

APPENDIX 3: List of autapomorphic characters for taxa involved in phylogenetic analysis.

Millerettidae

-no known autapomorphies

Bashkyroleter bashkyricus

-no known autapomorphies

'Bashkyroleter' mesensis

-no known autapomorphies

Rhipaeosaurus tricuspidens

1. Tricuspid teeth

Nycteroleter ineptus

-no known autapomorphies

Emeroleter levis

2. Closely-spaced small round pits on otherwise smooth skull
3. Posteriorly strongly elongated supratemporals that form narrow and long horns
4. Enlarged unsculptured otic notch that reaches anteriorly almost to orbit
5. Posterior end of quadratojugal curves upward forming small horn
6. Middle pterygoid denticle ridge stretches from area of basipterygoid joint to posterior edge of choana and does not adjoin vomeropalatine ridge

Macroleter poezicus

7. Maxilla vomer anterior contact
8. Basicranial articulation and basipterygoid processes facing anteriorly
9. Pterygoids meeting anterior to basipterygoid articulation
10. Sculptureless indentation just anterior to fronto-parietal suture

11. Skull roof v-shaped in posterior view

Bradysaurus seeleyi

-no known autapomorphies

Bradysaurus baini

12. Distal portion of paroccipital process greatly swollen

13. Huge, rounded lump on the maxilla immediately behind the naris

Nochelesaurus alexanderi

14. Groove on internal surface of scapulocoracoid located very close to the anterior margin of the scapula blade

15. Distinct tubercle on centre of dorsal surface of entepicondyle

16. Flange on the dorsal surface of the femur that projects distally beyond the postaxial tibial facet

Embrithosaurus schwarzi

17. Anterior expansion of the iliac blade is flat rather than everted

18. Two iliac blades not parallel but diverge anteriorly (making an angle of approximately 40 degrees with the sagittal plane)

19. Pelvic symphysis extremely thick, almost half as deep as long

Deltavjatia rossicus

20. Occipital condyle projects far behind posterior border of postparietal

21. Sculpturing consists of irregular 'pustule-like' bosses scattered among circular pits

Shansisaurus xuecunensis

-no known autapomorphies

Shihtienfenia permica

22. Rounded expansion on the anterior margin of the scapular blade near the dorsal end

23. Acromion process is a smoothly-contoured, semi-circular flange

Pareiasuchus peringueyi

24. Lateral flange of the exoccipital forms a distinct, dorsally-oriented crest along the posterior margin of the paroccipital process

25. Small median tubercle on the internal surface of the mandible immediately above the symphyseal 'hook'

26. Angular boss is a large, blunt knob

Pareiasuchus nasicornis

27. Boss on nasal a discrete ossification

28. Cultriform process extremely wide, occupying entire width of interpterygoid vacuity

29. Large descending cheek flanges project backwards, making the skull appear 'delta-shaped' in dorsal view

Pareiasaurus serridens

30. Cranial sculpturing consists of a reticulate network of very fine pits and grooves, no boss on centre of each element

31. Dorsal flange on the anterior margin of the proximal end of the paroccipital process

32. Large descending cheek flanges project ventrally (doubtful)

Scutosaurus karpinskii

33. Small median boss on the basioccipital between the basal tubera

34. Teeth on upper jaw point slightly outwards

35. Radiating ridges covering skull very coarse

Sanchuansaurus pygmaeus

36. Two exits for infraorbital canal further apart than in any other pareiasaurs

37. The marginal surface of every tooth has a cusped cingulum

Parasaurus geintzi

- 38. Reduced small spike-like horns on the quadratojugal and supratemporal

Elginia mirabilis

- 39. Long conical horns present over the skull and cheek margins
- 40. Distinct median “crater-like” depression just behind the nasal bosses
- 41. Posteroventral embayment of the orbital margin

Provelosaurus americanus

- 42. Quadratojugal with long smooth ventrolateral surface, with two prominent cylindrical bosses located distally
- 43. Squamosal dorsoventrally expanded

Anthodon serrarius

- 44. Marginal teeth separated by small gaps – no continuous cutting surface
- 45. Olecranon process lost
- 46. Capitellum of femur extends onto dorsal surface
- 47. Proximal end of tibia bears huge ridge
- 48. Large dorsally-projecting flange on posterolateral corner of ischium

Pumiliopareia pricei

- 49. Skull table and cheeks completely covered in densely-spaced, conical bosses
- 50. Orbits perfectly round
- 51. Only nine teeth on upper jaw, seven on lower jaw
- 52. Ribs very wide, no intercostal spaces

Nanoparia luckhoffi

- 53. Snout very pointed in dorsal view
- 54. Small, superficial element between squamosal and quadratojugal
- 55. External nares proportionately larger than any other pareiasaur taxon

Bunostegos akokanensis

56. Three hemispherical processes at the anterior end of the snout
57. Elongate, laterally-projecting bosses overhanging orbit
58. Hemispherical boss at posterolateral corner of skull roof
59. Postfrontal and supratemporal bosses with neck separating globular head from skull roof

Arganaceras vacanti

60. Anterior process of maxilla inclined posteriorly (ventral surface of the naris horizontal)
61. Well-developed S.E. (tabular), with a large flange applied to the internal side of the supratemporal
62. Internal flange of the supernumerary element continues dorsally the internal flange of the squamosal and supratemporal, so probably made contact with the paroccipital process of the braincase
63. The medial process of the exoccipital meets its pair at the midline, excluding the supraoccipital from the foramen magnum
64. Neurocranium extremely elongated with a lateral constriction of the parabasisphenoid
65. Basipterygoid processes laterally restricted and very elongate
66. Sella turcica
67. Two additional lateral tubercles present in addition to the single median tubercle on the ventral surface of the basioccipital
68. Articular and angular form a large retroarticular process
69. Prominent bony flange formed by the articular defines the medial edge of the glenoid fossa?
70. Maxillary teeth point forwards

Obirkovia gladiator

71. Quadratojugal with three osteoderms on occipital flank
72. Anterior projection of quadratojugal with three osteoderms