**Autopsie d’une radiation adaptative : Phylogénie des Theridomorpha, rongeurs endémiques du Paléogène d’Europe - histoire, dynamique évolutive et intérêt biochronologique.**

**Supplementary data- 2**

**List of characters**

[\*characters ordered; w = weight of multistate characters]

**General features**

1. *\*Infraorbital foramen (w: 50)*: **(0)** small (protrogomorphous); **(1)** moderately enlarged; **(2)** very enlarged (hystricomorphous).

2. *Lower jaw masseteric crests (w: 100)*: **(0)** two masseteric crests equally developed; **(1)** upper masseteric crest stronger than the lower one; **(2)** lower masseteric crest absent; **(3)** lower masseteric crest stronger.

3. *Ascending ramus (w: 100)*: **(0)** high; **(1)** low.

4. *Palate anterior width/posterior width (w: 100)*: **(0)** equally wide (parallel toothrows); **(1)** anterior < posterior (divergent toothrows).

5. *\*Crown growth (w: 25)*: **(0)** brachydonty or weak increase of crown height; **(1)** semi - hypsodonty (clear encrease in height mainly on lingual sides of upper teeth and buccal sides of lower teeth); roots present; **(2)** semi-hypsodonty + additional increase of crown height on buccal sides of upper teeth and mesial sides of lower teeth; roots open; **(3)** upper buccal roots and lower mesial roots strongly reduced; upper lingual root and lower distal root widely open since old individuals; **(4)** hypselodonty (roots always open, during the whole life).

6. *\*Crown height ratio of upper molars = maximum (H) of unworn or weakly worn M1-2 relative to their length (L) (w: 17)*: **(0)**  H<L; **(1)** H nearly = L; **(2)** 1L < H < 1.24L; **(3)** 1.25L < H < 1.49L; **(4)** 1.5L < H < 1.99L; **(5)** 2 < H < 2,49L; **(6)** 2.5L < H < 2.99L; **(7)** H > 3L.

7. *\*Differential in enamel thickness on opposite sides of lophs (lophids) and sinus (sinusid); applicable to species with crown height ratio of upper molars = or > state 2 (w: 50)*: **(0)** equal (or nearly equal) enamel thickness in all sides; **(1)** nearly equal on the upper part of the crown, appears unequal (thicker on distal sides) on worn teeth; **(2)** enamel thicker on distal sides than on mesial sides.

8. *\*Cement (w: 33)*: **(0)** absent; **(1)** occasionally present on limited areas; **(2)** present on limited areas of the crown, close to the roots, or at the bottom of flexus and flexids; **(3)** covering also the peripheral surfaces of the crown, even in early stages of wear.

**Upper tooth features**

9. *\*Enamel wrinkles and ridges on upper teeth (w: 33)*: **(0)** absent; **(1)** rare; **(2)** numerous; **(3)** reticulate enamel wrinkling.

***Upper deciduous molars features***

10. *Upper DP3 (w: 100)*: **(0)** present; **(1)** absent.

11. *\*DP4 size (w: 50)*: **(0)** smaller than M1; **(1)** slightly smaller to subequal than M1; **(2)** longer than M1.

12. *Parastyle (w: 100)*: **(0)** absent; **(1)** present.

13. *Size of parastyle (w: 100)*: **(0)** strong; **(1)** small.

14. *\*Length of the anteroloph (w: 50)*: **(0)** very short to absent; **(1)** short (less than half-width of the tooth); **(2)** equal or longer than half-width of the tooth.

15. *\*Height of anteroloph and posteroloph on upper teeth (DP4, P4, molars) (w: 50)*: **(0)** low, lower than the protoloph and metaloph; **(1)** high: as high as protoloph and metaloph, but less than paracone and metacone; **(2)** as high as protoloph, metaloph, paracone and metacone.

16. *Anterostyle (w: 100)*: **(0)** absent; **(1)** present.

17. *Size of the anterostyle (w: 100)*: **(0)** strong; **(1)** reduced.

18. *Antesinus on DP4 (w: 100)*: **(0)** absent; **(1)** present.

19. *\*Preprotocrista on unworn or weakly worn DP4 of moderately to strongly hypsodont species (w: 50)*: **(0)** present; **(1)** variably interrupted; **(2)** always interrupted.

20. *Preparacrista on unworn to weakly worn upper teeth (w: 100)*: **(0)** absent; **(1)** present.

21. *Postmetacrista on unworn or weakly worn teeth (w: 100)*: **(0)** absent; **(1)** présent.

22. *Orientation of preparacrista and / or postmetacrista on upper teeth (w: 100)*: **(0)** short and making a soft wide angle open lingually; **(1)** making a wide angle open buccally (centered on paracone and metacone), close to 180° or slightly less; **(2)** making an acute angle open buccally, less than 90° or equal; **(3)** mesio-distal.

23. *\*Protoloph w: 50)*: **(0)** absent; **(1)** short or incomplete; **(2)** complete.

24. *\*Protoloph lingual connection (or orientation) (w: 25)*: **(0)** to the anterostyle or to the anteroloph; **(1)** both to the anterostyle and the preprotocrista; **(2)** to the preprotocrista (anterior arm of protocone); **(3)** to the protocone (without angle with the postprotocrista); **(4)** to the postprotocrista (angle between the mesoloph and the postprotocrista) and / or to the mure.

25. *Paraconule on DP4 (w: 100)*: **(0)** present and simple; **(1)** present and double; **(2)** absent or indistinct from the protoloph.

26. *Paraconule state on DP4 (w: 100)*: **(0)** large (swollen); **(1)** protruding mesially; **(2)** small, reduced.

27. *protocone (w: 100)*: **(0)** inflated; **(1)** tip more or less sharp and base more or less swollen; **(2)** stretchted obliquely (more or less compressed mesiolingual to distobuccal).

28. *Mesostyle (w: 100)*: **(0)** present; **(1)** absent.

29. *\*Size of mesostyle (w: 50)*: **(0)** strong; **(1)** small; **(2)** indistinct to absent.

30. *Additional syncline (S0) into the anterosyncline (SI) (w: 100)*: **(0)** absent; **(1)** sketched due to a short buccol lingual crest; **(2)** present, due to the subdivision of the SI by a loph developed lingually from an anterobuccal extra-cusp; **(3)** S0 + additional short crest mesial to the S0; **(4)** S0 + additional short distal crest to the S0; **(5)** present with additional subdivisions (double or triple S0) than (2).

31. *Additional buccal cusp / crest between paracone and mesostyle on DP4 and P4 (w: 100)*: **(0)** absent; **(1)** variably present.

32. *Premetacrista (anterior arm of metacone) (w: 100)*: **(0)** present; **(1)** absent.

33. *Size of premetacrista (w: 100)*: **(0)** strong; **(1)** weak or short.

34. *Premetacrista connection with the mesostyle (w: 100)*: **(0)** absent; **(1)** present.

35. *Mesoloph (w: 100)*: **(0)** absent; **(1)** present.

36. *Mesolophule on DP4 (w: 100)*: **(0)** absent; **(1)** present.

37. *\*Mesoloph lingual connection on DP4 (w: 50)*: **(0)** free or connected to accessory crests present in the central basin; **(1)** mesoloph + mesolophule continuous, connected to the mesocone when present, or to the middle of the mure ; **(2)** mesoloph + mesolophule continuous, joining the buccal extremity of the prehypocrista, this being connected or not to the mure .

38. *\*Height of mesoloph + mesolophule on DP4 when both present (w: 50)*: **(0)** low, sometimes connection broken between mesoloph and mesolophule; **(1)** high but lower than the protoloph and metaloph; **(2)** as high as the the other lophs.

39. *Metacone (w: 100)*: **(0)** smaller than paracone; **(1)** as large than paracone.

40. *Shape of paracone (w: 100)*: **(0)** swollen and rounded; **(1)** buccolingually stretched but well-defined; **(2)** merged within the protoloph; **(3)** swollen and pointed; **(4)** slightly strechted mesio-distally; **(5)** more or less crescent-shaped, due to the V formed by pre and post-paracristae.

41. *Shape of metacone (w: 100)*: **(0)** swollen; **(1)** bucco-lingually stretched but well-defined (protruding); **(2)** merged within the metaloph; **(3)** swollen and pointed; **(4)** slightly stretched mesio-distally; **(5)** crescent-shaped and oblique buccomesial to distolingual; **(6)** stretched in an oblique metacrista, buccomesial to distolingual.

42. *\*Metaconule (w: 50)*: **(0)** absent or indistinct; **(1)** metaconule present; **(2)** double metaconule.

43. *Shape of metaconule (w: 100)*: **(0)** swollen; **(1)** stretched mesio-distally; **(2)** extended buccolingually; **(3)** oblique mesiobuccal crest.

44. *\*Size of metaconule II (w: 50)*: **(0)** stronger than protoconule; **(1)** as large as protoconule; **(2)** reduced to absent.

45. *Metalophule I (mesial metaloph: connection either to prehypocrista or to mid-hypocone, sometimes reduced to a lingual crest) (w: 100)*: **(0)** absent; **(1)** present.

46. *\*State of metalophule I (w: 50)*: **(0)** poorly developed and discontinuous, or lingual part only; **(1)** buccal and lingual part separated; **(2)** continuous.

47. *Metalophule II (at least distal to metaloph I) (w: 100)*: **(0)** absent; **(1)** present.

48. *Hypocone (w: 100)*: **(0)** absent; **(1)** present.

49. *\*Size of hypocone relative to protocone w: 50)*: **(0)** smaller and lower than protocone; **(1)** as high and large as protocone; **(2)** larger than protocone.

50. *Position of hypocone on upper DP4 and P4 (w: 100)*: **(0)** placed more lingually than protocone; **(1)** slightly more buccal or same level than protocone.

51. *Endoloph on DP4 (w: 100)*: **(0)** absent; **(1)** present.

52. *\*State of endoloph on DP4 (w: 50)*: **(0)** true endoloph (mesiodistal crest connecting protocone and hypocone); **(1)** resulting from two oblique (linguodistally) spurs one on the distal flank of the protocone, the other on the mesial flank of the hypocone; **(2)** only one mesiodistal to slightly oblique lingually spur from the protocone.

53. *Height of endoloph on DP4 (w: 50)*: **(0)** low (much lower than protocone) or vestigial; **(1)** as high as the protocone or slightly lower; **(2)** high but not reaching the occlusal surface in semi-hypsodont species.

54. *\*Mure on DP4 (w: 50)*: **(0)** absent; **(1)** sketched; **(2)** present.

55. *State of the mure (w: 100)*: **(0)** low; **(1)** higher but generally lower than the occlusal surface of inner cusps; **(2)** high and complete; **(3)** interrupted distally to the protocone (to the protoloph), at least on unworn teeth.

56. *\*Sinus (= hypoflexus) measured on the occlusal surface (w: 25)*: **(0)** absent or small; **(1)** short (less than half-width of the tooth); **(2)** about 1/2 of the width of the tooth; **(3)** about 2/3 of the width; **(4)** longer, occupies the whole width or nearly the whole width.

57. *Posteroconule (= posterostyle) (w: 100)*: **(0)** absent; **(1)** present.

58. *\*Posteroloph (w: 50)*: **(0)** long; **(1)** short (half width of the tooth or less); **(2)** reduced buccally.

59. *Posteroloph connections on unworn or weakly worn teeth (w: 100)*: **(0)** free (without connection either to metacone or to hypocone; **(1)** connected to hypocone / posterocone; **(2)** connected both to hypocone and metacone; **(3)** connected to metaloph and hypocone; **(4)** connected to metaloph only, at the posterocone level; **(5)** connected to metacone and metaloph.

60. *Additional posterosyncline (SV) on DP4 (w: 100)*: **(0)** absent; **(1)** present.

61. *Upper DP4 with additional short buccolingual crest or cusp, mesial to the metacone and metaloph (w: 100)*: **(0)** absent; **(1)** present.

***Upper premolar features***

62. *\*P4 size (w: 50)*: **(0)** P4 clearly smaller than M1; **(1)** P4 slightly smaller to subequal to M1; **(2)** P4 longer than M1.

63. *Parastyle (w: 100)*: **(0)** absent; **(1)** present.

64. *Size of parastyle (w: 100)*: **(0)** strong; **(1)** very strong; **(2)** weak / slender.

65. *\*State of anteroloph (w: 50)*: **(0)** low, cingular, and weak; **(1)** higher, generally connected to the preprotocrista, and short (half-width of the tooth or less); **(2)** like (1), but very short.

66. *Anterostyle (w: 100)*: **(0)** absent or indistinct; **(1)** present.

67. *Size of the anterostyle (w: 100)*: **(0)** strong; **(1)** small, reduced.

68. *\*Syncline I (SI) on P4 (w: 50)*: **(0)** always present; **(1)** variably present; **(2)** absent.

69. *\*Occurence of SI in strongly semihypsodont species (w: 50)*: **(0)** always present; **(1)** present from unworn to average-worn teeth; **(2)** absent since early stages of wear.

70. *State of SI on P4 (w: 100)*: **(0)** a more or less long furrow distally to the mesial cingulum; **(1)** shallow flexus more or less long, distal to the anteroloph; **(2)** deeper flexus, more or less long, distal to the anteroloph; **(3)** reduced to a short flexus or an islet on semihypsodont teeth.

71. *Postparacrista of P4 (posterior arm of paracone) (w: 100)*: **(0)** absent or indistinct; **(1)** present.

72. *Strength of postparacrista (w: 100)*: **(0)** weak; **(1)** strong.

73. *Postparacrista connection with the mesostyle (w: 100)*: **(0)** absent; **(1)** present.

74. *Protoloph (= protolophule I) (w: 100)*: **(0)** absent; **(1)** present and distinct from the anteroloph; **(2)** protoloph indistinct (fused) to the anteroloph, as seen on unworn teeth.

75. *\*State of protoloph on P4 (w: 50)*: **(0)** buccal part only; **(1)** lingual and buccal parts separated; **(2)** complete and continuous.

76. *\*Protoloph lingual connection (or directed to if incomplete) (w: 33)*: **(0)** both to the anterostyle (or anteroloph) and the preprotocrista; **(1)** to the preprotocrista (anterior arm of protocone); **(2)** to the protocone; **(3)** to the postprotocrista or / and to the mure.

77. *\*Paraconule (w: 50)*: **(0)** present; **(1)** reduced or indistinct.

78. *\*Shape of the paraconule (w: 50)*: **(0)** large and swollen; **(1)** strong and protruding mesially , reaching or not the mesial border of the tooth); **(2)** small.

79. *protocone (w: 100)*: **(0)** swollen; **(1)** tip more or less sharp and base more or less swollen; **(2)** as (1) + more or less compressed mesio-distally; **(3)** stretched, more or less obliquely, from the anteroloph (more or less compressed mesiolingual to distobuccal).

80. *Mesostyle (w: 100)*: **(0)** absent; **(1)** present.

81. *\*Mesostyle strength (w: 50)*: **(0)** strong; **(1)** small; **(2)** indistinct to absent.

82. *\*Premetacrista (anterior arm of metacone) (w: 50)*: **(0)** present; **(1)** nearly indistinct even on weakly to moderately worn teeth; **(2)** absent.

83. *Strength of premetacrista (w: 100)*: **(0)** strong; **(1)** weak.

84. *Premetacrista connection with the mesostyle (w: 100)*: **(0)** absent (on unworn or weakly worn teeth of semi-hypsodont species); **(1)** present since early stages of wear.

85. *Central loph on P4 (w: 100)*: **(0)** absent; **(1)** present.

86. *State of central loph (w: 100)*: **(0)** mesoloph only; **(1)** mesolophule only; **(2)** both, but separated; **(3)** complete mesoloph + mesolophule.

87. *\*Height of central loph (w: 50)*: **(0)** low; **(1)** high, but lower than the protoloph and metaloph; **(2)** as high as the other lophs.

88. *\*Mesoloph lingual connection on P4 (w: 50)*: **(0)** no lingual connection; **(1)** joining the mesocone when present or to the middle of the mure; **(2)** joining the buccal extremity of the prehypocrista, this being connected or not to the mure.

89. *P4 metacone (w: 100)*: **(0)** absent; **(1)** present.

90. *Shape of metacone (w: 100)*: **(0)** swollen rounded; **(1)** tip sharp and base swollen; **(2)** buccolingually stretched to the metaloph, but still protruding; **(3)** buccolingually stretched and merged within the metaloph; **(4)** stretched mesiobuccal to distolingual.

91. *Strength of the metacone on P4 (w: 100)*: **(0)** smaller than the paracone; **(1)** as strong (or stronger) to the paracone.

92. *Metastyle on P4 (w: 100)*: **(0)** absent; **(1)** present.

93. *\*State of metastyle on P4 (w: 50)*: **(0)** strong; **(1)** small; **(2)** reduced.

94. *\*Metaconule (w: 50)*: **(0)** absent (or indistinct from a thickening of the metaloph); **(1)** one metaconule present (well distinct); **(2)** metaconule doubled.

95. *Shape of metaconule (w: 100)*: **(0)** swollen (as a swelling of the metalophule I and / or the metalophule II); **(1)** stretched mesio-distally.

96. *\*Metalophule I (mesial metaloph, connecting the metacone either to the protocone or to the prehypocrista) (w: 50)*: **(0)** absent; **(1)** variably present; **(2)** present.

97. *\*Shape of metalophule I on P4 (w: 33)*: **(0)** reduced to a short element of the buccal part; **(1)** low and discontinuous, buccal part only or lingual only; **(2)** buccal + lingual part with interruptions; **(3)** complete and continuous.

98. *Metalophule II (distal metaloph connecting the metacone either to the hypocone, the posthypocrista or the posteroloph) (w: 100)*: **(0)** absent; **(1)** present.

99. *\*Connections of the metalophule II (w: 33)*: **(0)** joining the metaconule only or / and to the ostprotocrista; **(1)** weak connection with the hypocone; **(2)** strong connection to the hypocone; **(3)** joining both posteroloph and hypocone; **(4)** joining the posteroloph, since early stages of wear.

100. *Presence of posteroflexus (SIV) on P4 (w: 100)*: **(0)** absent; **(1)** present.

101. *Synclines IV (posteroflexus) on P4 (w: 100)*: **(0)** open buccally; **(1)** closed buccally.

102. *\*Buccolingual length of the posterosyncline SIV (w: 50)*: **(0)** long; **(1)** moderately long; **(2)** reduced (short).

103. *\*Shape of posterosyncline (SIV) on P4 (w: 33)*: **(0)** transverse (linguobuccal); **(1)** oblique (mesiobucco - distolingual); **(2)** arched; **(3)** small oval to circular islet.

104. *Additional posterosyncline (SV) on P4 (w: 100)*: **(0)** absent; **(1)** present, at least on some teeth.

105. *\*hypocone (w: 50)*: **(0)** minute; **(1)** present.

106. *\*Size of hypocone compared to that of protocone (w: 50)* : **(0)** smaller; **(1)** as large as protocone; **(2)** stronger than protocone.

107. *Height of hypocone compared to that of protocone (w: 100)*: **(0)** lower; **(1)** as high.

108. *Shape of hypocone (w: 100)*: **(0)** rounded; **(1)** swollen and tip sharp; **(2)** tip of hypocone a little stretched mesio-distally; **(3)** more or less compressed mesio-distally at the upper part of the crown: low to moderate wear producing a triangular occlusal surface; **(4)** stretched, more or less obliquely, from the prehypocrista.

109. *Presence of endoloph (w: 100)*: **(0)** absent; **(1)** present.

110. *State of endoloph on P4 (w: 100)*: **(0)** true endoloph = loph connecting the tops of the protocone and hypocone; **(1)** crest resulting from more or less oblique-buccally spurs developed one from the distal flank of the protocone and / or from the mesial flank of the hypocone.

111. *Length of endoloph on P4 (w: 100)*: **(0)** minute; **(1)** short.

112. *Height of endoloph (w: 100)*: **(0)** low; **(1)** high.

113. *\*Mure (w: 33)*: **(0)** absent; **(1)** low, more or less continuous mesio-distal crista between the protoloph and the metalophule I; **(2)** sketched out; **(3)** present; **(4)** present, and close to / or undistinct from the lingual border of SII.

114. *\*State of the mure (w: 50)*: **(0)** complete; **(1)** variably interrupted; **(2)** always interrupted (on unworn and weakly worn teeth at least).

115. *\*Sinus (measured on the occlusal surface) (w: 20)*: **(0)** absent or incipient (= very short); **(1)** short labio-lingually (less than half-width); **(2)** about half-width of the tooth; **(3)** long labio-lingually, more than half-width to 2/3 width; **(4)** long labio-lingually about 4/5 of the width of the teeth; **(5)** longer occupies the whole width or nearly the whole width.

116. *\*Posteroconule (w: 50)*: **(0)** absent or indistinct; **(1)** weak and underlined by a short posterosinus; **(2)** well-defined.

117. *\*Presence of posteroloph on P4 (w: 50)*: **(0)** present; **(1)** variably present; **(2)** absent.

118. *\*Posteroloph (w: 50)*: **(0)** long; **(1)** moderately long to short (half width of the tooth or less); **(2)** posteroloph reduced buccally.

119. *Posteroloph connections (w: 100)*: **(0)** connected to hypocone; **(1)** free (without connection with the metacone and the hypocone); **(2)** connected both to hypocone and metacone (at least joined to its base); **(3)** connected to hypocone and lingual end of metaloph, and separated from metacone (at least on unworn or weakly worn strongly hypsodont species); **(4)** connected to metacone and metaloph, and separated from hypocone, only at least on unworn or weakly worn teeth.

***Upper molars features***

120. *\*Length of M1 relative to M2 (w: 50)*: **(0)** M1 clearly shorter than M2; **(1)** slightly shorter or equal to M2; **(2)** M1 slightly longer than M2.

121. *\*Length of M3 (w: 50)*: **(0)** M3 > M2; **(1)** M3 = M2; **(2)** M3 < M2.

122. *Parastyle (w: 100)*: **(0)** present (variably or always); **(1)** absent.

123. *Size of parastyle on M1-M2 (w: 100)*: **(0)** strong; **(1)** weak.

124. *Length of anteroloph (w: 100)*: **(0)** short (half-width to less than half-width of the tooth); **(1)** longer than half-width of the tooth.

125. *Anterostyle (w: 100)*: **(0)** absent or undistinct; **(1)** present.

126. *Size of the anterostyle (w: 100)*: **(0)** strong; **(1)** small, reduced.

127. *Presence of a preprotocrista on M1-M2 (w: 100)*: **(0)** absent; **(1)** present.

128. *State of the preprotocrista on strongly hypsont species (w: 100)*: **(0)** distinct; **(1)** indistinct.

129. *Postparacrista (posterior arm of the paracone) (w: 100)*: **(0)** absent; **(1)** present.

130. *Strength of postparacrista (w: 100)*: **(0)** strong; **(1)** weak.

131. *\*Postparacrista connection with the mesostyle (w: 50)*: **(0)** absent; **(1)** variably present; **(2)** present.

132. *\*Paraconule (w: 50)*: **(0)** present; **(1)** reduced; **(2)** absent.

133. *Position of paraconule on DP4 and upper molars (w: 100)*: **(0)** at the mesial edge; **(1)** away from the mesial edge, and not protruding from the protoloph position; **(2)** protruding mesially from the protoloph position, at least on a part of the population.

134. *Shape of the paraconule (w: 100)*: **(0)** swollen; **(1)** stretched - at least protruding - distomesially; **(2)** stretched bucco-lingually within the protoloph.

135. *protocone (w: 100)*: **(0)** inflated - swollen; **(1)** tip more or less sharp and base more or less swollen; **(2)** tip protruding (on weakly worn teeth) and a little stretched mesio-distally; **(3)** as (1) and more or less pinched mesio-distally; **(4)** obliquely stretched from the anteroloph, more or less compressed mesiolingual to distobuccal.

136. *\*Protoloph connections on molars (w: 33)*: **(0)** to the anterostyle or anteroloph; **(1)** to the preprotocrista; **(2)** to the protocone (or directed to the protocone if the lingual part of protoloph is missing); **(3)** to the postprotocrista or to the mure.

137. *Mesostyle (w: 100)*: **(0)** absent; **(1)** present.

138. *\*Position of mesostyle on DP4 and molars (w: 50)*: **(0)** on the buccal edge of the crown; **(1)** close to the mesio-distal paracone-metacone line, but slightly buccal; **(2)** at the mesio-distal line joining paracone to metacone.

139. *\*Strength of mesostyle (w: 50)*: **(0)** strong; **(1)** small; **(2)** indistinct/absent.

140. *Premetacrista (anterior arm of metacone) (w: 100)*: **(0)** absent; **(1)** present.

141. *Strength of premetacrista (w: 100)*: **(0)** strong; **(1)** weak.

142. *\*Premetacrista connection with the mesostyle (w: 50)*: **(0)** absent, at least on weakly to moderately worn teeth; **(1)** variably present; **(2)** present.

143. *Additional cusp / short buccolingual crest mesial to the metacone, from the premetacrista or isolated (w: 100)*: **(0)** absent; **(1)** present.

144. *Mesoloph (w: 100)*: **(0)** absent; **(1)** present.

145. *Mesolophule (w: 100)*: **(0)** absent; **(1)** present.

146. *\*State of mesoloph + mesolophule (w: 50)*: **(0)** short; **(1)** both, separated; **(2)** both, making a continuous loph.

147. *\*Height of mesoloph (w: 50)*: **(0)** low; **(1)** high but lower than the protoloph and metaloph; **(2)** as high than other lophs.

148. *Mesoloph lingual connections (w: 100)*: **(0)** free; **(1)** joining elements (spurs, crestids) from the protoloph or of the metalophule I, or from the bottom of the central basin; **(2)** connected to the buccal extremity of the mesolophule.

149. *Mesolophule lingual connection (w: 100)*: **(0)** connected to the mesocone when present or to the middle of the mure; **(1)** connected to the mesial extremity of the prehypocrista, connected or not with the mure; **(2)** connected to a swelling of the extremity of the prehypocrista connecting the mure.

150. *Metacone (w: 100)*: **(0)** less developed than the paracone; **(1)** as strong than the paracone.

151. *\*Ectocingulum: low buccal cingulum, developed mesially and distally from the mesostyle, on the distal flanks of paracone and metacone, more or less long, on upper teeth (w: 50)*: **(0)** absent; **(1)** variably present; **(2)** always present.

152. *\*State of ectocingulum on molars (w: 50)*: **(0)** very short cingulae, discontinuous, close to the mesostyle; **(1)** cingulum longer, but not connected with the parastyle and posterololoph ; **(2)** cingulum long, connected both with the mesostyle, the pre and postprotocristae, the pre and postmetacristae, the parastyle and posteroloph.

153. *Shape of paracone and metacone (w: 100)*: **(0)** swollen; **(1)** tip sharp, base swollen; **(2)** bucco-lingually stretched but well-defined; **(3)** merged with the protoloph and metaloph; **(4)** metacone stretched from mesiobuccal to distolingual; **(5)** paracone and metacone slightly stretched mesio-distally.

154. *\*Metaconule (w: 50)*: **(0)** doubled metaconule (always or variably); **(1)** one metaconule present; **(2)** absent.

155. *Size of metaconule II (w: 100)*: **(0)** strong; **(1)** small, reduced.

156. *Shape of metaconule II (w: 100)*: **(0)** swollen; **(1)** swollen and tip sharp; **(2)** prolonged in two oblique opposite short crests; **(3)** protruding and streched distally; **(4)** protruding mesially.

157. *Size of metaconule relative to paraconule (w: 100)*: **(0)** stronger; **(1)** equal; **(2)** lower.

158. *Metalophule I (mesial part of metaloph) (w: 100)*: **(0)** absent or vestigial; **(1)** present.

159. *\*State of metalophule I (w: 50)*: **(0)** low, buccal part only or discontinuous crestules; **(1)** buccal + lingual part, with interruptions, or lingual only; **(2)** complete and continuous.

160. *\*Metalophule I lingual connection (w: 33)*: **(0)** attached or directed to the protocone; **(1)** attached both to the protocone and the prehypocrista; **(2)** generally confluent to the metalophule II lingually, and both attached to the hypocone; **(3)** attached to the hypocone; **(4)** metalophule I connected variably to the end of the prehypocrista.

161. *\*Metalophule II (distal metaloph) (w: 50)*: **(0)** absent; **(1)** reduced to a short buccal part between metacone and metaconule positions; **(2)** present.

162. *Shape of metalophule II (w: 100)*: **(0)** more or less sinuous, irregularly ornamented; **(1)** straight bucco-lingually or a little regularly curved; **(2)** postwardly oblique, straight, or angulated.

163. *\*Connections of metalophule II (w: 25)*: **(0)** strong junction to the hypocone / to the prehypocrista; **(1)** broken lingually to the metaconule, or weak junction to the hypocone; **(2)** variably connected to both hypocone and posteroloph; **(3)** connected to the posteroloph / posterocone or ending free; **(4)** indistinct from the posteroloph.

164. *Syncline I (SI) on molars (w: 100)*: **(0)** present (at least on unworn or weakly worn hypsodont teeth); **(1)** present and divided in two unequal elements by a mesio-distal crest on some of the teeth; **(2)** absent or incipient; **(3)** indistinct since early stage of wear on hypsodont species.

165. *State of mesoflexus (w: 100)*: **(0)** undivided mesoflexus (SII and SIII undifferenciated; **(1)** mesoflexus shortly divided buccally (SII and SIII widely confluent); **(2)** mesoflexus fractioned by the buccal mesoloph and additional crests; **(3)** SII and SIII distinct; **(4)** SII vestigial to absent and SIII present.

166. *\*States of SII (when distinct) (w: 50)*: **(0)** open buccally; **(1)** variably closed buccally; **(2)** always closed buccally.

167. *\*State of SIII when distinct from SII (w: 50)*: **(0)** open buccally; **(1)** variably closed buccally; **(2)** always closed buccally.

168. *Depth of SII and SIII (SII + SIII when indistinct) (w: 100)*: **(0)** shallow; **(1)** deep in their whole width; **(2)** deeper lingually than buccally.

169. *Relative depth of SIII and SII (w: 100)*: **(0)** equally deep; **(1)** SII less deep than SIII; **(2)** SIII less deep than SII.

170. *\*Length of SIV on M1-M2 (w: 25)*: **(0)** weak (very shallow); **(1)** long and well individualized; **(2)** short; **(3)** reduced to an islet; **(4)** inidstinct to absent.

171. *Syncline IV (SIV) on molars (w: 100)*: **(0)** transverse (buccolingual); **(1)** oblique (mesiobucco to distolingual).

172. *State of Syncline IV (posteroflexus) (w: 100)*: **(0)** open buccally at least on unworn or weakly worn teeth; **(1)** closed buccally since early stages of wear.

173. *\*Additional posterosyncline (SV) on upper molars (w: 33)*: **(0)** absent; **(1)** sketched on a few teeth; **(2)** variably present; **(3)** always present.

174. *hypocone (w: 100)*: **(0)** absent; **(1)** present.

175. *Position of hypocone on upper M1-M2 (w: 100)*: **(0)** lingual to protocone; **(1)** same level of slightly buccal to protocone.

176. *\*Size of hypocone (w: 50)*: **(0)** smaller and lower than the protocone; **(1)** smaller but as high than the protocone; **(2)** as elevated and long as the protocone.

177. *Shape of hypocone (w: 100)*: **(0)** bulbous; **(1)** swollen and tip sharp; **(2)** tip sharp and base more or less stretched mesio-distally; **(3)** more or less crescent-shaped wear surface of the protocone, due to the flattening of its buccal slope; **(4)** id, (3) + lingual side pinched mesio-distally; **(5)** id. (3) + protocone obliquely stretched from the prehypocrista.

178. *\*When hypocone is obliquely stretched to the prehypocrista (w: 50)*: **(0)** resulting crest making clear angle with the cebtral loph at the level of the mure; **(1)** resulting crest regularly curved, with smooth angles with the central loph or/and more lingually; **(2)** resulting crest regularly curved without angles.

179. *\*Endoloph (w: 50)*: **(0)** present; **(1)** variably present; **(2)** absent.

180. *State of endoloph on M1-M2 (w: 100)*: **(0)** true endoloph (mesiodistal crest connecting protocone and hypocone); **(1)** resulting from two oblique (linguodistally) spurs, one on the distal flank of the protocone, the other on the mesial flank of the hypocone; **(2)** only one mesiodistal to slightly oblique linguodistally spur from the protocone; **(3)** one oblique linguodistally spur, and additional low margino-lingual cingulum; **(4)** short mesiodistal crest between the protocone and the level of the prehypocrista mesial extremity.

181. *Height of endoloph (w: 100)*: **(0)** low; **(1)** high but not reaching the occlusal surface on unworn or weakly worn molars; **(2)** high.

182. *\*Mure (w: 50)*: **(0)** absent; **(1)** sketched; **(2)** present.

183. *Shape of the mure (w: 100)*: **(0)** more or less continuous low mesio-distal crista between the protoloph and the metalophule I ("pseudo-mure"); **(1)** joining the postprotocrista and prehypocrista extremities; **(2)** addition of a more or less long crest between these extremities.

184. *State of mure (w: 100)*: **(0)** interrupted; **(1)** continuous.

185. *Height of mure (w: 100)*: **(0)** lower than protocone and hypocone; **(1)** as high as the protocone and hypocone.

186. *"Mesocone" = swelling of the prehypocrista (w: 100)*: **(0)** absent; **(1)** present.

187. *\*Sinus = hypoflexus (measured on the occlusal surface) (w: 20)*: **(0)** absent or reduced; **(1)** shorter labio-lingually than half-width of the tooth; **(2)** equal or slightly longer than half-width of the tooth; **(3)** clearly longer (between 2/3 and 3/4 labio-lingually until average stages of wear; **(4)** about 3/4 to 4/5 of the width; **(5)** occupies nearly or completely the whole width.

188. *Posteroconule (w: 100)*: **(0)** absent; **(1)** present.

189. *Short posterosinus underlining the posteroconule (w: 100)*: **(0)** absent; **(1)** present.

190. *\*Posteroloph (w: 50)*: **(0)** long; **(1)** short (half width of the tooth); **(2)** reduced buccally.

191. *Posteroloph connections (w: 100)*: **(0)** free (without connection either to metacone or to hypocone); **(1)** connected to hypocone (posthypocrista) directly or via the posterocone; **(2)** connected both to hypocone and metacone (at least at its base); **(3)** to the lingual end of metaloph and hypocone (posthypocrista) via the posterocone when present, and separated from metacone; **(4)** connected to metacone and metaloph, and separated from hypocone, at least on unworn or weakly worn teeth.

**Lower teeth features**

192. *\*Length of lower incisors (w: 50)*: **(0)** ending distally to m3; **(1)** ending below m3 or slightly distally; **(2)** ending mesially to m3.

193. *\*Lower dp4 size (w: 25)*: **(0)** smaller than m1; **(1)** subequal to m1; **(2)** slightly longer than m1 (1Lm1< Ldp4 < 1.24m1); **(3)** longer than m1 (1.25 Lm1 < Ldp4 < 1.49 m1); **(4)** strongly longer than m1 (1.5 Lm1 < Ldp4 < 1.75m1).

194. *\*Length of p4 relative to m1 (w: 33)*: **(0)** shorter; **(1)** slightly shorter; **(2)** equal or slightly longer; **(3)** clearly longer.

195. *\*Size of m1 relative to m2 (w: 50)*: **(0)** shorter; **(1)** equal or slightly shorter; **(2)** longer.

196. *\*Length of m3 relative to m2 (w: 50)*: **(0)** longer; **(1)** equal; **(2)** shorter.

197. *\*Metaconid-protoconid width compared to entoconid-hypoconid width on dp4 and p4 (w: 50)*: **(0)** strongly narrower; **(1)** slightly narrower; **(2)** as wide.

***Mesial border of the tooth***

198. *Anteroconid on dp4 (w: 100)*: **(0)** absent; **(1)** present, variably or always.

199. *Number of anteroconids on dp4 (w: 100)*: **(0)** one; **(1)** two, at least.

200. *Anteroconid on p4 (w: 100)*: **(0)** absent or indistinct; **(1)** present (variably or always).

201. *\*Anteroconid on m1, m2 (w: 50)*: **(0)** absent; **(1)** variably (not always) present; **(2)** present.

202. *\*Position of anteroconid on dp4, when there is one anteroconid, and of the larger when there are two or more (w: 50)*: **(0)** mesio-lingual; **(1)** mesio-median; **(2)** mesio-buccal.

203. *\*Position of anteroconid on p4 (w: 50)*: **(0)** mesiobuccal, closer to the protoconid than to the metaconid; **(1)** mesio-median; **(2)** mesio-lingual, closer to the metaconid than to the protoconid.

204. *\*Position of anteroconid on m1-m2 (w: 50)*: **(0)** mesiolingual; **(1)** medial; **(2)** mesiobuccal.

205. *Size of anteroconid on p4 (w: 100)*: **(0)** large; **(1)** small.

206. *\*Size of anteroconid on m1, m2 (w: 50)*: **(0)** minute; **(1)** moderate; **(2)** strong.

207. *State of anterolophid on dp4 (w: 100)*: **(0)** absent; **(1)** present.

208. *\*Anterolophid on molars (w: 50)*: **(0)** absent; **(1)** variably present; **(2)** present.

209. *Height of anterolophid on molars (w: 100)*: **(0)** low; **(1)** high.

210. *Mesiobuccal cingulid on p4 (w: 100)*: **(0)** absent; **(1)** present.

211. *Mesiobuccal cingulid, developed buccally from the anteroconid or anterolophid on m1, m2 (w: 100)*: **(0)** absent, or very reduced; **(1)** present.

212. *\*Anterolophulid (connecting the anteroconid to the metalophid I) on m1, m2 (this is a lophid distinct of wrinkles) (w: 50)*: **(0)** absent to indistinct; **(1)** variably present; **(2)** always present.

213. *Antesinusid on dp4 (w: 100)*: **(0)** absent, or slightly developed; **(1)** present.

214. *Antesinusid on p4 (w: 100)*: **(0)** absent; **(1)** present.

215. *\*Antesinusid on m1, m2 (w: 50)*: **(0)** absent; **(1)** small or reduced; **(2)** present.

***Anterior part of the tooth***

216. *Occurence of distinct synclinids from the metalophid area to the posterolophid on dp4 (w: 100)*: **(0)** absent; **(1)** present.

217. *\*Synclinid I (= SI, entoflexid mesial to the metalophid I) on dp4 (w: 50)*: **(0)** absent (or sketched if the metalophid is incomplete, and oblique); **(1)** variably present; **(2)** present.

218. *State of SI on dp4 (w: 100)*: **(0)** incomplete; **(1)** complete.

219. *Depth (buccolingual) of antesinusid on dp4 (w: 100)*: **(0)** shallow; **(1)** deep.

220. *Closure of SI on dp4 (w: 100)*: **(0)** closed lingually (with a crestid from -at least- the anteroconid to the mesostylid); **(1)** open lingually, mesial to the metaconid ; **(2)** open lingually and buccally; **(3)** closed lingually and buccally, open mesially; **(4)** closed mesially, buccally and lingually; **(5)** closed mesially, buccally and lingually, and subdivided by additional crestids.

221. *Position of SI on dp4 (w: 100)*: **(0)** lingual; **(1)** whole width of the "prelobe".

222. *\*SI at least on unworn to moderately worn m1, m2 (w: 50)*: **(0)** absent, or as a short lingual notch; **(1)** variably present; **(2)** always present.

223. *\*Relationship SI / SII on dp4 (w: 50)*: **(0)** separated; **(1)** connected only on unworn or weakly worn teeth; **(2)** connected.

224. *Position of the SI on m1-m2 (w: 100)*: **(0)** along the mesial margin of the teeth; **(1)** in the buccal half of the teeth; **(2)** in the lingual one/third of the teeth.

225. *Shape of the SI on m1-m2 (w: 100)*: **(0)** shallow and narrow; **(1)** SI relatively deep, thus well-defined, even on moderately worn hypsodont teeth; **(2)** reduced to a mesiolingual notch; **(3)** reduced to a mesial notch; **(4)** SI as a shallow mesiolingual islet; **(5)** shallow buccally; prolonged and divided lingually by small crestids.

226. *\*Occurrence of mesiolingual SI on hypsodont molars (m1-m2) (w: 50)*: **(0)** on less than 50% of the teeth; **(1)** between 51 to 90% of the teeth; **(2)** 95 to 100% of the teeth.

227. *Additional synclinid(s) mesial to SI on dp4 (w: 100)*: **(0)** absent; **(1)** present.

228. *Additional pre-anterosyncline (S0) on lower p4 and molars (w: 100)*: **(0)** absent; **(1)** present.

229. *Relative position of the protoconid and metaconid on dp4 (w: 100)*: **(0)** well distinct; **(1)** nearly or completely fused mesially.

230. *\*Position of metaconid on dp4 (w: 50)*: **(0)** lingual; **(1)** mesiolingual; **(2)** clearly mesial.

231. *Shape of metaconid with respect to protoconid on dp4 (w: 100)*: **(0)** swollen; **(1)** stretched in linguobuccal crestids; **(2)** stretched in mesiodistal crestids; **(3)** metaconid and protoconid stretched in oblique crestids.

232. *\*Development of the protoconid on p4 (w: 50)*: **(0)** present, strong and much more developed than the hypoconid; **(1)** present and clearly weaker than the hypoconid; **(2)** present and well developed (as high as the hypoconid).

233. *\*State of mesial notch between protoconid and metaconid on p4 (w: 50)*: **(0)** absent; **(1)** notch medial; **(2)** notch lingual, closer to the metaconid than to the protoconid.

234. *\*Metaconid on lower molars (w: 50)*: **(0)** strongly higher than the entoconid; **(1)** slightly higher than the entoconid; **(2)** equally elevated as the other main cuspids.

235. *Shape of the protoconid on dp4 (w: 100)*: **(0)** rounded, tip more or less sharp; **(1)** crestiform mesiodistally, weakly prominent; **(2)** as (1) + a little pinched mesiodistally; **(3)** stretched into oblique (mesiobuccal to distolingual) crestid, to the postprotocristid.

236. *Protoconid shape on p4 and m1- m2 (w: 100)*: **(0)** swollen - bulbous; **(1)** base swollen and tip sharp; **(2)** stretched mesio-distally, tip weakly prominent; **(3)** slightly mesio-distally pinched; **(4)** more or less obliquely strechted; **(5)** more or less obliquely stretched and strongly pinched mesio-distally on their buccal side.

237. *\*Metaconid and entoconid shape on lower dp4 and m1, m2 (w: 50)*: **(0)** swollen, more or less pointed; **(1)** more or less stretched linguobucally (but still protruding from the lophids); **(2)** merged in lophids.

238. *Mesio-distal crestid along the medial axis of the teeth, from the mesial lophid or conids on dp4 and p4 (w: 100)* : **(0)** absent; **(1)** present from the anterolophid to the mesolophid positions (SII); **(2)** variably present in the SI ; **(3)** variably present in S0.

239. *Lingual anteroconid (developed as a preprotoconid cuspid on molarized dp4, more or less extended in an oblique crestid parallel and mesial to the protoconid)(w: 100)*: **(0)** absent; **(1)** present.

240. *Metalophid I on dp4 (w: 100)*: **(0)** absent; **(1)** present.

241. *\*State of metalophid on dp4 (w: 50)*: **(0)** incomplete; **(1)** complete; **(2)** complete with additionnal mesio-distal crestids.

242. *Orientation of the metalophid (or neo-metalophid) on dp4 (w: 100)*: **(0)** transverse (linguobuccal) or slightly oblique ; **(1)** strongly oblique buccomesial to distolingual; **(2)** angulated (linguobuccal then distomedial to the front of the teeth); **(3)** strongly oblique linguomesial to buccodistal.

243. *Metalophid on m1-m2 (w: 100)*: **(0)** absent or incipient; **(1)** present.

244. *Position of buccal root of the metalophid on m1, m2 (w: 100)*: **(0)** on the distal flank of the protoconid (or from its posterior arm); **(1)** from the tip of the protoconid; **(2)** from the mesial flank of the protoconid, whether there is an anterior arm or not.

245. *State of metalophid on m1-m2 (w: 100)*: **(0)** short buccal lophid ; **(1)** buccal metalophid + low lingual from the tip of metaconid; **(2)** complex (buccal metalophid + lingual part mesially displaced); **(3)** high linguobuccal lophid developed from the lingual half of the complex metalophid (and therefore the lingual metalophid curves here), close to the metaconid, at least on some teeth; **(4)** complex + straight linguobuccal lophid ( = high anterolophid?) all along the mesial length of the molars, at least on some teeth.

***Central area of the tooth***

246. *Shape of the metalophid, when its buccal half is attached to the tip of the protoconid or to its mesial flank (i.e., except metalophulid II) (w: 100)*: **(0)** irregular, low, straigfht or gently curved; **(1)** angle between lingual and buccal halves; **(2)** high and regularly straight or nearly straight.

247. *\*Mesio-distal crestids along the medial axis of the teeth on m1, m2 (in strongly semi-hypsodont species, visible only on unworn teeth) (w: 50)*: **(0)** absent; **(1)** some, rare; **(2)** high and strong.

248. *Presence and number of mesio-distal well-individualized additional crestids from the lingual end of the buccal metalophulid I into the talonid basin, or more lingually from this metalophulid I on m1, m2 (w: 100)*: **(0)** absent; **(1)** one crestid present, low, short, close to the mesio-distal axis; **(2)** one or two crestids individualized, and strong, close to the mesio-distal axis; **(3)** one or two spurs, variably localized from the metalophulid I: from its lingual part and directed obliquely to the lingual border, or from the mesio-distal axis and straight postward.

249. *Postprotocristid on dp4, p4 and m1, m2 (w: 100)*: **(0)** absent or indistinct; **(1)** present.

250. *\*Length of posprotocristid on dp4, p4 and m1, m2 (w: 50)*: **(0)** short; **(1)** long, but not reaching the lingual 1/2 of the teeth; **(2)** long, reaching the 1/2 to 2/3 of the teeth.

251. *Posprotocristid orientation on dp4, p4 and m1, m2 (w: 100)*: **(0)** more or less transverse bucco-lingually; **(1)** oblique bucco-distally.

252. *\*Ectolophid on p4 and m1, m2 (w: 50)*: **(0)** present; **(1)** shallow interruption, present below; **(2)** absent.

253. *\*Length of the ectolophid on p4, m1 and m2 (w. 50)*: **(0)** long; **(1)** short; **(2)** very short, reduced.

254. *Direction of the ectolophid on dp4, p4, m1 and m2 (w: 100)*: **(0)** mesiodistal, more or less straight; **(1)** oblique mesiobucco-distolingual; **(2)** oblique mesiolinguo-buccodistal.

255. *Connections of the ectolophid (as depicted on unworn or weakly worn teeth) on dp4, p4, m1 and m2 (w: 100)*: **(0)** separated from the postprotocristid (posterior arm of protoconid); **(1)** separated from the prehypocristid (anterior arm of hypoconid), at least on some unworn teeth; **(2)** connected to both even in unworn or weakly worn teeth; **(3)** interrupted between the levels of mesolophid and entolophid buccal connections.

256. *\*Position of the ectolophid on p4, m1 and m2 (w: 25)*: **(0)** in the buccal transverse half of the tooth; **(1)** close to the mesio-distal midline of the tooth; **(2)** in the lingual transverse half of the tooth; **(3)** close to (but not reaching) the lingual border of the tooth; **(4)** at the lingual border of the tooth.

257. *Mesoconid on dp4 and molars (w: 100)*: **(0)** present; **(1)** absent to indistinct.

258. *Height of the mesoconid (or neomesoconid) on dp4 and molars (w: 100)*: **(0)** salient; **(1)** weakly salient or not salient.

259. *State of mesoconid (w: 100)*: **(0)** true mesoconid (as a swelling or a well-defined cuspid); **(1)** neomesoconid.

260. *Neomesoconid position on molars (w: 100)*: **(0)** present at the junction of ectolophid and the lingual end of postprotocristid; **(1)** present at the junction of the lingual end of the entolophid with the ectolophid; **(2)** both, as thickenings of the lingual ends of mesolophid and entolophid; **(3)** addition of a pre-neomesoconid as a swelling mesial to the neomesoconid, at the junction of the entolophid with the prehypocristid.

261. *Ectomesolophid on p4 and m1, m2 (w: 100)*: **(0)** absent; **(1)** present.

262. *Length of ectomesolophid on p4, m1 and m2 (w: 100)*: **(0)** short; **(1)** long.

263. *\*Orientation of the ectomesolophid on m1 and m2 (w: 50)*: **(0)** linguo-buccal (= transverse); **(1)** variably directed (or adjoined) to the mesial base of hypoconid; **(2)** always directed or adjoined to the mesial base of hypoconid.

264. *State of mesostylid on dp4 and p4 (w: 100)*: **(0)** absent or indistinct; **(1)** present.

265. *Number of mesostylids on dp4 and p4 (w: 100)*: **(0)** one; **(1)** two or more.

266. *Size of mesostylid on dp4 and p4 (w: 100)*: **(0)** small to indistinct; **(1)** moderate to strong.

267. *\*Mesostylid on m1, m2 (w: 50)*: **(0)** present; **(1)** indistinct; **(2)** absent.

268. *Connections of mesostylid on dp4 and p4 (w: 100)*: **(0)** isolated; **(1)** connected.

269. *State of connections of mesostylid on dp4 and p4 (w: 100)*: **(0)** connected only to the lingual mesio-distal crestid (metastylid crestid and/or premetaconid crestid); **(1)** connected to the mesolophid only; **(2)** connected to lingual mesio-distal crestid (metastylid crestid and/or premetaconid crestid), in addition to the connection with the mesolophid(s).

270. *Connections of mesostylid on m1-m2 (w: 100)*: **(0)** free; **(1)** connected.

271. *State of connections of mesostylid on m1, m2 (w: 100)*: **(0)** connected to the metaconid only, generally through a metastylid crest (postmetacristid); **(1)** connected only to the mesolophid; **(2)** connected both to the mesolophid and postmetacristid.

272. *Occurence of mesolophid on dp4 (w: 100)*: **(0)** absent; **(1)** present.

273. *\*On dp4, p4, m1-2 of weakly to strongly semi-hypsodont species: relationship between central flexid (SIII when mesolophid individualized) and sinusid (w: 50)*: **(0)** separated by the ectolophid - entolophid; **(1)** shallow communication (only on unworn teeth in hypsodont species); **(2)** deep communication.

274. *State of mesolophid on lower teeth (w: 100)*: **(0)** true mesolophid; **(1)** neocrestid oblique directed (but separated) to the mesostylid from the buccal crestid between the protoconid and anteroconid on dp4; **(2)** neocrestid developed from the end of the postprotocrestid, distinct on dp4 and p4, fused all along the entolophid on molars.

275. *\*Number of mesolophids on dp4 (w: 50)*: **(0)** one; **(1)** two (1 additional more or less long lophid in the SIII); **(2)** three (two additional lophids in the SIII).

276. *State of mesolophid on dp4 (w: 100)*: **(0)** transverse (or nearly transverse) buccolingually; **(1)** oblique mesiolinguo-buccally.

277. *Occurence of mesolophid on p4, m1, m2 (w: 100)*: **(0)** absent; **(1)** present.

278. *Number of mesolophid (-s) on p4 (w: 100)*: **(0)** one; **(1)** two or more.

279. *\*Length of mesolophid on p4 and molars (w: 50)*: **(0)** mesolophulid, as a spur from the mesoconid; **(1)** short, generally less than half width of the tooth; **(2)** long, reaching the lingual border of the tooth on almost teeth, or on whole teeth.

280. *State of lingual connection of the mesolophid on dp4 (w: 100)*: **(0)** no connection; **(1)** connected to the mesostylid; **(2)** connected to the metastylid crestid.

281. *\*State of mesolophid: relationship between lingual mesolophulid and buccal mesolophid on m1-m2 (w: 50)*: **(0)** lingual "mesolophid" separated from the mesolophulid; **(1)** weakly connected (shallow breaks along the mesolophid); **(2)** completely connected, without breaks.

282. *On unworn or slightly worn m1 and m2: mesio-distal length of the synclinid between metalophulid I and entolophid (when SII and SIII are undistinct, due to the absence of mesolophid) compared to mesio-distal length of the posterosynclinid (= SIV) (w: 100)*: **(0)** SII+III longer than SIV; **(1)** SII+III length = or nearly = to SIV length.

283. *\*State of lingual mesolophid (= mesolophulid) when present on p4, and m1, m2 (w: 50)*: **(0)** absent; **(1)** present, short; **(2)** longer, connected or not (char. 260) to the mesolophulid.

***Posterior part of the tooth***

284. *Hypoconid on p4 (w: 100)*: **(0)** absent to indistinct from the entoconid; **(1)** present.

285. *Hypoconid on m1, m2 (w: 100)*: **(0)** expanded posterobuccally on m1 and m2; **(1)** nearly placed at the same buccal level than protoconid or slightly buccally.

286. *\*State of hypoconid on p4 (w: 50)*: **(0)** developed but less than the protoconid; **(1)** as large (or larger) as the protoconid.

287. *\*On dp4, p4 and m1, m2 relationships between SIV (posterosynclinid) and sinusid (ectoflexid), i.e., strength of the entolophid and / or prehypocristid (w: 50)*: **(0)** separated by the entolophid and / or the prehypocristid; **(1)** shallow communication, at least on unworn teeth; **(2)** deep communication.

288. *Distobuccal spur of the hypoconid on m1 and m2 (connected or not to the mesoconid) (w: 100)*: **(0)** absent; **(1)** present.

289. *Mesiobuccal spur of the protoconid on m1 and m2 (w: 100)*: **(0)** absent; **(1)** present.

290. *Entoconid on p4 (w: 100)*: **(0)** absent; **(1)** present.

291. *Entolophid (= hypolophid) on dp4 and p4 (w: 100)*: **(0)** absent; **(1)** present.

292. *Entolophid on m1-m2 (w: 100)*: **(0)** absent; **(1)** present.

293. *State of entolophid (= hypolophid) on dp4 and p4 (w: 100)*: **(0)** short and incomplete; **(1)** long and complete.

294. *\*Connections of the entolophid on p4 and dp4 (w: 33)*: **(0)** connected to ectolophid or mesoconid; **(1)** connected to the prehypocristid (to the hypoconid, when the ectolophid is absent, or broken distally); **(2)** connected (at least directed) to the posterolophid.

295. *\*State of entolophid on m1 and m2 (w: 50)*: **(0)** lingual part only; **(1)** two parts, lingual and buccal (prehypocristid) separated; **(2)** complete.

296. *Entolophid components on p4, dp4 and m1, m2 (w: 100)*: **(0)** single; **(1)** bifid or double.

297. *\*Entolophid connections on m1, m2 (w: 33)*: **(0)** connected to the mesoconid or ectolophid; **(1)** connected (or directed) to the end of the prehypocristid (to its junction to the ectolophid); **(2)** connected or directed to the hypoconulid / to the posthypocristid; **(3)** indistinct from / fused to the posterolophid.

298. *Shape of the entolophid (from the entoconid to its buccal connection) on m1, m2 (w: 100)*: **(0)** more or less curved backwardly; **(1)** straight; **(2)** angulated backwardly in its buccal half; **(3)** oriented forwardly.

299. *Entoconulid on the entolophid of m1, m2 (w: 100)*: **(0)** absent; **(1)** present.

300. *Hypoconulid on dp4 (seen on unworn teeth) (w: 100)*: **(0)** present; **(1)** indistinct (or absent).

301. *Shape of hypoconulid on dp4 (and p4 when hypoconulid is present) (w: 100)*: **(0)** swollen; **(1)** stretched bucco-lingually in the posterolophid.

302. *Hypoconulid on p4 (w: 100)*: **(0)** present; **(1)** absent, or indistinct.

303. *Hypoconulid on m1, m2 (w: 100)*: **(0)** present; **(1)** indistinct (or absent).

304. *Shape of hypoconulid on m1, m2 (w: 100)*: **(0)** swollen; **(1)** stretched bucco-lingually in the posterolophid; **(2)** curved mesio-linguodistally.

305. *Connections of the hypoconulid on molars (w: 100)*: **(0)** isolated; **(1)** connected.

306. *Relationship between the hypoconulid and the posthypocristid on m1-m2 (w: 100)*: **(0)** on unworn m1-m2, hypoconulid separated from (or weakly connected to) the poshypocristid; **(1)** strongly connected to the poshypocristid.

307. *Elements of the hypoconulid on dp4 (w: 100)*: **(0)** single; **(1)** divided in two or three elements.

308. *\*Posterolophid on dp4 and p4 (w: 50)*: **(0)** absent or reduced; **(1)** moderately developed; **(2)** present.

309. *Posterolophid on m1, m2 (w: 100)*: **(0)** absent; **(1)** present.

310. *State of the posterolophid on dp4, p4 (when present) and m1, m2 (w: 100)*: **(0)** free buccally and lingually; **(1)** connected.

311. *Posterolophid connections, as seen on unworn or weakly worn teeth on dp4, p4 (when present) and m1, m2 (w: 100)*: **(0)** connected to the hypoconid and separated from the entoconid, or merged in its base; **(1)** connected only to the entoconid; **(2)** connected to both the entoconid and hypoconid.

312. *On dp4, additional lingual cuspid/crestid mesial to the lingual end of the posterolophid or isolated in the posterosynclinid (w: 100)*: **(0)** absent; **(1)** present.

313. *Length of the additional lingual cuspid/crestid mesial to the lingual end of the posterolophid on dp4 (w: 100)*: **(0)** reduced to a cuspid; **(1)** short linguobuccal lophid; **(2)** lophid connected to the posthypocristid, dividing the posteroflexid (SIV) in two separate flexids.

314. *Surface of the talonid basins on m1, m2 (w: 100)*: **(0)** smooth; **(1)** rugose, or with low wrinkles; **(2)** wrinkles along the crestids and lophids; **(3)** in addition with (2), clear small ridges,somewhat convergent in the basins; **(4)** reticulate.

315. *State of wrinkles and low cristids on m1 and m2 (w: 100)*: **(0)** rare; **(1)** numerous.