Cretaceous Research 62 (2016) 86–89

Contents lists available at ScienceDirect

Cretaceous Research

journal homepage: www.elsevier.com/locate/CretRes

Discussion

A densely feathered ornithomimid (Dinosauria: Theropoda) from the Upper Cretaceous Dinosaur Park Formation, Alberta, Canada: A comment

Theagarten Lingham-Soliar

Environmental Sciences, Nelson Mandela Metropolitan University, Summerstrand, Port Elizabeth 6001, South Africa

ARTICLE INFO

Article history:
Received 25 November 2015
Accepted in revised form 4 December 2015
Available online 11 February 2016

Keywords:
Ornithomimus
Feathers
Collagen fibres
Biology
Taphonomy

ABSTRACT

The presence of feathers in *Ornithomimus* is questioned on poor evidence and a failure to observe scientific process and procedure.

1. Introduction

van der Reest et al. (2016) describe an *Ornithomimus* with alleged plumaceous feathers including reconstructions/interpretations; most of latter will not be considered in any detail in this commentary for reasons that will become clear in my concluding remarks. I shall, however, examine independently, where possible, the paleontological evidence behind the authors interpretations. However, findings discussed in this study must not be interpreted as antagonistic to the idea of feathered dinosaurs but rather, as in any hypothesis, whether or not they are circumscribed by sufficient scientific rigour.

2. Discussion

van der Reest et al. state, "[t]he most common integumentary structures are unambiguous feathers comprising filaments that range from 25 to 87 mm in length and 0.2–0.5 mm in width, preserved as dark carbonaceous imprints surrounding specific portions of the skeleton (Fig. 4)." Most are preserved as dark brown to black carbonaceous traces." Their figure 4, in particular Fig. 4a, is indeed the only one in which one can make a reasonable and independent assessment of the alleged feathers. The dimensions they give are a very good place to start.

Measurements may be reasonably interpreted as a defining principle of science. Notwithstanding the importance of establishing rachidial widths of their alleged feathers (innumerable according to the authors reconstructions in figs. 3, 5, 6), the authors have provided no statistical measurements. This is conflated by a vague reference to the 'feather' width range of between 0.2 and 0.5 mm and to a solitary example "on the body of UALVP 52531 is 0.4 mm laterally (their fig. 4b and c)."This leaves no option but to trust to the scale bar on their fig. 4 and to try to establish what they mean by feathers in the context of width and structure, at least in their fig. 4a. The sections in their figure 4b, c, which is considerably eroded, will not be considered in any depth because it is based on one alleged rachis and on allegations of a "clearly branching plumage", based on one v-shaped configuration and another in which the all-important point of origin of the alleged branch is absent (hence an assumption).

Reading between the lines, the authors' interpretation of feathers is based on two criteria, feather rachides 0.2–0.5 mm wide and an internal system of filaments, both of which were at some point organic. It is possible to see how this interpretation came about (my Fig. 1a). However, to understand why this interpretation is fundamentally flawed, first, we need to understand, crucially, the nature of the substrate upon which the integumental structures are preserved. It is a coarse sandstone substrate that forms a craggy, highly uneven surface (troughs separated by flats or crests), riddled by cracks. Second, we need to know how and why filaments from the ornithomimid were preserved on this surface. The coarse sandstone substrate probably enabled rapid dehydration of the soft

http://dx.doi.org/10.1016/j.cretres.2015.12.001
0195-6671/

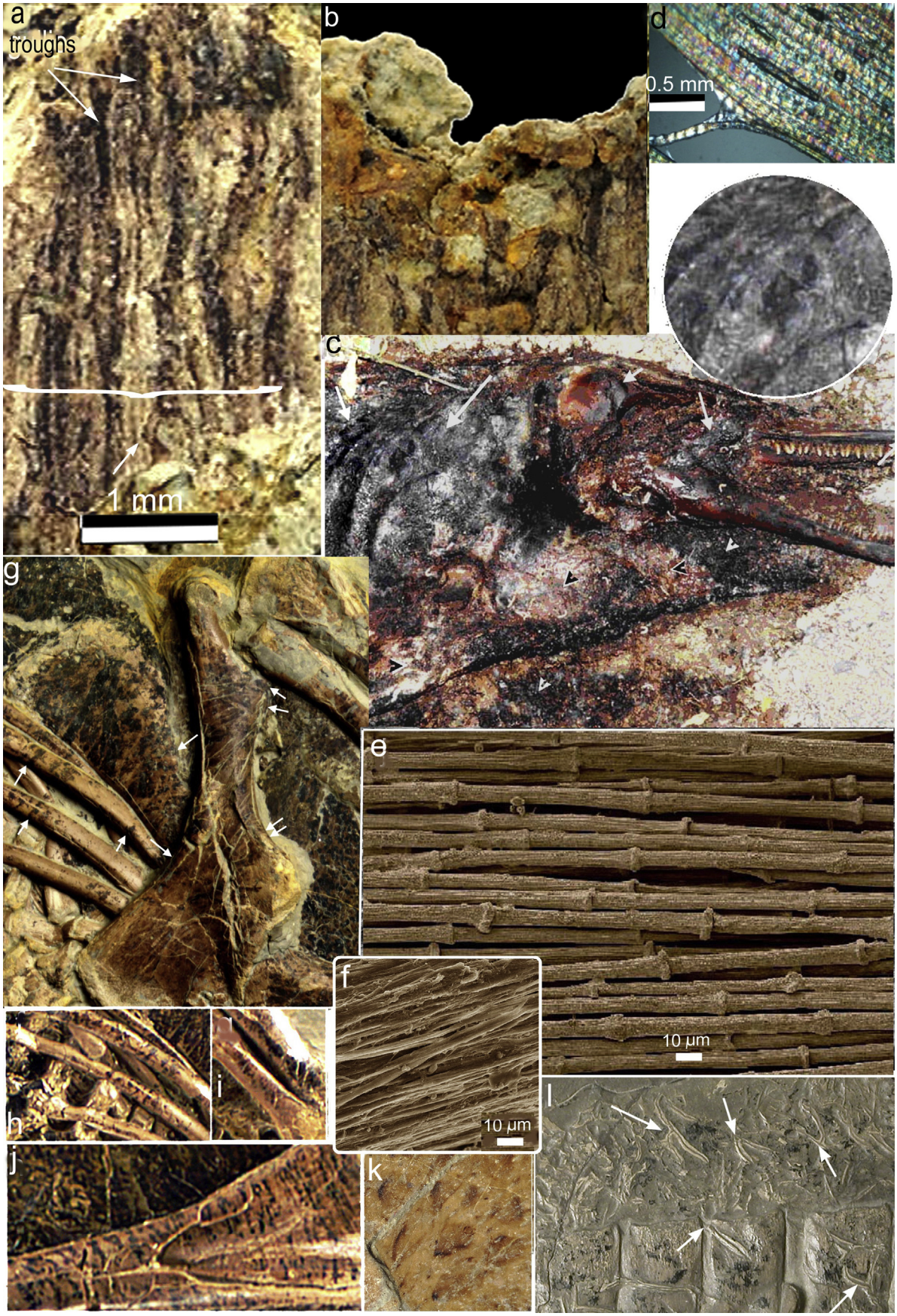

Fig. 1. Collagen, β-keratin and pigment. (a) Detail of collagen fibres impressed upon part of the 'craggy' surface in van der Reest et al.'s (2016) fig. 4. (b) A section near the top edge showing crevices in the sandstone and collagen filaments. (c) Histological section of collagen fibre bundle from shark dermis showing a few fibres teased away as well as the beaded appearance (d) and inset of decaying dolphin (about 3 months) showing collagen fibres being reoriented along the ribs. (e) (f) β-keratin after several years of complete microbial degradation of the binding matrix, while still retaining the rigidity and compactness. (f) in other parts the matrix was only partly degraded to show to show how tightly bonded the fibres are. (g–k) Pigment impressions. (g) humerus, radius, ulna, and ribs. (h) Ribs. (i) Radius and ulna. (j) Femur. (k) Left humerus. (l) Ichthyosaur soft tissue above neural spines showing numerous collagen fibres that had associated with others to form branch-like structures during the animal's taphonomic history.