

On the identity of a hominoid male upper canine from the Vallès-Penedès Basin figured by Pickford (2012)

Sobre la identidad de un canino superior masculino de hominoideo de la Cuenca del Vallès-Penedès figurado por Pickford (2012)

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ABSTRACT

Pickford (2012) inadvertently figured—with an incorrect catalogue number—an unpublished male upper canine of a hominoid primate from the Vallès-Penedès Basin (without specifying its locality of provenance), and attributed it to the Late Miocene fossil great ape *Hispanopithecus laietanus*. In fact, this canine comes from the Middle Miocene local stratigraphic series of Abocador de Can Mata (ACM), and shows greater similarities with Middle Miocene hominoids than with *Hispanopithecus*. Here we report the correct catalogue number of this specimen (IPS41714) and provide details on its locality of provenance (ACM/C4-Ap) as well as estimated age (11.9 Ma). On morphologic grounds, we further justify the attribution of this specimen to *Dryopithecus fontani*, previously recorded by craniodental remains at another ACM locality with the same age, and also correct several other minor errors.

Key words: Teeth, Hominidae, Dryopithecinae, *Dryopithecus*, *Hispanopithecus*, Abocador de Can Mata.

RESUMEN

Pickford (2012) involuntariamente figuró—con un número de catálogo erróneo—un canino superior masculino inédito de un primate hominoideo de la Cuenca del Vallès-Penedès (sin especificar su localidad de procedencia), y lo atribuyó al gran antropomorfo fósil del Mioceno Superior *Hispanopithecus laietanus*. En realidad, este canino procede de la serie estratigráfica local del Abocador de Can Mata (ACM), y muestra mayores similitudes con los hominoideos del Mioceno Medio que con *Hispanopithecus*. Damos a conocer aquí el número de catálogo correcto de este espécimen (IPS41714) y proporcionamos detalles de su localidad de procedencia (ACM/C4-Ap) así como de su edad estimada (11,9 ma). En base a consideraciones morfológicas, justificamos además la atribución de este espécimen a *Dryopithecus fontani*, previamente registrado mediante restos craneodentales en otra localidad del ACM con la misma edad, y corregimos también algunos otros pequeños errores.

Palabras clave: Dientes, Hominidae, Dryopithecinae, *Dryopithecus*, *Hispanopithecus*, Abocador de Can Mata.

Introduction

In a recently-published paper on the taxonomic identity of the hominoid dental remains from Neuhausen and other Böhnerz localities (Swabian Alb, Germany), Pickford (2012) emphasized the role of Middle and Late Miocene hominoids from

the Vallès-Penedès Basin for understanding the diversity of European fossil hominoids. In his Figure 12, Pickford (2012) compared the male upper canine SMNS 47445 from Germany with several of the available Miocene specimens from the Vallès-Penedès. Middle Miocene taxa from this basin include *Pierolapithecus catalaunicus*, *Anoiapithe-*

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cus brevirostris and *Dryopithecus fontani* from several localities of the Abocador de Can Mata (ACM) local stratigraphic series (Moyà-Solà *et al.*, 2004, 2009a,b), whereas Late Miocene taxa include *Hispanopithecus laietanus* and *Hispanopithecus crusafonti* (Begun *et al.*, 1990; Begun, 1992; Golpe Posse, 1993; Moyà-Solà & Köhler, 1995; Alba *et al.*, submitted). Pickford (2012) provisionally maintained the latter species within *Dryopithecus*, concluding that it might be a junior synonym of *Udabnopithecus garedziensis*, and further noting similarities with *Anoiapithecus brevirostris* and *Neopithecus brancoi* (considered a nomen dubium by Casanovas-Vilar *et al.*, 2011, but a taxonomically valid taxon by him). Leaving aside Pickford's (2012) particular taxonomic attributions of several specimens, we generally agree with his contention that the paleodiversity of European Miocene hominoids has been underestimated during the last decades (see also Casanovas-Vilar *et al.*, 2011). The aim of this paper is not to discuss Pickford's (2012) taxonomic attributions, but rather to clarify several factual mistakes regarding the identity of several male upper canines figured by this author.

Catalogue numbers

In Pickford's (2012) Figure 12 legend, the letters denoting the *H. laietanus* IPS18000 canine from Can Llobateres 2 and that of *D. fontani* IPS35026 from ACM/C3-Ae (see also our Fig. 1F-I) are transposed, the former corresponding in fact to his Fig. 12D, and the latter to his Fig. 12E. It is also noteworthy that the canine from Can Llobateres 1 figured by Pickford's (2012) Fig. 12G should be given a different catalogue number than IPS1801. Certainly, this specimen has borne a label with this number for at least 15 years, and has appeared as such in print: Ribot *et al.* (1996), in particular, referred to it as IPS1801, whereas Moyà-Solà & Köhler (1995) referred to it as IPMC1801 and Alba *et al.* (2001) as CLL1801. As noted by Alba *et al.* (submitted), the introduction of modern IPS catalogue numbers in the early 1990s generated some confusion in the literature. Modern catalogue numbers were first used in print by Harrison (1991), who did not provide a modern number for this canine (previously referred to as IPS41 following the older numbering system, e.g. Crusafont Pairó & Golpe Posse; Golpe Posse, 1993). Harrison (1991) explicitly asserted that IPS1801 was the number of a ruminant incisor,

which is still present in the ICP collections (DMA, pers. obs.). Hence, as noted by Alba *et al.* (submitted: Table S1), the hominoid canine specimen should be in fact labeled IPS1765. The latter is the correct number according to the ICP records, even though Harrison (1991) missed this modern catalogue number for some unknown reason, subsequently being incorrectly labeled as IPS1801.

The most serious inadvertent mistake made by Pickford (2012), however, refers to the specimen depicted in his Figure 12H (see our Figure 1A-E). According to the legend, this specimen would be labeled as IPS14741, being attributed to *Hispanopithecus laietanus*. Throughout the text, Pickford (2012) did not refer specifically to this specimen, although he attributed the Can Llobateres canines to *H. laietanus*, thus implicitly assuming that this specimen came from Can Llobateres. Neither the catalogue number, nor the taxonomic attribution, nor the locality of provenance are correct. First, according to ICP records, IPS14741 corresponds to a coprolite from the early Pleistocene site of Cal Guardiola. The canine depicted in Pickford's (2012) Figure 12H corresponds in fact to IPS41714, which was originally labeled with the field number ACM14741. No doubt, the similarity between the two numbers is responsible for Pickford (2012) mistaking the ACM field number for the correct catalogue number (preceded by the acronym 'IPS', corresponding to the collections of the Institut Català de Paleontologia Miquel Crusafont). In any case, this mistake ultimately resulted in incorrect taxonomic and locality assignments for this specimen, which are corrected here.

This situation is particularly unfortunate, given that Pickford was allowed to study, but not to publish (either describe or figure) this particular specimen, because it was already under study by the two authors of the present paper. In the acknowledgments of his paper, Pickford (2012) thanked one of us (SMS) for granting him access to the Vallès-Penedès specimens, and he did not include in his paper any of the other unpublished specimens that he was allowed to study. Nevertheless, given the factual inaccuracies that follow from his inadvertent mistake, we feel compelled to clarify both its stratigraphic provenance and taxonomic attribution (see below). We refrain from providing a detailed description of this specimen, since a comparative description of all available hominoid male upper canines from the Vallès-Penedès Basin will be submitted elsewhere (Alba *et al.*, in prep.).

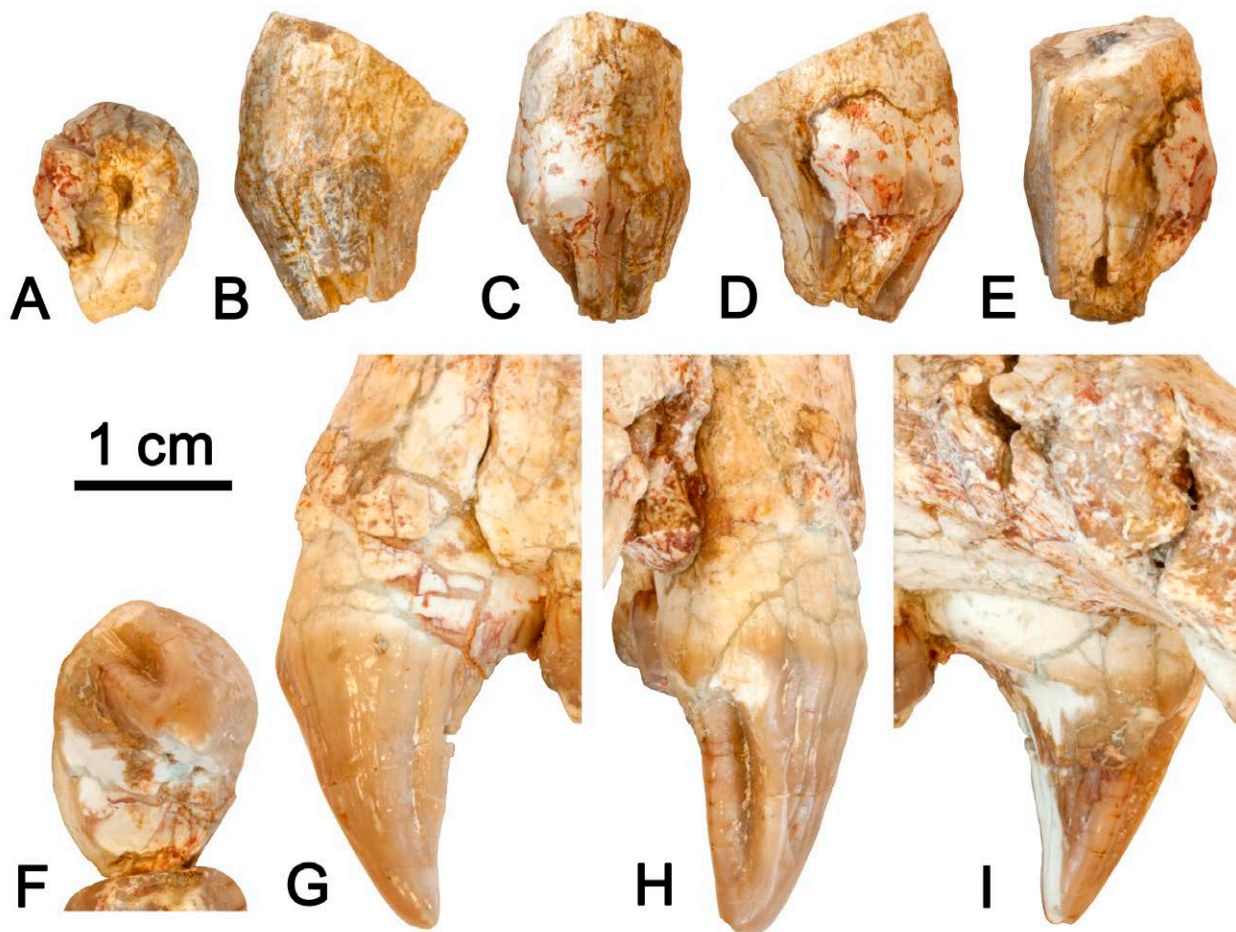


Fig. 1.—Male upper canines of *Dryopithecus fontani*. A-E, Left C¹ IPS41714 from ACM/C4-Ap, in occlusal (A), buccal (B), mesial (C), lingual (D) and distal (E) views. F-I, Right C¹ IPS35026 (reversed) from ACM/C3-Ae, in occlusal (F), buccal (G), mesial (H) and lingual (I) views.

Locality and age

IPS41714 comes from locality ACM/C4-Ap, from the local stratigraphic series of ACM (see Alba *et al.*, 2006, 2009, 2011, and Casanovas-Vilar *et al.* 2011, for details on the biostratigraphy and chronology of the ACM localities). On the basis of litho- and magnetostratigraphic correlation (Moyà-Solà *et al.*, 2009a), C4-Ap is correlated to subchron C5r.3r, with an estimated interpolated age of 11.9 Ma (Casanovas-Vilar *et al.*, 2011; Alba *et al.*, 2012), corresponding either to late MN7 or early MN8 sensu Mein & Ginsburg (2002). In spite of the similar estimated age of 11.9 Ma, this locality is slightly younger than (i.e., it is stratigraphically situated above) the type localities of *Pierolapithecus catalaunicus* (ACM/BCV1) and *Anoiapithecus brevi-*

rostris (ACM/C3-Aj), whereas it is stratigraphically equivalent to the ACM locality that had previously delivered craniodental remains attributed to *D. fontani* (ACM/C3-Ae) (Moyà-Solà *et al.*, 2009a; Casanovas-Vilar *et al.*, 2011; Alba *et al.*, 2012).

Comparisons and taxonomic attribution

IPS41714 (Figure 1A-E; see also Pickford, 2012: Fig. 12H) resembles other Miocene hominoid homologous teeth from the Vallès-Penedès Basin, which correspond to several dryopithecine genera. It should be noted that here ‘dryopithecine’ is employed as the semi-formal designation of the subfamily Dryopithecinae, unlike Pickford’s (2012) usage of the same term as an informal designation

that does not imply any taxonomic rank, and which should be better substituted by 'dryopith'.

Similarities between IPS41714 and the upper canines of Vallès-Penedès dryopithecines include the presence of secondary, vertical enamel crenulations on both the lingual and buccal faces and the presence of a well-developed mesiolingual sulcus originating close to the crown base (except in *Hispanopithecus crusafonti*). IPS41714, however, clearly differs from Late Miocene taxa (*Hispanopithecus* spp.; see Pickford, 2012: Figs. 12C,D,G) by displaying a more buccolingually-compressed crown and root, with the former showing a clearly oval occlusal profile (broader towards its mesial portion), instead of the more elliptical and less buccolingually-compressed occlusal contour of *Hispanopithecus*. IPS41714 also differs from the latter by displaying a shorter and less vertical root, which is markedly tilted distalwards (thus forming a relatively abrupt angle relative to the main basal-apical crown axis), and by further displaying a lingually curved crown relative to the root (instead of being tilted buccalwards).

In the various features mentioned above, IPS41714 most closely resembles the Middle Miocene taxa *Dryopithecus* (Fig. 1F-I; see also Pickford, 2012: Fig. 12E), *Pierolapithecus* (Pickford, 2012: Fig. 12F) and *Anoiapithecus* (Pickford, 2012: Fig. 12A), although on the basis of size and shape, it is attributable to the first of these, given its similarities to the two available canines from the partial face and palate IPS35026 from ACM/C3-Ae (Fig. 1F-I), attributed to *D. fontani* by Moyà-Solà et al. (2009a; see also Pickford, 2012). Admittedly, IPS41714 is less completely preserved and shows a somewhat more advanced degree of wear, but their morphological features fit very well in spite of the slightly smaller overall dimensions of IPS41714. In contrast, compared to the holotype specimen of *Anoiapithecus brevirostris*, the two *D. fontani* individuals display larger dimensions, a less buccolingually-compressed crown, and a larger buccolingual diameter (clearly situated on the mesial portion of the crown and progressively tapering distally). In both size and morphology, the canines attributed to *D. fontani* resemble more closely those of the holotype of *Pierolapithecus catalaunicus* than that of *Anoiapithecus*, although *Pierolapithecus* differs from *Dryopithecus* by displaying a relatively more brachyodont crown with a broader (less tapering) distal portion. Unfortunately, small sample sizes preclude a more secure assessment of intraspecific

variability. However, given the association of distinctive canine features with other diagnostic features distinguishing the three above-mentioned hominoid taxa (see Moyà-Solà et al., 2004, 2009a,b, and Alba et al., 2010, for further details), an attribution of IPS41714 to *D. fontani* is justified.

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References

- Alba, D.M.; Moyà-Solà, S. & Köhler, M. (2001). Canine reduction in the Miocene hominoid *Oreopithecus bambolii*: behavioural and evolutionary implications. *Journal of Human Evolution*, 40: 1-16.
- Alba, D.M.; Moyà-Solà, S.; Casanovas-Vilar, I.; Galindo, J.; Robles, J.M.; Rotgers, C.; Furió, M.; Angelone, C.; Köhler, M.; Garcés, M.; Cabrera, L.; Almécija, S. & Obradó, P. (2006). Los vertebrados fósiles del Abocador de Can Mata (els Hostalets de Pierola, l'Anoia, Cataluña), una sucesión de localidades del Aragoniense superior (MN6 y MN7+8) de la cuenca del Vallès-Penedès. Campañas 2002-2003, 2004 y 2005. *Estudios Geológicos*, 62: 295-312. doi:10.3989/egol.0662127.
- Alba, D.M.; Robles, J.M.; Rotgers, C.; Casanovas-Vilar, I.; Galindo, J.; Moyà-Solà, S.; Garcés, M.; Cabrera, L.; Furió, M.; Carmona, R. & Bertó Mengual, J.V. (2009). Middle Miocene vertebrate localities from Abocador de Can Mata (els Hostalets de Pierola, Vallès-Penedès Basin, Catalonia, Spain): An update after the 2006-2008 field campaigns. *Paleolusitana*, 1: 59-73.
- Alba, D.M.; Fortuny, J. & Moyà-Solà, S. (2010). Enamel thickness in Middle Miocene great apes *Anoiapithecus*, *Pierolapithecus* and *Dryopithecus*. *Proceedings of the Royal Society B*, 277: 2237-2245.
- Alba, D.M.; Casanovas-Vilar, I.; Robles, J.M. & Moyà-Solà, S. (2011). Parada 3. El Aragoniense superior y la transición con el Vallesiense: Can Mata y la exposición paleontológica de els Hostalets de Pierola. *Paleontologia i Evolució*, memòria especial núm. 6: 95-109.
- Alba, D.M.; Moyà-Solà, S.; Robles, J.M. & Galindo, J. (2012). Brief Communication: The oldest pliopithecoid record in the Iberian Peninsula based on new material from the Vallès-Penedès Basin. *American Journal of Physical Anthropology*, 147: 135-140.
- Alba, D.M.; Casanovas-Vilar, I.; Almécija, S.; Robles, J.M.; Arias-Martorell, J. & Moyà-Solà, S. (submitted). New dental remains of *Hispanopithecus laietanus* (Pri-

- mates: Homindiae) from Can Llobateres 1 and the taxonomy of Late Miocene hominoids from the Vallès-Penedès Basin (NE Iberian Peninsula). *Journal of Human Evolution*.
- Begun, D.R. (1992). *Dryopithecus crusafonti* sp. nov., a new Miocene hominoid species from Can Ponsic (Northeastern Spain). *American Journal of Physical Anthropology*, 87: 291-309.
- Begun, D.R.; Moyà-Sola, S. & Köhler, M. (1990). New Miocene hominoid specimens from Can Llobateres (Vallès Penedès, Spain) and their geological and paleoecological context. *Journal of Human Evolution*, 19: 255-268.
- Casanovas-Vilar, I.; Alba, D.M.; Garcés, M.; Robles, J.M. & Moyà-Solà, S. (2011). Updated chronology for the Miocene hominoid radiation in Western Eurasia. *Proceedings of the National Academy of Sciences, U.S.A.*, 108: 5554-5559.
- Crusafont-Pairó, M. & Golpe-Posse, J.M. (1973). New pongids from the Miocene of Vallès Penedès Basin (Catalonia, Spain). *Journal of Human Evolution*, 2: 17-23.
- Golpe Posse, J.M. (1993). Los Hispanopitecos (Primates, Pongidae) de los yacimientos del Vallès-Penedès (Cataluña, España). II: Descripción del material existente en el Instituto de Paleontología de Sabadell. *Paleontologia i Evolució*, 26-27: 151-224.
- Harrison, T. (1991). Some observations on the Miocene hominoids from Spain. *Journal of Human Evolution*, 19: 515-520.
- Mein, P. & Ginsburg, L. (2002). Sur l'âge relatif des différents dépôts karstiques miocènes de La Grive-Saint-Alban (Isère). *Cahiers scientifiques*, 2/2002: 7-47.
- Moyà-Solà, S. & Köhler, M. (1995). New partial cranium of *Dryopithecus* Lartet, 1863 (Hominoidea, Primates) from the upper Miocene of Can Llobateres, Barcelona, Spain. *Journal of Human Evolution*, 29: 101-139.
- Moyà-Solà, S.; Köhler, M.; Alba, D.M.; Casanovas-Vilar, I. & Galindo, J. (2004). *Pierolapithecus catalaunicus*, a new Middle Miocene great ape from Spain. *Science*, 306: 1339-1344.
- Moyà-Solà, S.; Köhler, M.; Alba, D.M.; Casanovas-Vilar, I.; Galindo, J.; Robles, J.M.; Cabrera, L.; Garcés, M.; Almécija, S. & Beamud, E. (2009a). First partial face and upper dentition of the Middle Miocene hominoid *Dryopithecus fontani* from Abocador de Can Mata (Vallès-Penedès Basin, Catalonia, NE Spain): taxonomic and phylogenetic implications. *American Journal of Physical Anthropology*, 139: 126-145.
- Moyà-Solà, S.; Alba, D.M.; Almécija, S.; Casanovas-Vilar, I.; Köhler, M.; De Esteban-Trivigno, S.; Robles, J.M.; Galindo, J. & Fortuny, J. (2009b). A unique Middle Miocene European hominoid and the origins of the great ape and human clade. *Proceedings of the National Academy of Sciences, U.S.A.*, 106: 9601-9606.
- Pickford, M. (2012). Hominoids from Neuhausen and other Böhnerz localities, Swabian Alb, Germany: evidence for a high diversity of apes in the Late Miocene of Germany. *Estudios Geológicos*, 68: 113-147 doi: 10.3889/egeol.40322.129
- Ribot, F.; Gibert, J. & Harrison, T. (1996). A reinterpretation of the taxonomy of *Dryopithecus* from Vallès-Penedès, Catalonia (Spain). *Journal of Human Evolution*, 31: 129-141.

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