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SUPPLEMENTARY ONLINE MATERIAL FOR

A well-preserved partial skeleton of the poorly known early Miocene seriema *Noriegavis santacrucensis*

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Published in *Acta Palaeontologica Polonica* 2015 60 (3): 589-598.
http://dx.doi.org/10.4202/app.00011.2013

Supplementary Online Material

SOM 1. Character descriptions.

SOM 2. Data matrix

SOM 1

Character descriptions.

1. Skull, well-developed, caudally projecting processus supraorbitales: absent (0); present, of unknown length (1); present, measuring more than half of the rostrocaudal diameter of the orbit (2), present, measuring less than half of the rostrocaudal diameter of the orbit (3).
2. Skull, processus basipterygoidei: absent (0), present (1).
3. Skull, processus paroccipitalis well developed and forming a caudolaterally projecting flange: no (0), yes (1).
4. Skull, foramen magnum: essentially ventrally positioned (0), cranioventrally positioned (1).
5. Skull, fossae temporalis well developed and large, each fossa extending over about one third of the skull roof: no (0), yes (1).
6. Upper beak dorsoventrally very deep and mediolaterally compressed: no (0), yes (1).
7. Coracoid, processus procoracoideus and processus acrocoracoideus: not as follows (0), fused or almost fused to form a bony ring (1), not comparable as processus acrocoracoideus greatly reduced (2).
8. Coracoid, foramen/incisura nervi supracoracoidei: present (0), absent (1).
9. Furcula: not as follows (0), with weekly developed scapi clavicularum (1), reduced (2).
10. Sternum, medial section of labrum internum dorsoventrally wide: no (0), yes (1).
11. Sternum, trabecula mediana very long and caudally projected, distinctly exceeding trabecula lateralis in caudal extent: no (0), yes (1). Phorusrhacidae lack incisions in the caudal margin of the sternum, but because the trabecula mediana is of similar size and shape to that of Cariamidae, the character has been scored as present.
12. Humerus, ventral surface of proximal end with distinct attachment scar for musculus scapulohumeralis cranialis distal to foramen pneumaticum: no (0), yes (1).
13. Humerus, distal margin of bone markedly oblique in relation to longitudinal axis of the shaft, with strongly projecting processus flexorius: no (0), yes (1). A markedly obliquely oriented distal margin of the distal humerus is an autapomorphy of phorusrhacid birds.
14. Ulna, caudal surface of proximal end with marked projection, just distal to olecranon (Fig. $3A_2$): no (0), yes (1).
15. Ulna greatly abbreviated, measuring only about three quarters of the length of the humerus (related to the flightlessness of the respective taxa): no (0), yes (1). For *Noriegavis*, an ulna of similar proportions to that of modern seriemas was assumed from the preserved remains; certainly the bone was not as abbreviated as in phorusrhacids.
16. Carpometacarpus, os metacarpale minus markedly bowed in craniocaudal direction: no (0), yes (1).
17. Carpometacarpus, ventral rim of proximal portion of os metacarpale minus with well developed tubercle: no (0), yes (1).
18. Pelvis mediolaterally strongly compressed: no (0), yes (1). A mediolaterally strongly compressed pelvis is an autapomorphy of phorusrhacid birds.
19. Pelvis, processus obturatorius fused with the pubis, thus forming a closed foramen obturatum: no (0), yes (1).
20. Pelvis, well-defined, lateral process dorsal to antitrochanter (Fig. 4): absent (0), present (1).
21. Pelvis, alae postacetabulares ilii forming a laterally projecting bulge in their midsection (Fig. 4): no (0), yes (1).
22. Pelvis, cristae iliacae dorsales fused on level of crista spinosa: no (0), yes (1).
23. Femur, prominent crista trochanteris: absent (0), present (1).
24. Femur, ratio maximum length of bone: width of proximal end 4.5 or less: no (0), yes (1).
25. Tibiotarsus, cristae cnemiales markedly proximally projected: no (0), yes (1).
26. Tibiotarsus, medial surface of proximal end, prominent projection medial to fossa retropatellaris, steeply sloping towards facies gastrocnemialis (Fig. $5A_8$): absent (0), present (1).
27. Tibiotarsus, medial surface of proximal end bearing marked laterally projecting tubercle (Fig. $5C_1$; tuberositas interna of Ballmann 1969): no (0), yes (1).
28. Tarsometatarsus, shaft greatly elongated and very slender, with length of bone measuring more than ten times the width of the distal end: no (0), yes (1). For *Noriegavis*, no complete tarsometatarsus is known, but the preserved remains indicate that it was greatly elongated as in extant seriemas.
29. Tarsometatarsus, hypotarsus block-like, plantar prominence without well developed sulci: no (0), yes (1).
30. Tarsometatarsus, well-developed crista plantaris lateralis: absent (0), present (1).
31. Tarsometatarsus, marked sulcus for musculus extensor hallucis longus on medial surface of distal shaft: absent (0), present (1).
32. Tarsometatarsus, trochleae metatarsorum II et IV: not reaching to middle of trochlea metatarsi III (0), reaching at least to middle of trochlea metatarsi III (1).
33. Proximal phalanx of hallux very short, measuring less than half of length of proximal phalanx of third toe: no (0), yes (1). The condition in Otididae is not comparable owing to the loss of the hallux.
34. Second toe very short, with distal end of second phalanx extending only little beyond proximal end of second phalanx of third toe: no (0), yes (1).
35. Ungual phalanx of second toe "raptorial", i.e., strongly curved and sharply hooked: no (0), yes (1). For *Dynamopterus*, this feature has been scored after a fossil tentatively referred to *D. itardiensis* by Mayr (2000).

SOM 2

Data matrix of 35 osteological characters for *Eupodotis* (Otididae), *Micrastur* (Falconidae), *Dynamopterus*, Phorusrhacidae (*Psilopterus* and *Patagornis*), crown group Cariamidae, and *Noriegavis*; see SIM 1 for character definitions. Outgroup comparisons are based on Otididae and Falconidae, unknown character states are indicated by "?", non-applicable ones by "–".

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Eupodotis vigorsii	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micrastur semitorquatus	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Dynamopterus gallicus, *D. itardiensis*	?	?	?	?	?	?	1	1	?	?	?	0	0	0	0	1	1	0
Cariama cristata	3	0	1	1	1	0	1	1	1	1	1	1	0	1	0	1	1	0
Chunga burmeisteri	3	0	1	1	1	0	1	1	1	1	1	1	0	1	0	1	1	0
Noriegavis santacrucensis	2	0	1	1	1	0	?	?	?	0	?	?	?	1	0	?	?	0
Psilopterus bachmanni, *P. lemoinei*	2	1	1	1	1	1	2	1	2	?	1	0	1	0	1	1	1	1
Patagornis marshi	2	1	1	1	1	1	2	1	2	?	1	?	1	0	1	1	1	1

	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Eupodotis vigorsii	0	0	0	0	1	1	0	0	0	0	0	0	0	0	–	0	0
Micrastur semitorquatus	1	0	0	1	0	0	0	0	0	1	0	1	0	1	0	0	1
Dynamopterus gallicus, *D. itardiensis*	?	?	?	?	1	0	0	0	0	0	1	0	0	0	0	0	0
Cariama cristata	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Chunga burmeisteri	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Noriegavis santacrucensis	?	1	1	0	1	0	1	1	1	1	?	?	1	1	?	?	?
Psilopterus bachmanni, *P. lemoinei*	1	1	0	1	0	0	1	0	0	0	1	1	0	1	1	1	1
Patagornis marshi	1	1	0	1	0	1	1	0	0	0	1	1	0	1	1	1	1