## Supplementary material 1

## A new species of *Plohophorus* Ameghino (Cingulata, Glyptodontidae) from the latest Pliocene–earliest Pleistocene of the Pampean Region (Argentina): the last survivor of a Neogene lineage

Sofía Inés Quiñones a\*, Francisco Cuadrelli a, Martin de los Reyes b, Carlos AlbertoLuna a, Daniel Gustavo Poiré c and Alfredo Eduardo Zurita a

*aLaboratorio de Evolución de Vertebrados y Ambientes Cenozoicos, Centro de Ecología Aplicada del Litoral (CECOAL-CONICET) and Universidad Nacional Del Nordeste, Ruta 5, Km 2,5 (3400), Corrientes, Argentina; b División Paleontología de Vertebrados, Museo de La Plata, Paseo Del Bosque S.n., La Plata, 1900, Argentina; cConsejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina, Centro de Investigaciones Geológicas (CIG), CONICET - UNLP, Diagonal 113 n°275, 1900, La Plata, Argentina*

**Supplementary** 1: List of characters and character states used in the cladistic analysis. Of these, the last six are new and have not been published previously.

0) Angle between the major axis of the descending process of the zygomatic arches and the plane at the level of the dental series close to 80°: (0) absent; (1) present

1) Morphology of the infraorbital foramina: (0) round or oval, without lower canal; (1) oval with a lower canal

2) Pneumatization of the rostral area of the skull: (0) absent; (1) present

3) Ossified nasal cartilages: (0) absent; (1) present

4) Dorsal profile of the skull, in lateral view: (0) nasal parallel to frontal; (1) nasal tangent to the fronto-parietal profile

5) Angle between the naso-frontal region and the parietal region located at level of the orbital notch (in lateral view): (0) absent; (1) present

6) Morphology of the orbital notch, in lateral view: (0) dorso-ventrally elongated; (1) circular

7) Angle between the posterior margin of the orbital and the palatal plane closer o 90°: (0) absent; (1) present

8) Shape of the antero-lateral margin of the nasal opening: (0) right; (1) sigmoid; (2) heavily cleavage

9) Contour of the dorsal area located in front of the orbitals (in dorsal view): (0) non quadrangular (1) quadrangular

10) Skull with circular zygomatic arches in dorsal view: (0) absent; (1) present

11) Morphology of the palate: (0) transverse expansion limited to one of the margins or absent; (1) transverse expansion present in the proximal and distal margin

12) Transverse diameter of the palate at level of the Mf1: (0) equal to the antero-posterior diameter occupied by the Mf1-Mf3; (1) equal to the antero-posterior diameter occupied by the Mf1-Mf4

13) Flat occlusal surface in all molariform: (0) absent; (1) present

14) Beginning of evident labiolingual trilobation: (0) Mf1; (1) Mf2; (2) Mf3; (3) Mf4

15) Labio-lingual axis of Mf1 greater than or equal to 75% of the antero-posterior axis of the same molariform: (0) absente; (1) present

16) Antero-posterior diameter of the Mf1: (0) >50% of the antero-posterior diameter of the Mf2; (1) <50% of the antero-posterior diameter of the Mf2

17) Morphology of the Mf2/mf2: (0) non lobated; (1) lobated on one face; (2) lobated on both faces

18) Relationship between the anterior edentulous portion of the mandible with respect to its total length: (0) >10%; (1) <10%

19) Postorbital bar forms an angle close to 90° with respect to the sagittal plane of the skull (in dorsal view): (0) absent; (1) present

20) Angle between the major axis of the horizontal ramus of the mandible and the major axis of the ascending ramus of the same: (0) <90°; (1) major or equal to 90° 21) Bony crest on the ventral margin of the orbital notch: (0) absent; (1) present and poorly marked; 2) present and strongly marked

22) Vaulted fronto-parietal region: (0) absent; (1) present

23) Cephalic shield consisting only of small osteoderms: (0) absent; (1) present

24) Peripheric figures in the osteoderms forming the cephalic shield: (0) absente; (1) present

25) Entepincondilar foramen: (0) absent; (1) present

26) Articulation between scaphoid and metacarpal of digit V: (0) absent; (1) present

27) Third trochanter extends for more than a third of the length of the diaphysis: (0) absent; (1) present

28) Cephalic notch composed of tubercular osteoderms: (0) absent; (1) present

29) Maximum number of peripheral figures in the series proximal to the central figure: (0) zero; (1) up to 12; (2) up to 20; (3) 21 or more

30) Number of series of peripheral and accessory figures: (0) one series, with peripheral accessory figures in <10% of osteoderms; (1) a series, with accessory peripheral figures in >10% of the osteoderms; (2) osteoderms without ornamentation

31) Morphology of the osteoderms that constitute the margin of the dorsal carapace: (0) tubercular osteoderms absent or limited to the caudal opening; (1) tubercular osteoderms present throughout the margin of the dorsal carapace

32) Number of series of peripheral figures: (0) one series; (1) two or more series; (2) without figures and evenly perforated

33) Osteoderms of the latero-ventral region of the dorsal carapace: (0) with circular central figure; (1) with angular central figure; (2) without ornamentation

34) Osteoderms of the latero-ventral region of the dorsal armor: (0) in a central position or displaced backwards, with more than six peripheral figures; (1) displaced towards the posterior margin, with five or fewer peripheral figures

35) Development of the central grooves of the osteoderms of the dorsal part of the carapace: (0) width < 4mm; (1) between 4-6mm; (2) absent

36) Dorsal area of dorsal carapace with reticular ornamentation pattern: (0) absent; (0) present

37) Small foramina with an almost homogeneous distribution along the exposed surface of the osteoderms, only applicable to osteoderms without an ornamentation pattern: (0) absent; (1) present

38) Exposed surface of osteoderms of posterior third of dorsal armor: (0) flat or concave, with central cavity; (1) flat or convex; (2) blistered; (3) without ornamentation

39) Dorsal carapace divided into preiliac and postiliac regions, both occupying 50% of the curvature: (0) absent; (1) present

40) Carapace convexity, in lateral view: (0) absent; (1) present

41) Posterior region of dorsal carapace with dome-shaped hypertrophied glandular structure: (0) absent; (1) present

42) Expression zone of the convexity of the dorsal carapace, in lateral view: (0) convex anteriorly; (1) mid-level convex; (2) convex posteriorly; (3) unexpressed convexity

43) Peripheral figures of the osteoderms that constitute the caudal notch of the dorsal carapace: (0) osteoderms with lateral and proximal peripheral figures; (1) osteoderms only with proximal peripheral figures

44) Ornamentation of the marginal osteoderms of the caudal notch: (0) osteoderms with one series of proximal peripheral figures; (1) osteoderms with two or more series of peripheral figures

45) Percentage that the central figure occupies on the total surface of the immediate osteoderms to the caudal notch: (0) <50%; (1) >50% but <80%; (2).>80%; (3) without ornamentation

46) Central figure of the osteoderms of the caudal notch: (0) non central trapezoidal figure; (1) with central trapezoidal figure

47) Dorsal outline of caudal notch, in lateral view: (0) ventrally inclined; (1) dorsally inclined

48) Dorsal carapace ornamentation vs caudal armor ornamentation: (0) different; (1) similar

49) Morphology of the exposed surface of the osteoderms of the caudal rings: (0) flat and without ornamentation; (1) flat with peripheral figures; (2) distal series of osteoderms with tubercular surface

50) Peripheral figures on the exposed surface of the distal series of osteoderms of the caudal rings: (0) absent; (1) present

51) Caudal armor morphology: (0) rings representing more than 90% of total length; (1) rings plus caudal tube (the latter represents more than 20% of the length of the caudal armature); (2) rings plus caudal tube (the latter represents more than 40% of the length of the caudal armature)

52) Transverse contour of the distal third of the caudal tube: (0) Nearly circular; (1) dorsoventrally flattened

53) Morphology of the terminal portion of the caudal tube: (0) proximal diameter similar to distal diameter; (1) proximal diameter less than distal diameter; (2) proximal diameter larger than distal diameter

54) Pattern of ornamentation of the dorsal osteoderms of the caudal tube: (0) smooth surface; (1) rosette pattern; (2) reticular pattern; (3) smooth surface with numerous foramina

55) Osteoderms of the lateral area of the caudal tube: (0) without peripheral figures; (1) with peripheral figures

56) Presence of depressions with a convex central zone in the lateral and/or terminal zone of the caudal tube: (0) absent; (1) present

57) Presence of concave depressions for the insertion of spines in the terminal area of the caudal tube: (0) absent; (1) present

58) Terminal tubercle of caudal tube: (0) formed by two fused rings; (1) formed up of three fused rings

59) Morphology of the terminal portion of the caudal tube: (0) not expanded transversely; (1) slightly expanded transversely; (2) greatly expanded transversely

60) Osteoderms of the lateral area of the caudal tube with a wide central figure and a flat surface: (0) absent; (1) present

61) Number of osteoderms with a broad, flat central figure in the lateral area of the caudal tube: (0) up to 3; (1) more than 3

62) Number of peripheral figures present in the proximal series surrounding the large central figure: (0) up to 15; (1) 16 or more

63) Peripheral figures of the osteoderms of the proximal end of the caudal tube forming a complete series around their corresponding central figure: (0) absent; (1) present

64) Ornamentation of the proximal-ventral region of the caudal tube, with accessory figures between rows two and three of osteoderms: (0) numerous and contiguous; (1) isolated; (2) absent

65) Ornamentation of the proximal-ventral region of the caudal tube, with numerous and contiguous accessory figures: (0) only up to the sixth series of osteoderms; (1) along the entire length of the tube

66) Peripheral figures in the osteoderms of the caudal tube: (0) with rounded contour; (1) with angular contour