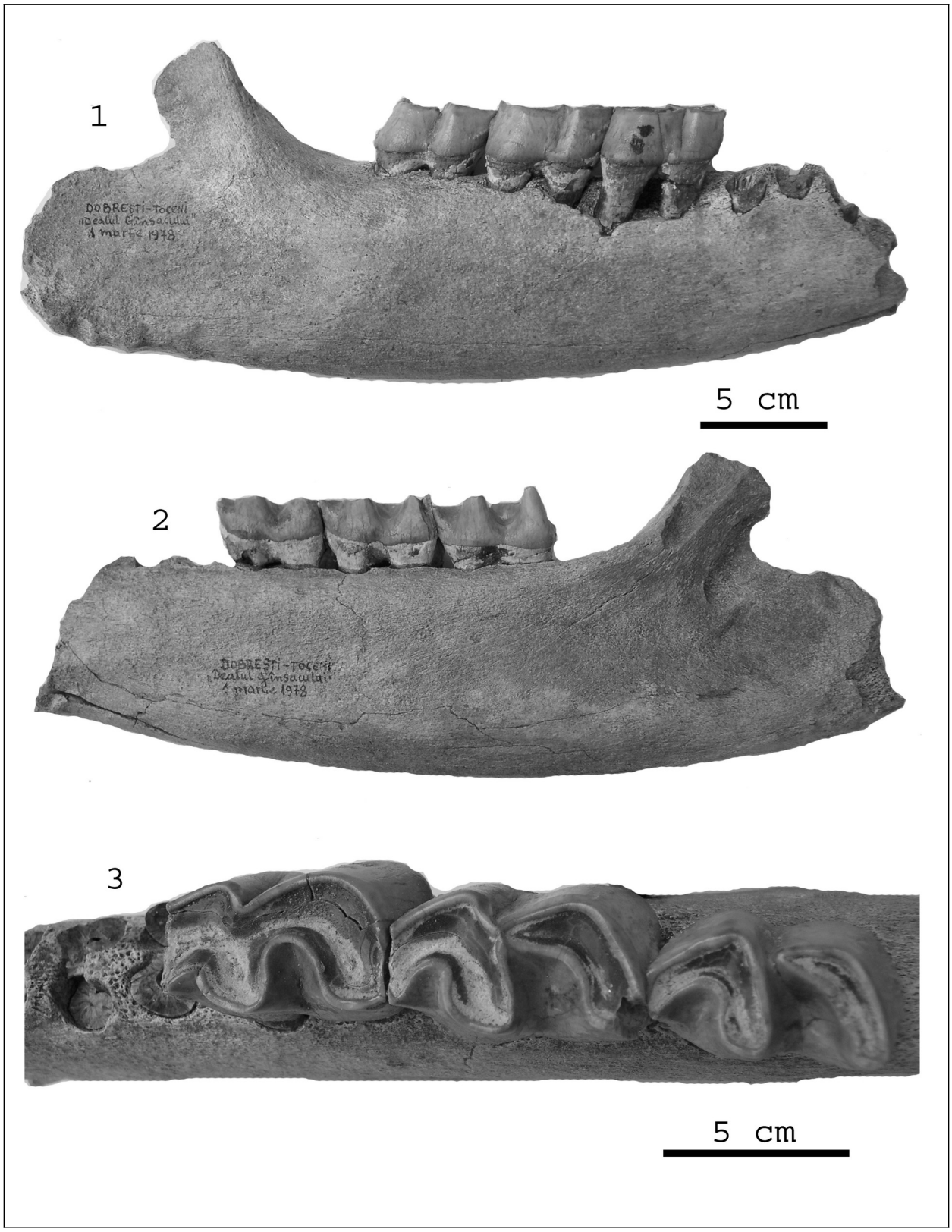
Pl. 2. ***Stephanorhinus etruscus*** **(Falconer), palate fragment with D2-D4, Tetoiu, Valea Grăuceanu (T1). Fig. 1: crown view of the tooth rows. Fig. 2: outer view of left D2-D4.**



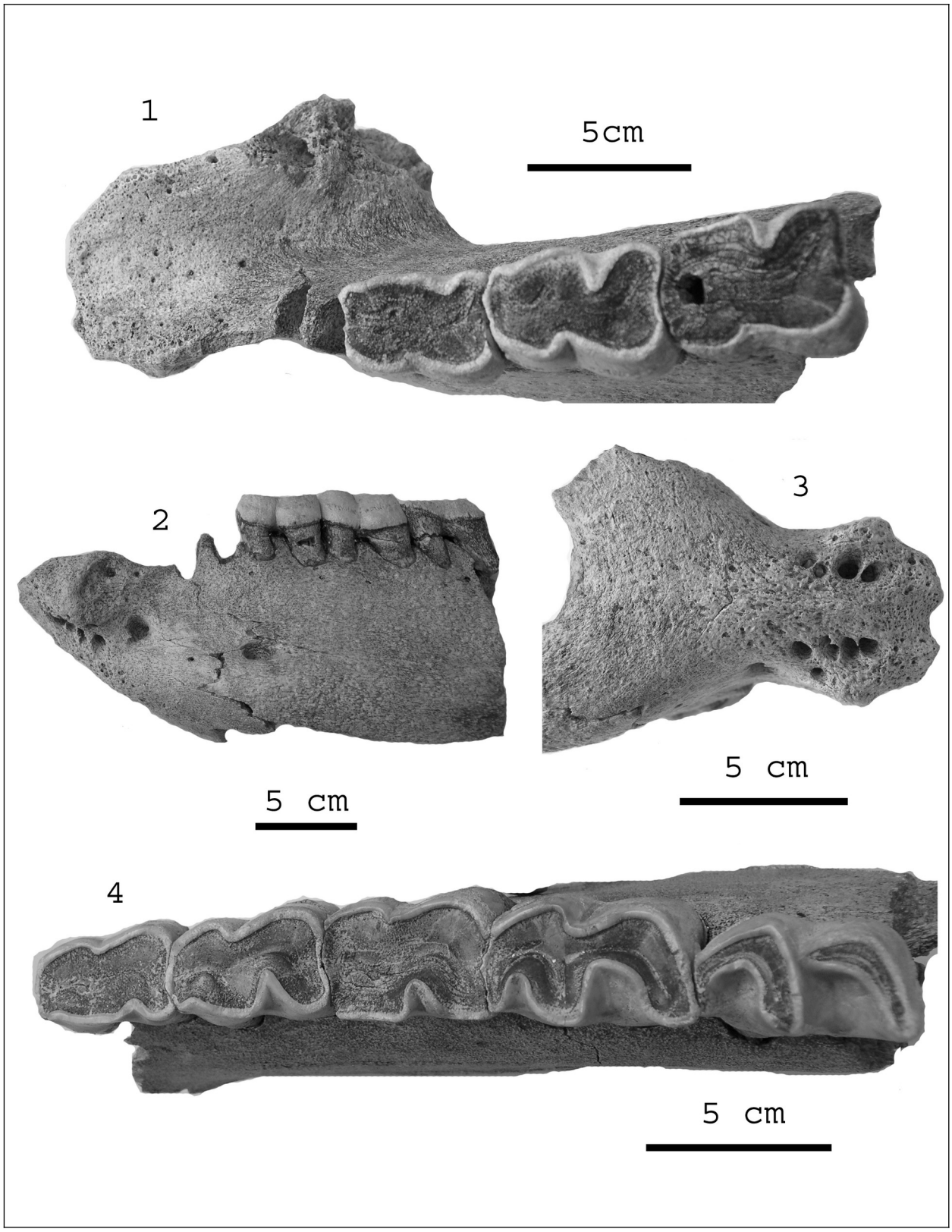
Pl. 3. *Stephanorhinus* sp., right hemimandible fragment with p4-m3, Busuioci.
Fig. 1: outer view. Fig. 2: inner view. Fig. 3: crown view.



Pl. 4. *Stephanorhinus* sp., right hemimandible fragment with m1-m2, Cernăteşti.
Fig. 1: outer view. Fig. 2: inner view. Fig. 3: crown view.



Pl. 5. *Stephanorhinus* sp., right hemimandible fragment with m1-m3, Dobreşti-Toceni.
Fig. 1: outer view. Fig. 2: inner view. Fig. 3: crown view.



Pl. 6. *Stephanorhinus* sp., mandible fragments, Izvoarele-Corlate.
Fig. 1: dorsal view of symphysis and left p3-m1. Fig. 2: outer view of the same fragment.
Fig. 3: ventral view of the same fragment. Fig. 4: crown view of right tooth row with p3-m3.