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Eremotherium laurillardi (Lund, 1842) (Xenarthra, Megatheriinae) is the only valid megatheriine sloth species in the Pleistocene of intertropical Brazil: A response to Faure et al., 2014

Eremotherium laurillardi *(Lund, 1842) (Xenarthra, Megatheriinae) est la seule espèce de paresseux mégathère dans le Pléistocène intertropical du Brésil : réponse à Faure et al., 2014*

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ABSTRACT

Recent reports (Faure et al., 2014; Guérin and Faure, 2000, 2008) describe the existence, in intertropical Brazil, of a small ("dwarf") megatheriine sloth, *Eremotherium laurillardi* (Lund, 1842), and a giant-sized megatheriine, *Eremotherium rusconii* (Schaub, 1935). This view is in marked contrast to that advanced by Cartelle and De Iuliis (1995, 2006), who demonstrated the presence of a single Late Pleistocene giant *Eremotherium* species, for which the valid name is *Eremotherium laurillardi* (Lund, 1842), in intertropical Brazil and elsewhere in America. These authors dubbed this species the Panamerican giant ground sloth. The present contribution reviews the material discussed by Faure et al. (2014) and demonstrates that it belongs to a juvenile (as did the material from Guérin and Faure, 2000) of the Panamerican giant ground sloth (i.e., *E. laurillardi* sensu Cartelle and De Iuliis, 1995, 2006) and that there is no evidence of a dwarf megatheriine in the Late Pleistocene of intertropical Brazil.

Mots clés :
Megatheriinae
Pléistocène
Région intertropicale du Brésil
Paresseux panaméricain
Mégathère « nain »

RÉSUMÉ

Plusieurs études récentes (Faure et al., 2014 ; Guérin et Faure, 2000, 2008) signalent l'existence, dans la région intertropicale du Brésil, d'un paresseux mégathère « nain », *Eremotherium laurillardi* (Lund, 1842), ainsi que d'un mégathère géant, *Eremotherium rusconii* (Schaub, 1935). Ce point de vue diffère de celui avancé par Cartelle et De Iuliis (1995, 2006), qui démontrent l'existence d'une seule espèce, *Eremotherium laurillardi* (Lund, 1842) durant

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la fin du Pléistocène, rencontrée dans la région intertropicale du Brésil et plus généralement en Amérique. Ces derniers auteurs surnomment cette espèce le paresseux géant panaméricain. La présente contribution correspond à une révision du matériel examiné par Faure et al. (2014) tendant à montrer que ce fossile appartient à un spécimen juvénile (tout comme le matériel présenté par Guérin et Faure, 2000) du paresseux géant panaméricain (i.e. *E. laurillardi* sensu Cartelle et De Iuliis, 1995, 2006) et qu'aucun indice de l'existence d'un mégathère nain n'est à ce jour disponible durant la fin du Pléistocène dans la région intertropicale brésilienne.

1. Introduction

Fossil remains of the megatheriine sloth *Eremotherium laurillardi* (Lund, 1842) are often encountered in (Late) Pleistocene deposits of intertropical Brazil. Indeed, there are few states in this region of the country from which remains of this species have not yet been recovered. This species has also been recorded from beyond intertropical Brazil (Toledo, 1986, 1989), and remains of a second Pleistocene megatheriine, *Megatherium americanum* Cuvier, 1796, have been recovered from Rio Grande do Sul, the southernmost state of Brazil. Lund (1842), generally regarded as the founder of Brazilian paleontology (Cartelle, 2002), erected the species *M. laurillardi* on two megatheriine molariform teeth that he believed represented a species about the size of a tapir, and thus much smaller than the very large *M. americanum*, a species originally described from Argentina. Subsequently recovered megatheriine remains from Brazil were identified under various names: *M. americanum* by Winge (1915), *Eremotherium* sp. by Hoffstetter (1954), and *E. rusconii* by Paula Couto (1979). Cartelle and Bohórquez (1982) and, particularly, Cartelle and De Iuliis (1995) demonstrated that Lund's specific epithet was valid and that the molariform teeth, belonging to a juvenile individual, could stand as the holotype of this taxon. The species required generic reassignment, thus its correct name is *E. laurillardi* (Lund, 1842). Cartelle and Bohórquez (1982) suggested the hypothesis that the large differences in size of, in particular, the long bones reflected sexual dimorphism. Cartelle and De Iuliis (1995) provided partial confirmation of this hypothesis through analysis of a large sample of astragali (among the most commonly recovered remains) of this species from a single locality at Jacobina (Brazil). This hypothesis provides a reasonable explanation of the large morphological variation among homologous skeletal elements of numerous specimens. These authors also demonstrated that all late Pleistocene megatheriine remains assigned to *Eremotherium* since about the middle of the last century, recovered from a vast geographical area extending from most of Brazil north through Central America and into the United States, represent a single species, *E. laurillardi*, which these authors denoted as the Panamerican giant ground sloth.

Guérin and Faure (2000), however, disagreed with this view and instead accepted the presence of two megatheriine species in intertropical Brazil: a large-sized species identified as *Eremotherium rusconii* (Schaub, 1935) and a second, smaller or dwarf species, *E. laurillardi*, the one defined by Lund (based on the two molariform teeth). As justification for their position, these authors described a cranial fragment bearing teeth having the same morphology as those described and figured by Lund as *E. laurillardi*. The only evidence advanced by Guérin and Faure (2000) to support their view was Hoffstetter's (1952) contention that molariforms of Megatheriinae bearing parallel mesial and distal surfaces represent adult individuals. However, Cartelle's (1984) analyses of numerous molariforms of *E. laurillardi* (sensu Cartelle and De Iuliis, 1995, 2006 as explained further below) indicated that Hoffstetter's observation is not valid for the remains from intertropical Brazil; by extension, this would mean that his observation is not a general feature of *E. laurillardi* (sensu Cartelle and De Iuliis, 1995, 2006). Cartelle and De Iuliis (2006: fig. 1) demonstrated the development of the dentition of *E. laurillardi* based on molariform teeth of different ontogenetic stages, all from a single locality and housed in the Natural History Museum of PUC Minas, and illustrated several of these molariforms as representative ontogenetic stages. In earlier stages, the molariforms are pyramidal, with surfaces converging apically. In adults, the mesial and distal molariform surfaces converge basally. As well, Cartelle and De Iuliis (2006: figs. 4, 5) illustrated a cranial fragment, essentially a maxilla, that in form and size is a replica of that described and illustrated by Guérin and Faure (2000: fig. 2) and considered by these authors as representing the adult of the species they considered as *E. laurillardi* (sensu Guérin and Faure, 2000; i.e., the small or dwarf megatheriine). Cartelle and De Iuliis (2006) also described the cranial ontogenetic development, again based on a series of remains from the same single locality (Toca das Onças. Jacobina. Bahia, Brazil), noting the sequence and pattern of sutural closure. Cartelle and De Iuliis (2006) pointed out, in both the specimen they figured and that figured by Guérin and Faure (2000) as many as six entirely open sutures, which without doubt demonstrate the very early juvenile nature of the remains, and the presence of molariform teeth with parallel mesial and distal surfaces, which thus clearly demonstrate, as noted above, that parallel-sided molariform teeth are already present in very young juveniles.

In response to Cartelle and De Iuliis (2006), Guérin and Faure (2008) continued to maintain, surprisingly, the opposite viewpoint, despite the presence (and these authors' acceptance) of entirely open sutures in both their specimen and those described by Cartelle and De Iuliis (2006). In other words, Guérin and Faure (2008) discounted sutural closure, an elementary and universally accepted morphological criterion for mammalian ontogenetic development, as indicating ontogenetic stage, and chose to

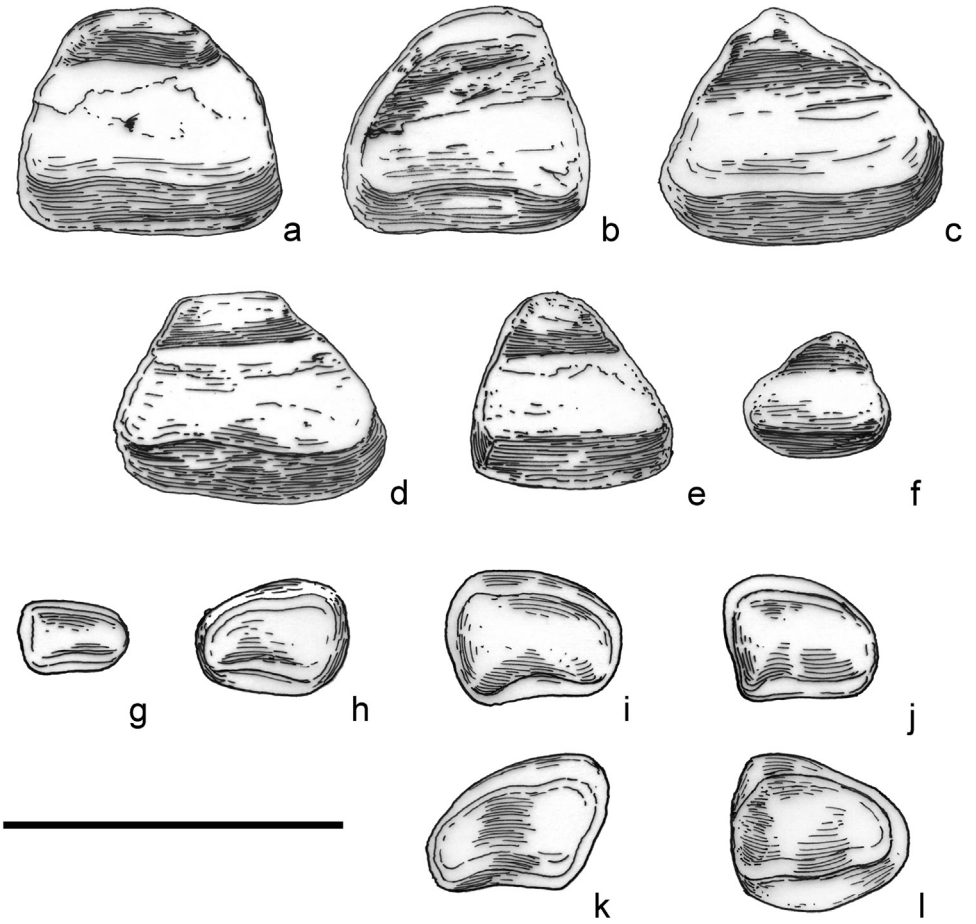

Fig. 1. Drawing in occlusal view of upper molariform teeth (**a**–**f**: M1 and **g**–**l**: M5) of *Eremotherium laurillardi*; specimens MCL 7282 (**a**), MCL 3293 (**b**), MCL 7290 (**c**), MCL 7288 (**d**), MCL 7206 (**e**), MCL 7243 (**f**), MCL 7334 (**g**), MCL 7333 (**h**), MCL 7481 (**i**), MCL 7332 (**j**), MCL 7325 (**k**), and MCL 7331 (**l**). Scale bar: 5 cm.

Fig. 1. Dessins en vue occlusale de dents molariformes supérieures (**a**–**f**, M1 et **g**–**l**, M5) d'*Eremotherium laurillardi* ; spécimens MCL 7282 (**a**), MCL 3293 (**b**), MCL 7290 (**c**), MCL 7288 (**d**), MCL 7206 (**e**), MCL 7243 (**f**), MCL 7334 (**g**), MCL 7333 (**h**), MCL 7481 (**i**), MCL 7332 (**j**), MCL 7325 (**k**) et MCL 7331 (**l**). Barre d'échelle : 5 cm.

regard the presence of parallel-sided molariforms as the single and only determinant, in Megatheriinae, of adulthood. In essence, these authors refused to consider the possibility that Hoffstetter (1952) was mistaken (or this assertion cannot be referred to the Brazilian intertropical species *Eremotherium laurillardi*). Most recently, Faure et al. (2014) maintained the views expressed earlier in Guérin and Faure (2000, 2008) in their description of mandibles of *E. rusconii* and of *E. laurillardi* (as these taxa are conceptualized by these authors). In accepting Hoffstetter's assertion, which we noted above is erroneous, Faure et al. (2014) claimed that the molariform tooth MCL 7350 illustrated by Cartelle and De Iuliis (2006: fig. 1g) is anomalous, amounting merely to a teratological individual. The molariform of this specimen of *E. laurillardi* has mesial and distal surfaces converging basally. However, this feature, far from being teratological, is by far the most typical condition of adult *Eremotherium* molariforms, as we demonstrate below. Further, the same condition, according to Owen (1856: pl. 26, fig. 2), is also present in *Megatherium americanum*.

We repeat here the analyses of ontogenetic development of the molariform teeth of *Eremotherium laurillardi* (sensu Cartelle and De Iuliis, 1995, 2006), and have reached the same conclusion. This time we analyzed, as is evident from the Materials and methods section, 944 molariform teeth of this species (Fig. 1). We are confident that such a large sample from a single locality and time period provides ample robustness as to the reliability of our conclusions. We therefore reaffirm, with heightened emphasis (if that is possible), the conclusions reached by Cartelle and De Iuliis (2006). We add that in most, though certainly not all, adult molariforms the mesial and distal surfaces are not parallel but converge basally. Clearly, this invalidates the interpretation of Faure et al. (2014) that the molariform (MCL 7350) illustrated by Cartelle and De Iuliis (2006: fig. 1g) is teratological. We provide in this report measurements (see Table 1) that clearly demonstrate that the basally converging surfaces represent the typical rather than the anomalous condition. The measurements were taken on molariforms that are still within but could be removed from their alveoli, and thus represent a random

Table 1
Measurements (in mm) of dentaries and mandibles of *Eremotherium laurillardi*.
Tableau 1
Mesures (en mm) de dentaires et mandibules attribués à *Eremotherium laurillardi*.

Specimen/measurements	LTR	MaWMR	MaHMR	MiHMR	ALMT	ALBRT
"No. 187851"	82	37.5	56.5			
MCL 7232	83	43	62	53	17 (m1)	25[a]
"No. 109001"	106.5	41.5	76	60		
MCL7221	114	50	86	69		
MCL7230	116	49	81	70	27 (m2)	26
MCL7228	116	46	90	70		
MCL7236	119	51	82	74	26 (m1)	24
MCL7220	121	49	88	69	25 (m4)	22
MCL7226	128	51	95	81		
MCL7223	132	57	106	90	28 (m3)	26
MCL1702	170	58	115	100	36 (m2)	31
MCL7881	181	64	139	116	41 (m2)	32
MCL7229	185	65	121	98	38 (m3)	34
MCL 7247	191	66	132	105	44 (m2)	28
MCL7223	195	71	138	102	44 (m3)	36

LTR: length of the tooth row; MaWMR: maximum width of the mandibular ramus; MaHMR: maximum height of the mandibular ramus; MiHMR: minimum height of the mandibular ramus; ALMT: anteroposterior length of the extra-alveolar portion of the molariform teeth; ALBRT: anteroposterior length at the base of the intra-alveolar portion of the tooth.
[a] X-ray measurement.

sampling; we did not search and include only those teeth that we could observe a priori as having basally convergent surfaces. We cannot consider the molariform teeth included in Table 1, not to mention the dozens and dozens of isolated molariforms teeth not included in this table but exhibiting convergent surfaces, as being teratological.

As mentioned, Cartelle and De Iuliis (2006) noted aspects of the ontogenetic progression of the skull and dentition. We complement their efforts by including here a brief analysis of the ontogenetic development of the mandible, which supports the same conclusion as the previously noted study that there is no evidence for recognizing both large-sized and dwarf species of *Eremotherium* in intertropical Brazil, but only a single large-sized species, documented by a wide range of ontogenetic stages; the valid name for this species is *E. laurillardi*.

2. Material

This analysis included 944 complete or incomplete (though still identifiable) molariform teeth. Among the complete teeth are 28 molariform teeth, implanted or isolated, of very young juveniles, 104 isolated upper molariforms, 82 isolated lower molariforms, 70 implanted upper molariforms, and 146 implanted lower molariforms. The molariforms illustrated in Fig. 2d were removed for photography from the mandible illustrated in Fig. 2c. There are 514 incomplete teeth. Analysis of the ontogenetic development of the mandible involved 27 nearly complete mandibular and dentary elements (Figs. 2 and 3). Particular attention was given to MCL 7230 (Fig. 2), which includes the well-preserved skull (Fig. 2a and b) and mandible (Fig. 2c), recovered in association, of an undoubtedly young juvenile. All material is housed in the Natural History Museum of PUC Minas (Belo Horizonte, Brazil).

3. Results and discussion

3.1. The ontogenetic development of the jaw of Eremotherium laurillardi *(sensu Cartelle and De Iuliis, 1995, 2006)*

Among the various stages represented among the 27 nearly complete dentary or mandibular specimens are several morphological differences that are attributable to increased age (Fig. 3). Among these changes is that the anterior edge of the ascending ramus tends to incline anterodorsally (Fig. 3g). In lateral view, the m4 is generally visible in younger individuals (Fig. 3a and e) whereas with growth the ascending ramus incrementally tends towards occlusion of m4; the ascending ramus tends to occlude m4 in this view (Fig. 3g). The surface of the mandible is ventrally convex (or bulges), lying approximately at the level of the ventral margin of the angular process in very young individuals (Fig. 3b–e). In older individuals, the ventral bulge becomes more prominent, projecting well below the level of the angular process, but there is variation in its prominence (Fig. 3g). As would be expected, absolute depth of the jaw increased during growth, but the relationship between mandibular body height and mandibular tooth row length remained constant, within the limits of individual variation (Table 1). This relationship differs from that in *M. americanum*, in which mandibular body height increases not only absolutely, but also with respect to mandibular tooth row length (De Iuliis, 1996). In *E. laurillardi* the lateral surface of the horizontal ramus in younger individuals is markedly convex, but with increased age convexity decreased. The lateral convexity appears to be altered with respect to the position and growth of the molariforms, so that the dentary seems relatively thicker vestibular to m1–m2 in younger individuals. The change may reflect a difference in the alignment of the tooth row during growth. In younger individuals, the tooth

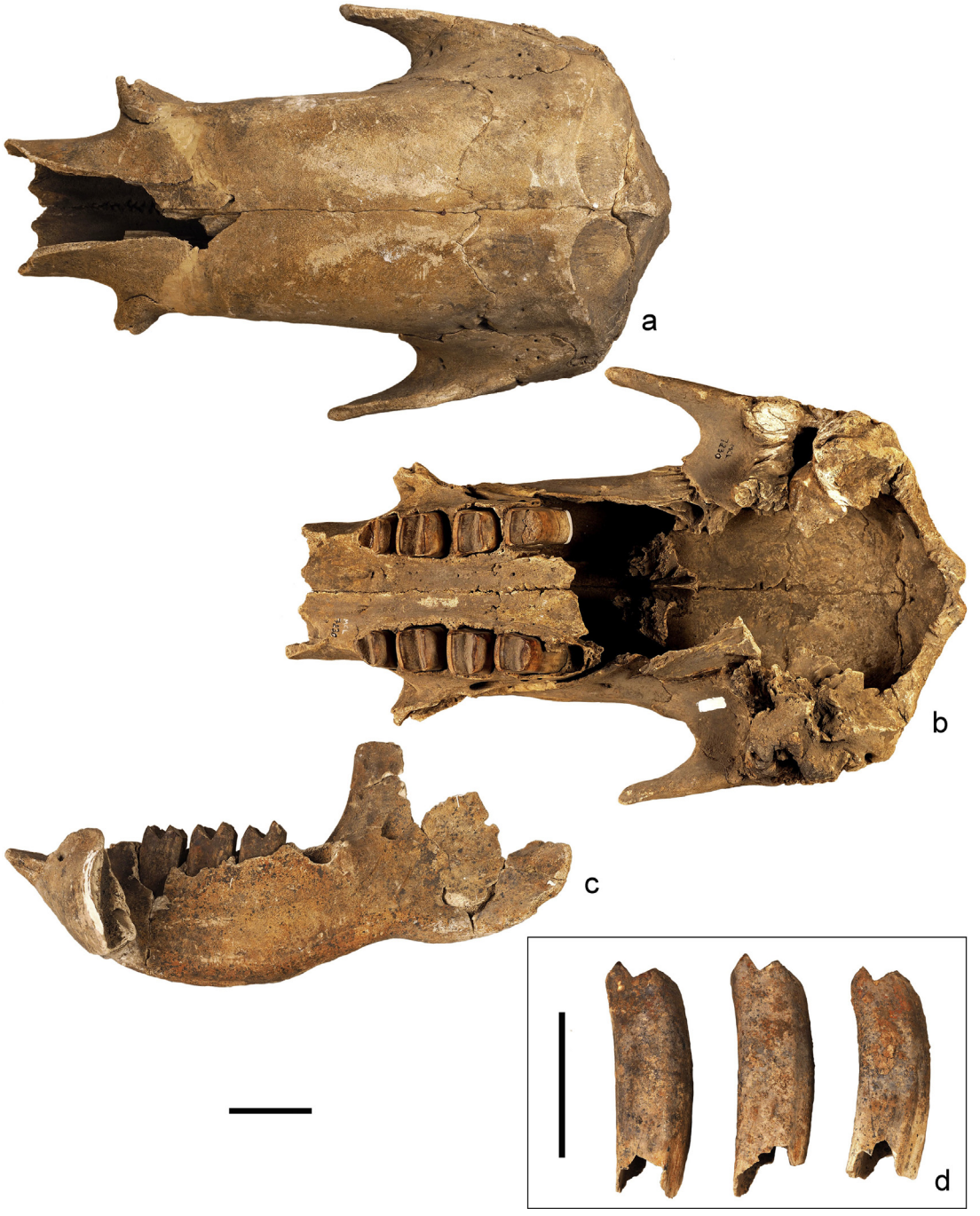

Fig. 2. (Color online). Photographs of skull, mandible, and molariform teeth of a young juvenile specimen of *Eremotherium laurillardi* (MCL 7230). **a**–**b**: skull in dorsal and posteroventral views respectively. **c**: right dentary and partial left dentary in medial view. **d**: Right m1–m3 in lateral view. Scale bars: 5 cm.
Fig. 2. (Couleur en ligne). Photographies du crâne, de la mandibule ainsi que des dents molariformes d'un très jeune spécimen d'*Eremotherium laurillardi* (MCL 7230). **a**–**b** : crâne en vues dorsale et postéroventrale, respectivement. **c** : hémimandibule droite et portion de l'hémimandibule gauche en vue médiale. **d** : m1-m3 droites en vue latérale. Barres d'échelle : 5 cm.

row appears, in dorsal view, more nearly aligned with the long axis of the horizontal ramus whereas it becomes more obliquely oriented in older individuals. As a result, in older individuals the vestibular margin of m1 closely approaches the lateral surface of the dentary (De Iuliis, 1996). This is possibly, at least in part, related to the difference in the intra- and extra-alveolar portions of the teeth: in juveniles the intra-alveolar portion is relatively more voluminous than the extra-alveolar portion (Fig. 3c); this relationship becomes inverted with increased age (Fig. 3f

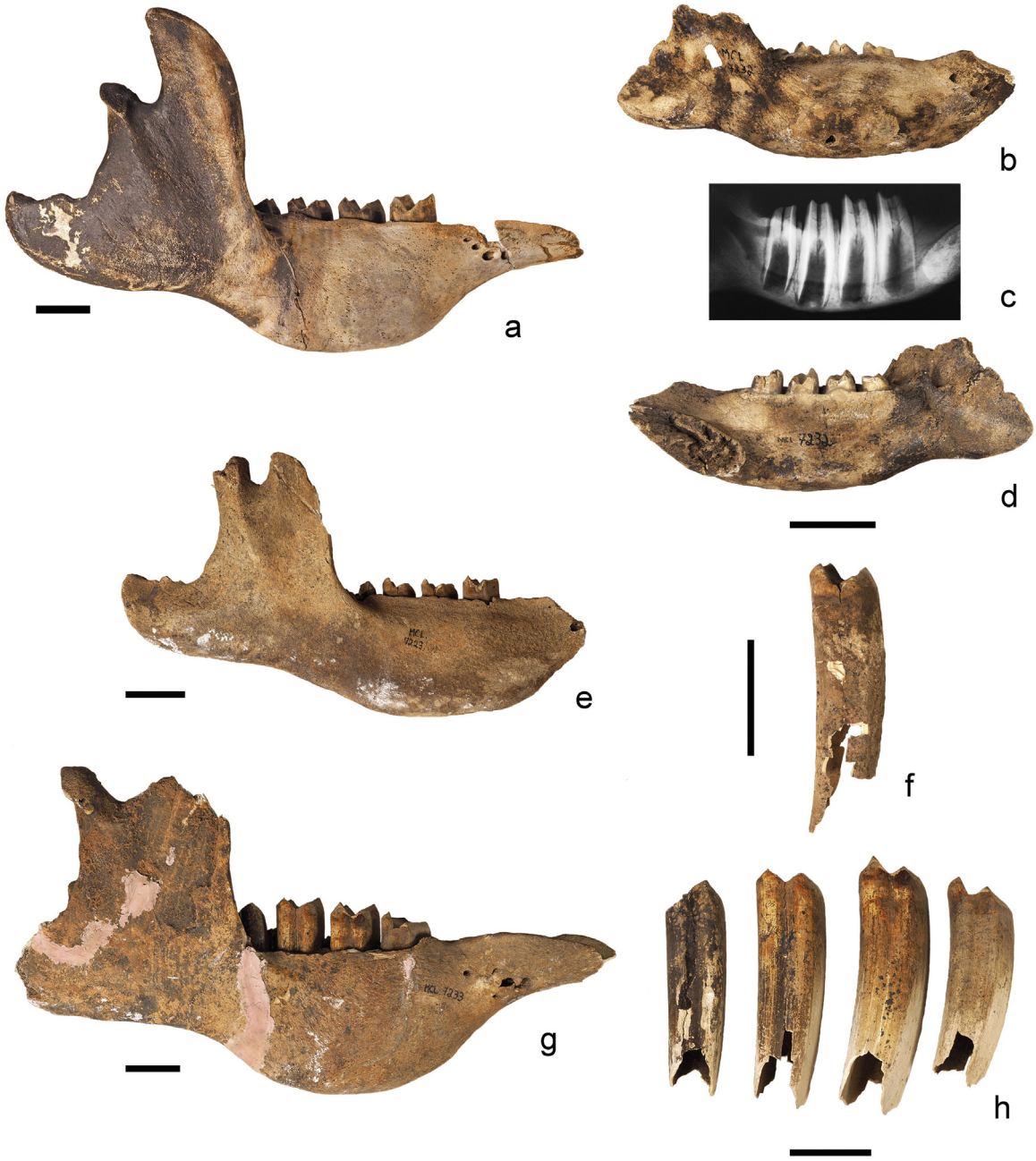

Fig. 3. (Color online). Photographs of dentaries and molariform teeth of several specimens assigned to *Eremotherium laurillardi* at different ontogenetic stages. **a**: right dentary in lateral view of a young adult specimen (MCL 7247). **b**–**d**: right dentary in lateral (**b** and **c** [X-ray picture]) and medial (**d**) views of a young juvenile specimen (MCL 7232). **e**–**f**: right dentary and right m3 in lateral view of a young specimen (MCL 7223). **g**–**h**: right dentary and m1–m4 in lateral view of an adult specimen (MCL 7233). Scale bars: 5 cm.

Fig. 3. (Couleur en ligne). Photographies de mandibules ainsi que de dents molariformes appartenant à plusieurs spécimens assignés à *Eremotherium laurillardi* à des stades ontogénétiques différents. **a** : hémimandibule droite en vue latérale appartenant à un spécimen adulte jeune (MCL 7247). **b**–**d** : hémimandibule droite en vues latérale (**b** et **c** [photo aux rayons X]) et médiale (**d**) appartenant à un très jeune individu (MCL 7232). **e**–**f** : hémimandibule et m3 droite en vue latérale appartenant à un jeune individu (MCL 7237). **g**–**h** : hémimandibule et m1–m4 droites en vue latérale appartenant à un individu adulte (MCL 7233). Barres d'échelle : 5 cm.

and h). The notch between the mandibular condyle and the coronoid process widens with age and the condyles expand mediolaterally (Fig. 3a, e, g). The number of mental foramina increases with age. Co-ossification between the dentaries at the mandibular symphysis occurs earlier than in other skeletal elements. In one particularly complete specimen (MCL 7247, Fig. 3a), the suture is closed, with a sulcus, which in turn disappears with increasing age,

demarcating the position of the previously open suture. In this specimen, the basicranial sutures and those between the epiphyses and diaphyses of the long bones and vertebrae are still open. Such conditions are observable in different specimens. Other variation is observable among the various ontogenetic stages but these may be due to normal intraspecific variation rather than age-related. As examples of such variations, we may note that the posterolateral opening of the mandibular canal may occur at the level of the plane that cuts through m4 or slightly posterior to this plane, and the ventral border of the symphysis varies between the level of the mesial and distal surfaces of m1. The series of measurements in Table 1 facilitate recognition of several age-related features, including growth sequence and modifications in form. The measurements, to reiterate, were made on implanted teeth that could be removed from their alveoli, and were thus randomly chosen.

The two specimens figured by Faure et al. (2014) fall easily within the series of measurements of Table 1. The specimen considered by these authors as representing a juvenile individual of *E. rusconii* ("nº 187851" according to the authors, who did not specify an acronym for the specimen) can easily be considered as a very young individual of *E. laurillardi* (sensu Cartelle and De Iuliis, 1995, 2006), and specimen "nº 109001," considered by these authors as representing *E. laurillardi* (sensu Guérin and Faure, 2000), can easily be accommodated as a young individual of *E. laurillardi* (sensu Cartelle and De Iuliis, 1995, 2006), rather than as a member of a dwarf species. The morphology and measurements of this latter specimen are nearly identical to those of MCL 7232 that we have identified as a very young individual of *E. laurillardi* (sensu Cartelle and De Iuliis, 1995, 2006).

The radiographic image of this specimen (Fig. 3c) illustrates the form of the dentary that defines a very young individual and Fig. 3d, of the dentary's medial surface, clearly reveals the open suture at the symphyseal region, which is missing in the specimen described by Faure et al. (2014).

Faure et al. (2014) provided an extensive description of the dentition of the two dentaries that they figured and concluded that the differences between them were interspecific. However, as noted from Table 1 and Fig. 1 and as we already stated, intraspecific variations are present not only in postcranial elements but also in molariform teeth. As example, Fig. 1 illustrates the degree of diversity in occlusal morphology between randomly selected M1 and M5 from different growth stages of *E. laurillardi* (sensu Cartelle and De Iuliis, 1995, 2006). The morphological variation may seem to be remarkable, sufficient even to warrant specific separation.

3.2. Specimen MCL 7230

This specimen provides the most definitive example for the argument that only a single species of *Eremotherium* is represented by the fossil Pleistocene megatheriine remains from intertropical Brazil (and elsewhere in the Late Pleistocene of North and South America; see Cartelle and De Iuliis, 1995, 2006; De Iuliis, 1996; Fig. 2). MCL 7230 contains all the aspects discussed in this report. It includes the right dentary (Fig. 2c) with the first three molariform teeth (Fig. 2c and d) and symphyseal region which, though fragmented, may be interpreted. The left dentary preserves the lateral surface, parts of the ascending and angular processes, two molariforms, and the symphyseal region; these portions are not represented in Fig. 2c. The articular condyles are not preserved. The symphyseal suture is closed, clearly marked by a shallow groove and several apparently vascular foramina. This specimen, according to the criteria of Guérin and Faure (2000), represents an adult of the dwarf species. In evaluating the value of this assessment, the specimen could indeed be considered as representing an adult individual of a small-sized megatheriine species. However, one could only arrive at this conclusion:

- in the absence of other skeletal information;
- a lack of understanding of the ontogenetic development of this part of the skeleton;
- by accepting Hoffstetter's supposition that parallel mesial and distal molariform surfaces define the adult condition.

But this would be an erroneous conclusion, not least because relying on single isolated elements can often lead to tenuous conclusions but because there is so much additional information available in the literature and in the institutions that house the specimens on which the literature is based. As may be noted in Table 1, arranged in order of increasing age, MCL 7230 falls in accordance with other specimens, and this strongly suggests that it may belong to a juvenile individual regardless of the character that Guérin and Faure (2000) use to define it as an adult, as noted below. Moreover, the skull of this specimen is also preserved (Fig. 2a and b), which demonstrates without any doubt that the mandible, bearing molariforms with parallel-sided mesial and distal surfaces, does not belong to an adult individual of a small-sized megatheriine species (Fig. 2d). Although the skull is missing portions ventroposteriorly (palatines, presphenoid, pterygoids, basioccipitals, and exoccipitals), as well as premaxillae and zygomatics, all of the sutures of its preserved part are clearly open (see Fig. 2a and b), so the specimen must represent a very young juvenile, if not newborn, individual.

In summary, the morphology of both the skull and mandible of MCL 7230 indicates that this specimen is undoubtedly of a juvenile individual of *Eremotherium laurillardi* (sensu Cartelle and De Iuliis, 1995, 2006). Despite the presence of molariforms bearing parallel-sided mesial and distal surfaces, the individual is not an adult, because this criterion does not reflect the adult condition in megatheriine sloths. Clearly, the morphological feature that principally reflects ontogenetic stage in megatheriines as well as other mammals is the degree of sutural closure among osseous elements, which may vary among the various skeletal elements. Obviously, MCL 7230 (a single individual) cannot possess the skull of a juvenile and the mandible of an adult, but this would be the very conclusion we would have to accept if we were to use the criteria of Guérin

and Faure (2000) and Faure et al. (2014). When considering the attributes of a species, it is necessary to analyze a suite of individuals, likely to constitute its hypodigm, given the reality of intraspecific variation. This is particularly true when dealing with ontogenetic stages, as morphological and size differences are considerably accentuated in comparison to those representing only one stage. MCL 7230 confirms the different rates of co-ossification or sutural closure among elements of the mandible and skull. In the former, it is necessary to recognize the generally subtle morphological variations that accompany age-related size increase, such as the diminished convexity of the lateral surface of the dentary, increased convexity of the ventral surface of the dentary, increase in number of mental foramina, and mediolateral expansion of the articular condyles. The interdentary suture that forms the mandibular symphysis closes early, more so than any of the other sutures of the skull. This and the nature of the molariforms were clearly indicated by De Iuliis (1996: 144): "The change between tapered and parallel-sided molariforms is gradual, but is complete by the stage when MTRL [mandibular tooth row length] = about 110–120 mm, and well before the symphysis is fully fused.

4. Conclusion

- The only valid megatheriine species present in intertropical Brazil is *Eremotherium laurillardi* (Lund, 1842) sensu Cartelle and De Iuliis (1995, 2006). *Eremotherium rusconii* (Schaub, 1935) is a junior synonym of this species, as noted by Cartelle and De Iuliis (1995);
- the specimen used by Guérin and Faure (2000) in their attempt to define *E. laurillardi* as a dwarf species of *Eremotherium* is based on a very young individual of *E. laurillardi* as defined by Cartelle and De Iuliis (1995, 2006) and, for reasons explained by these latter authors and reiterated and expanded upon in this report (ontogenetic development of the dentition, skull, and mandible), is unsuitable for such a purpose;
- the large quantity of molariform teeth surveyed here, from a single locality and age, demonstrates that Hoffstetter's (1952) assertion that molariform teeth bearing parallel mesial and distal surfaces is indicative of adulthood, upon which Faure et al. (2014) base their arguments, is incorrect. Most adult molariform teeth do not possess parallel-sided mesial and distal surfaces; instead, these surfaces converge basally. Those adult teeth that do not exhibit this morphology represent the exceptions, rather than the rule. The form of a tooth cannot be the sole criterion for recognizing the ontogenetic stage of an individual, in contrast to the proposals of Guérin and Faure (2000) and Faure et al. (2014);
- the dentition, skull and mandible figured by Cartelle and De Iuliis (2006) or in the present report demonstrate the conclusions reached by these authors. Conversely, if one follows the logic of Guérin and Faure (2000) and Faure et al. (2014), MCL 7230 (Fig. 2) would document a chimera of *E. laurillardi* (mandible) and of *E. rusconii* (skull);
- the purported size and morphological differences advanced by Faure et al. (2014) to support recognition of two species, *E. laurillardi* and *E. rusconii* (sensu Faure et al., 2014), merely reflect the large intraspecific differences exhibited by a single and very large-sized megatheriine species. These differences were noted as occurring in nearly all the referred skeletal and dental remains by Cartelle (1992), Cartelle and De Iuliis (1995, 2006), and De Iuliis (1996).

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