

Subfamily Archaeomyinae

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Discussion. – STEHLIN identified the teeth of this species as *Issiodoromy quercyi* SCHLOSSER 1884 (1928, labels). THALER (1966, p. 203) – with doubts – HUGUENEY (1969, p. 200, Fig. 116) and VIANEY-LIAUD (1976, p. 60, 67 and 69, Table 16d, Fig. 34 and 1979, p. 215 and 227) were of the same opinion. Nevertheless, a painstaking preparation of the material permitted its separation as a new species.

Measurements in the Tables 39–40.

Table 40: Measurements of the lower cheek teeth of *Oensingenomys huerzelei* n. sp. from Boningen (Switzerland)

Tooth	SW	N		range	\bar{X}	S	V
P ₄	3	2	Sinusid height	0,92–1,58	1,25	0,47	–
		2	Length	1,83–2,08	1,96	0,18	9,04
		2	Width	1,42–1,50	1,46	0,06	3,87
		2	Sinusid length	–	0,83	–	–
		2	Extrasinusid distance	0,42–0,58	0,50	0,11	–
		2	Crown height	1,58–2,00	1,79	0,30	16,59
P ₄	4	1	Sinusid height	–	1,25	–	–
		1	Length	–	–	–	–
		1	Width	–	1,58	–	–
		1	Sinusid length	–	0,83	–	–
		1	Extrasinusid distance	–	0,50	–	–
		1	Crown height	–	–	–	–
M _{1/2}	2	1	Sinusid height	–	3,00	–	–
		1	Length	–	2,75	–	–
		1	Width	–	1,92	–	–
		1	Sinusid length	–	1,17	–	–
		1	Extrasinusid distance	–	0,75	–	–
		1	Crown height	–	3,25	–	–
M _{1/2}	3	2	Sinusid height	1,92–2,92	2,42	0,71	–
		2	Length	2,42–2,50	2,46	0,06	2,30
		2	Width	–	1,83	–	–
		2	Sinusid length	1,08–1,17	1,13	0,06	5,66
		2	Extrasinusid distance	–	0,75	–	–
		2	Crown height	2,17–3,17	2,67	0,71	–
M _{1/2}	4	7	Sinusid height	1,17–2,50	1,77	0,56	–
		7	Length	2,33–2,75	2,50	0,15	5,88
		7	Width	1,75–2,08	1,89	0,12	6,09
		7	Sinusid length	1,08–2,25	1,38	0,41	–
		7	Extrasinusid distance	0,42–0,83	0,62	0,13	–
		6	Crown height	1,58–3,00	2,25	0,56	–
M ₃	3	2	Sinusid height	2,17–2,75	2,46	0,41	16,67
		2	Length	2,42–2,67	2,55	0,18	6,95
		2	Width	–	2,00	–	–
		2	Sinusid length	1,00–1,08	1,04	0,06	5,44
		2	Extrasinusid distance	0,50–0,75	0,63	0,18	–
		1	Crown height	–	3,17	–	–

Subfamily *Archaeomyinae* LAVOCAT 1952

Genus *Toeniodus* POMEL 1854

Synonymy. –

1854 *Toeniodus* POMEL, p. 36 (correct original spelling Art. 32 cii).

1859 *Taeniodus* GERVAIS, p. 31 (incorrect emendation of the original spelling).

- 1891–93 *Theridomys* ZITTEL, p. 554, in part.
 1904 *Taeniodus* PALMER, p. 659.
 1904 *Toeniodus* PALMER, p. 681.
 1941 *Trechomys* WINGE, p. 117.
 1941 *Pararchaeomys* STEHLIN, p. 213.
 1951 *Taeniodus* SCHAUB, p. 253, 364 and 365, in: STEHLIN & SCHAUB.
 1952 *Taeniodus* LAVOCAT, p. 79 and 81.
 1953 *Taeniodus* SCHAUB, p. 41, Fig. 22 and 23, non Fig. 24.
 1958 *Taeniodus* SCHAUB, p. 701.
 1966 *Taeniodus* THALER, p. 51, 59 and 74.
 1972 *Taeniodus* BAHLO, p. 18.
 1975 *Taeniodus* BAHLO, p. 18.
 1979 *Archaeomys* (*Taeniodus*) VIANEY-LIAUD, p. 198.

Stratigraphic range. – Oligocene, Rupelian to Lower “Chattien”. From Balm to Grenchen-I assemblage zones (see ENGESSER & MAYO 1987).

Geographical distribution. – Central and West Europe.

Previous diagnoses. – See POMEL (1854, p. 37); LAVOCAT (1953, p. 79) and SCHAUB (1958, p. 701).

Emended diagnosis. – Maxilla without infraorbital canal. Anterior alveolar foramen dorsal to P⁴ and open laterally; without depressions or nutritive foramina. Infraorbital foramen oval, without pinching. Narrow ascending ramus of anterior zygomatic process with slightly concave anterior border. Palatine vault very short. Incisive foramen very long with its posterior border in front of I syncline of P⁴. Posterior palatine foramen in front of the posterior prism of M¹ and with or without channel opening into the choanaes. Choanaes opened in front of anterior border of M². With posterior maxillary foramen. Mandible with small shelflike masseteric ridge below P₄ and pronounced low angular ridge. Upper angular masseteric ridge slightly represented and with a groove. Anterior border of coronoid process in front of M₃. Condylloid process much higher than cheek teeth. Upper teeth penta or hexaantycline. Lower ones pentaantyclinid. Semihypsodontic teeth with wide synclines or synclinids and fine antyclines or antyclinids in unworn stage. II syncline tubular. Other synclines pseudolaminar or laminar. Sinus very prolonged, anteroversus and ends generally in front of I syncline. I syncline frequently longer than II. III syncline open to labial and posterior borders of crown. Posterior opening generally deeper than labial on M¹ and M². In unworn stage I synclinid open or closed to anterior border of crown. II open to anterior border and closed to the lingual. III lingually open and sometimes superficially joined with II. IV fused with sinusid in a graben or united in a pseudograben. D₄ with graben and anterograben or antero-pseudograben. Upper teeth with two small labial roots and one lingual root. Lower teeth with two small anterior roots and one posterior root.

Differential diagnoses. – *Toeniodus* differs from *Blainvillimys* in the following characters:

- different morphology of the maxilla,
- strongly expanded labial border of the maxilla in front of P⁴,
- shorter palatine vault,
- presence of sulcus in palatine vault,
- different position of the posterior border of the incisive foramen,
- different morphology of the incisive foramen,

- different position of the posterior palatine foramen
- presence of posterior maxillary foramen,
- absence of an infraorbital canal,
- absence of depression associated with anterior alveolar foramen,
- absence of nutritive foramina associated with the depression and the anterior alveolar foramen,
- finer antyclines and antyclinids of the teeth in the unworn stage,
- finer anterior borders of enamel in the antyclines of the upper teeth,
- different morphology of D^4 ,
- finer posterior borders of enamel in the antyclinids of the lower teeth,
- longer sinus in the upper teeth,
- different morphology of the mandible,
- different inclination of the anterior shelflike masseteric ridge,
- different position of the union between the anterior shelflike masseteric ridge and the upper angular masseteric ridge,
- different morphology of the D_4 ,
- presence of graben or deep pseudograben in the lower teeth,
- fusion of the IV synclinid with the sinusid in a graben or joined in a pseudograben,
- constant presence of the I synclinid in unworn or moderately worn teeth.

From *Archaeomys* (n. subg.) or primitive Archaeomyids in the:

- different morphology of the maxilla,
- different infraorbital foramen,
- much shorter palatine vault,
- longer incisive foramen,
- different position of the posterior palatine foramen,
- weak upper masseteric ridge,
- different position of the shelflike masseteric ridge,
- different position of the anterior border of the coronoid process,
- different condyloid process,
- lower crown height of the teeth,
- different morphology of the D^4 ,
- more open syncline of the upper teeth in the unworn stage,
- a generally different position of the end of the sinus,
- deeper aperture of the III syncline on the labial border of the crown,
- shallower aperture of the III syncline on the posterior border of the crown,
- different morphology of the D_4 ,
- the fusion of the IV synclinid and the sinusid in a graben or joined in a pseudograben,
- constant presence of the I synclinid in the slightly or moderately worn lower teeth.

Toeniodus curvistriatus POMEL 1854

Fig. 23–30

Synonymy. –

1839 ?*Echimys curvistriatus* LAIZER & PARIEU, p. 25, nomen nudum.

1854 *Toeniodus curvistriatus* POMEL, p. 36.

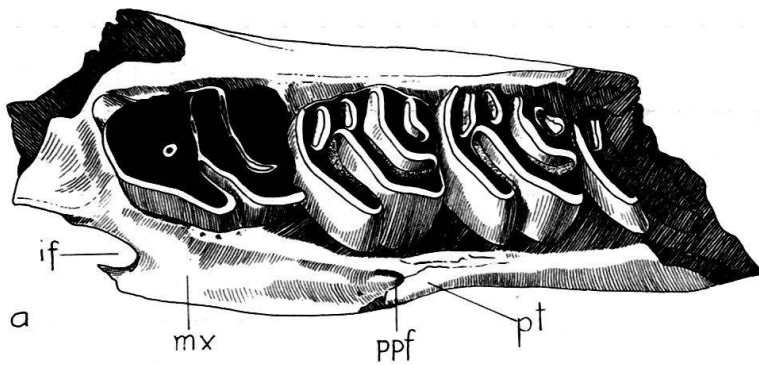
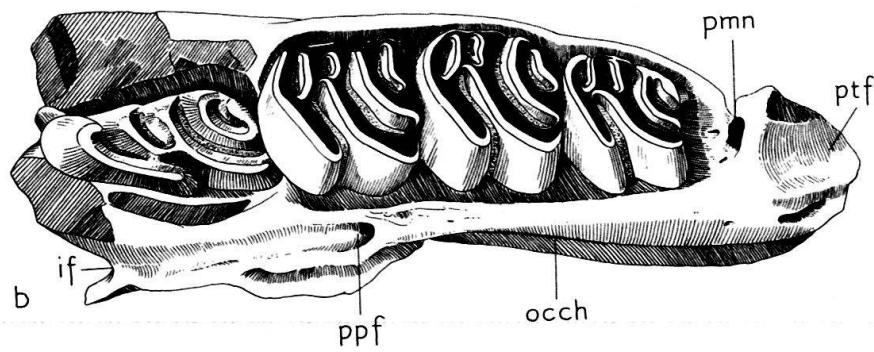
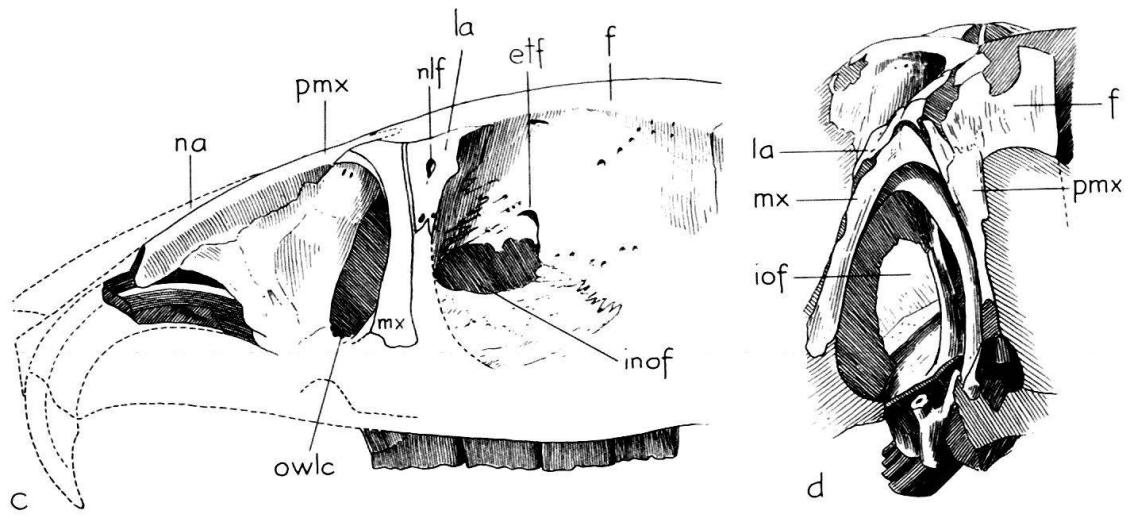


Fig. 23. *Toeniodus curvistriatus* POMEL 1854. MNHNP: THE-1. Skull fragment with teeth row. a = D⁴-M³ f. sin. b = P⁴-M³ dex (invers.). c = lateral view. d = frontal view. Paralectotype. Sauvetat, France. - All figures × 4.

- 1859 *Taeniodus curvistriatus* GERVAIS, p. 31.
 1891 *Theridomys curvistriatus* ZITTEL, p. 554.
 1904 *Taeniodus curvistriatus* PALMER, p. 659.
 1904 *Toeniodus curvistriatus* PALMER, p. 681.
 1941 *Trechomys curvistriatus* WINGE, p. 117.
 1951 "*Pararchaeomys*" *curvistriatus* SCHAUB, p. 365, in: STEHLIN & SCHAUB.
 1951 non *Taeniodus curvistriatus* SCHAUB, p. 79, 252, 365, 415 and 416, Fig. 106 and 107, in: STEHLIN & SCHAUB.
 1952 *Taeniodus curvistriatus* LAVOCAT, p. 79, Plate 13, Fig. 6.
 1953 non *Taeniodus curvistriatus* SCHAUB, p. 41, Fig. 22 and 23.
 1966 *Taeniodus curvistriatus* THALER, p. 74 and 75 in part.
 1966 *Blainvillimys* aff. *blainvillei* THALER, p. 75.
 1979 *Taeniodus curvistriatus* VIANEY-LIAUD, p. 198 non 227.
 1979 *Archaeomys* (*Taeniodus*) *curvistriatus* VIANEY-LIAUD, p. 232.
 1981 *Taeniodus curvistriatus* HUGUENEY, p. 334, in: BRUNET et al.

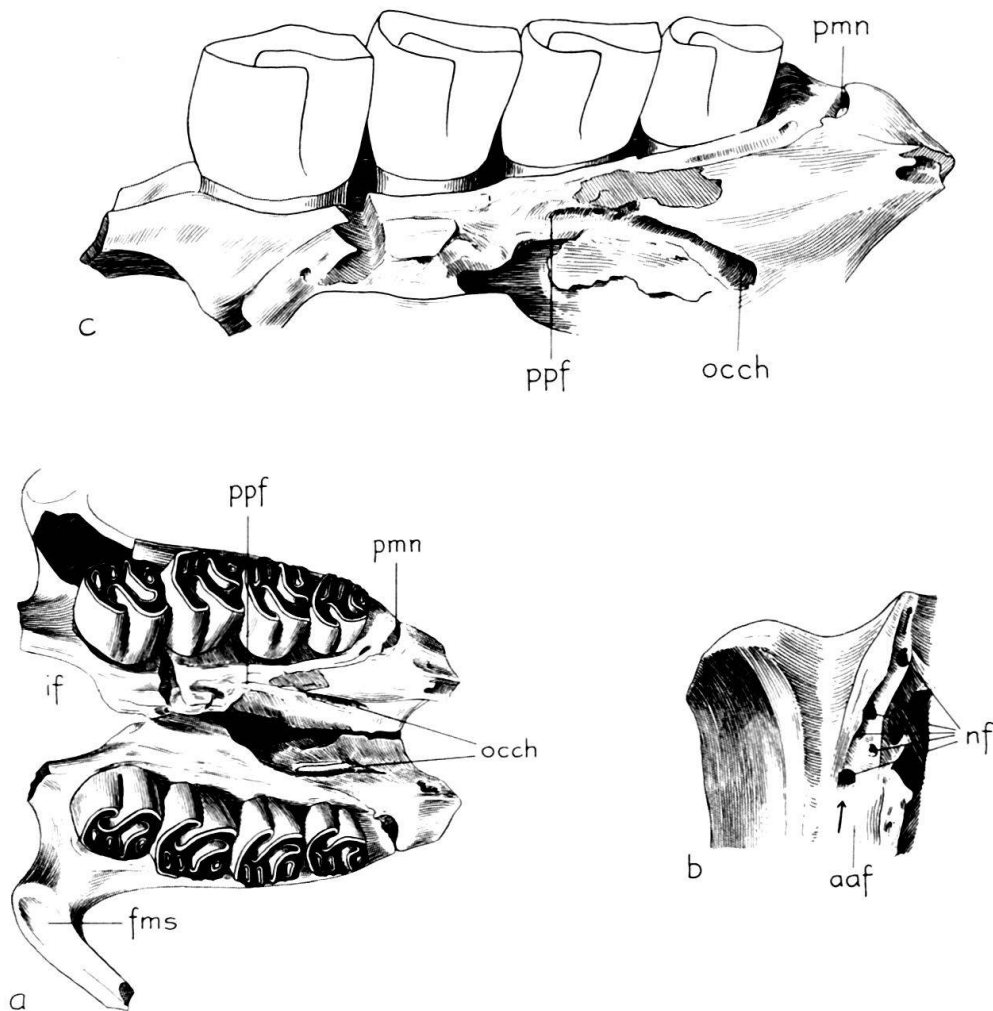


Fig. 24. *Toeniodus curvistriatus* POMEL 1854. BM(NH): M 27689. Palate with teeth row. a = ventral view. The right cheek teeth – somewhat fragmentary – is reconstructed on the basis of the left one. – $\times 4$. b = dorsal view with the canal of the anterior alveolar foramen opened, showing many nutritive foramina. – $\times 8,33$. c = lingual view of the left maxilla. – $\times 8,33$. St. Yvoine, France.

Lectotype. – MNHNP: THE-3 (fragment of mandible with P_4-M_3 dex. in SW-2)³). LAVOCAT (1952, p. 79) designated as Lectotype the specimen MHNL: Co-3 (P_4-M_3 dex.) and as Paralectotype the specimen MHNL: Co-2 (P^4-M^3); both with dubious reference to the Cournon locality. However, these specimens cannot belong to the syntype series applied by POMEL, 1854 and they did not come with any certainty from the type locality Sauvetat, France. For this reason, they cannot be designated the types (see THALER 1966, p. 74–75). Furthermore, *Echimys curvistriatus* LAIZER & PARIEU 1839 is a nomen nudum, because no description of LAIZER & PARIEU (1839, p. 206) was ever printed. For this reason it is not possible to take into account the type designation of PALMER (1904, p. 681). The specimens mentioned by THALER (1966, p. 74–75, Pl6, Fig. a, b, c) belong to the POMEL collection (and came from the Museum of Oran) and are the syntypes series. I select as Lectotype the specimen MNHNP: THE-3 (explained above) and as Paralectotypes the specimens MNHNP: THE-1 (a fragment of skull with P^4-M^3 dex. and D^4-M^2 sin.) and THE-2 (a fragment of mandible with P_4-M_2 sin.).

Topotypes. – Maxilla: BM(NH): 25543 (ex 27760 XII) P^4-M^2 f dex.; 27702 P^4-M^3 sin.; CCJR 201 P^4-M^3 sin. (labeled «Cournon» but by its lithology appears belong to Sauvetat). Mandibles: BM(NH): 25537 D_4-M_3 sin.; 25539 (ex 27760 VIII) P_4-M_3 dex.; 25541 (ex 27760 X) P_4-M_3 f dex.; 25548 M_1-M_3 dex.; 25553 (ex 27760d) P_4-M_3 sin.; 25554a P_4-M_3 sin.; 25554b P_4-M_2 sin.; 25554c D_4-M_3 dex.; 34900 M_1-M_3 sin. Isolated teeth: 25542 (ex 27760 XI) $M_1 + M_2$ sin. Measurements of P_4 , $M_{1/2}$ and M_3 of the specimens BM(NH): 25537; 25554a; 25554b; 25554c and 25548 together with the Lectotype and Paralectotype are offered in Table 41.

Type locality. – Sauvetat (France).

Other localities. – St. Yvoine and Cournon? (France); Grenchen-I (Switzerland).

Table 41: Measurements of the lower cheek teeth of *Toeniodus curvistriatus* POMEL, 1854 from La Sauvetat (France)

Tooth	N		range	\bar{X}	S	V
P_4	4	Sinusid height	1,25–1,60	1,44	0,19	12,42
	4	Length	2,33–2,50	2,42	0,09	3,73
	4	Width	1,40–1,52	1,48	0,05	3,57
	2	Sinusid length	1,52–1,60	1,56	0,06	3,63
	2	Extrasinusid distance	–	0,00	–	–
	2	Crown height	1,67–2,00	1,84	0,23	12,72
$M_{1/2}$	12	Sinusid height	0,92–1,60	1,20	0,23	19,15
	13	Length	1,84–2,17	2,03	0,09	4,37
	13	Width	1,67–1,83	1,72	0,08	4,90
M_3	4	Sinusid height	0,92–1,42	1,17	0,24	–
	5	Length	1,67–1,83	1,74	0,06	3,33
	5	Width	1,08–1,67	1,40	0,24	17,15
	3	Crown height	1,25–1,67	1,39	0,24	17,45

³) When this paper was at the press I received two papers from M. Huguency (Lyon; 1986, Rev. scient. Bourbonnais and 1987: Ann. Paléont.), where she has designated as Lectotype of *T. curvistriatus* the same specimen: MNHNP: Lim 585 (ex THE-3). In addition Huguency has explained the correct spelling of *Toeniodus*.

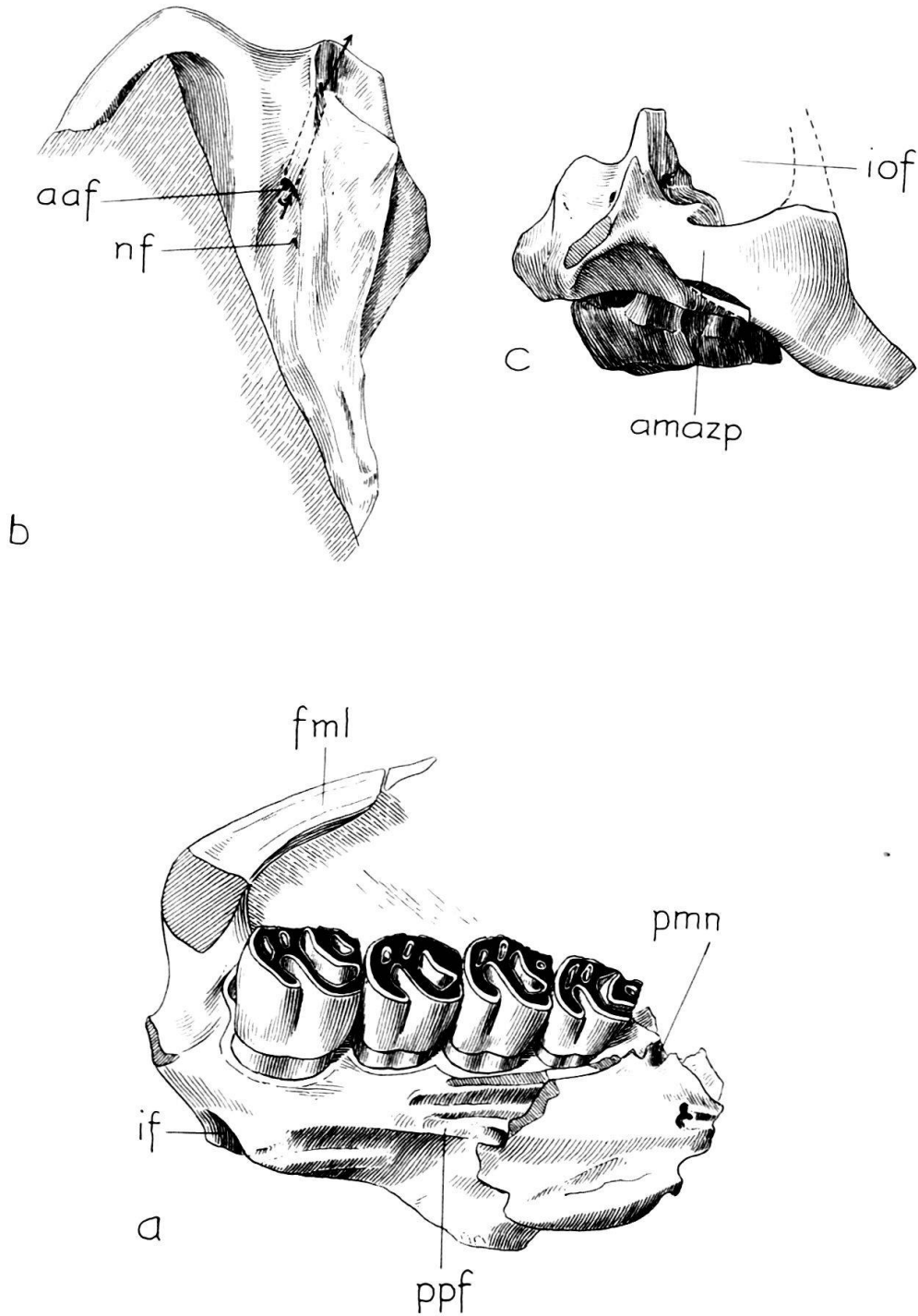


Fig. 25. *Toeniodus curvistriatus* POMEL 1854. BM (NH): M 27702. Left maxillary fragment with P⁴-M³. a = ventral-lingual view. b = dorsal view. c = frontal view. Sauvetat, France. - All figures × 6.

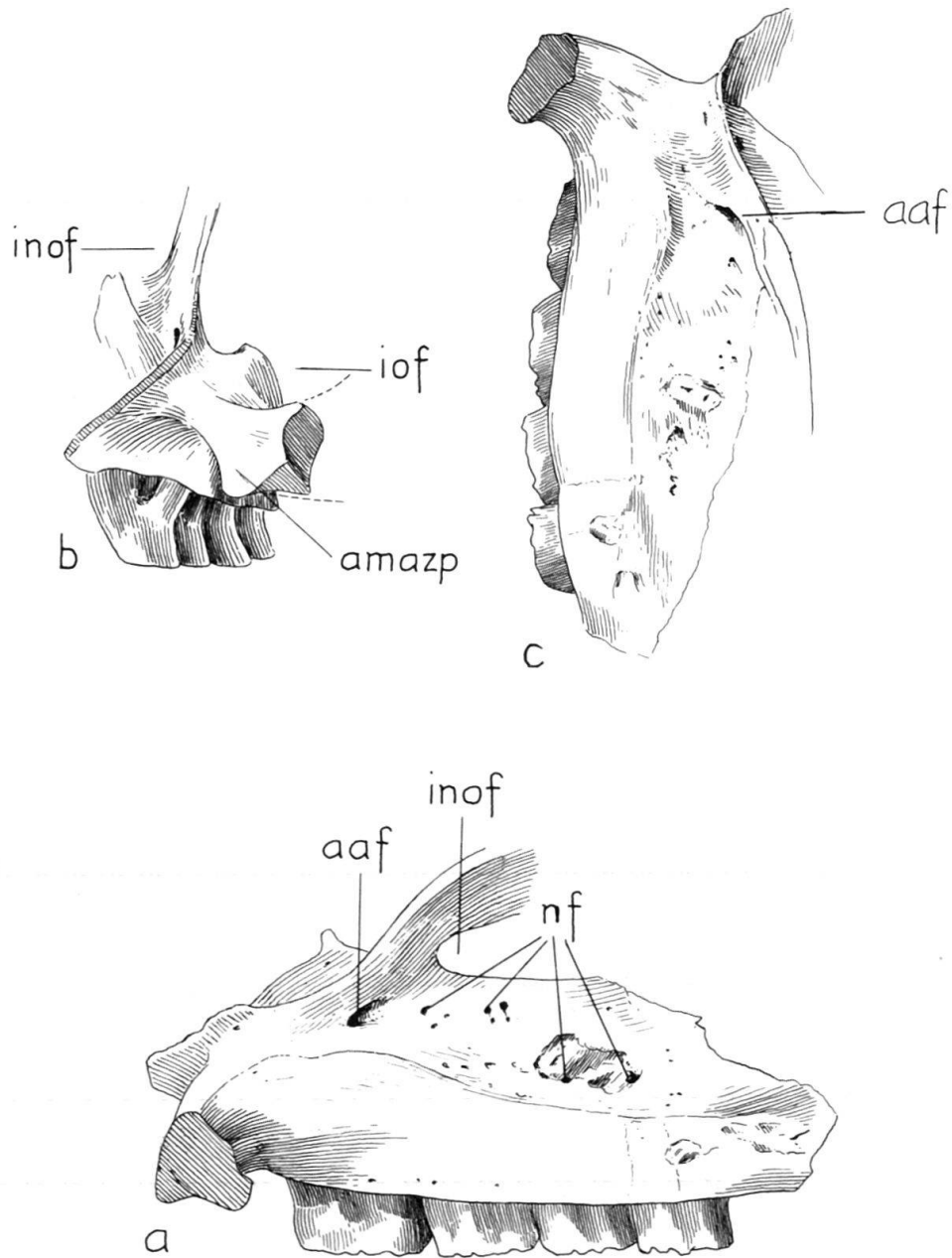


Fig. 26. *Toeniodus curvistriatus* POMEL 1854. BM(NH): CCJR 201. Left maxillary fragment with P⁴-M³. a = labial view. b = frontal view. c = dorsal view. Sauvetat, France. - All figures × 6.

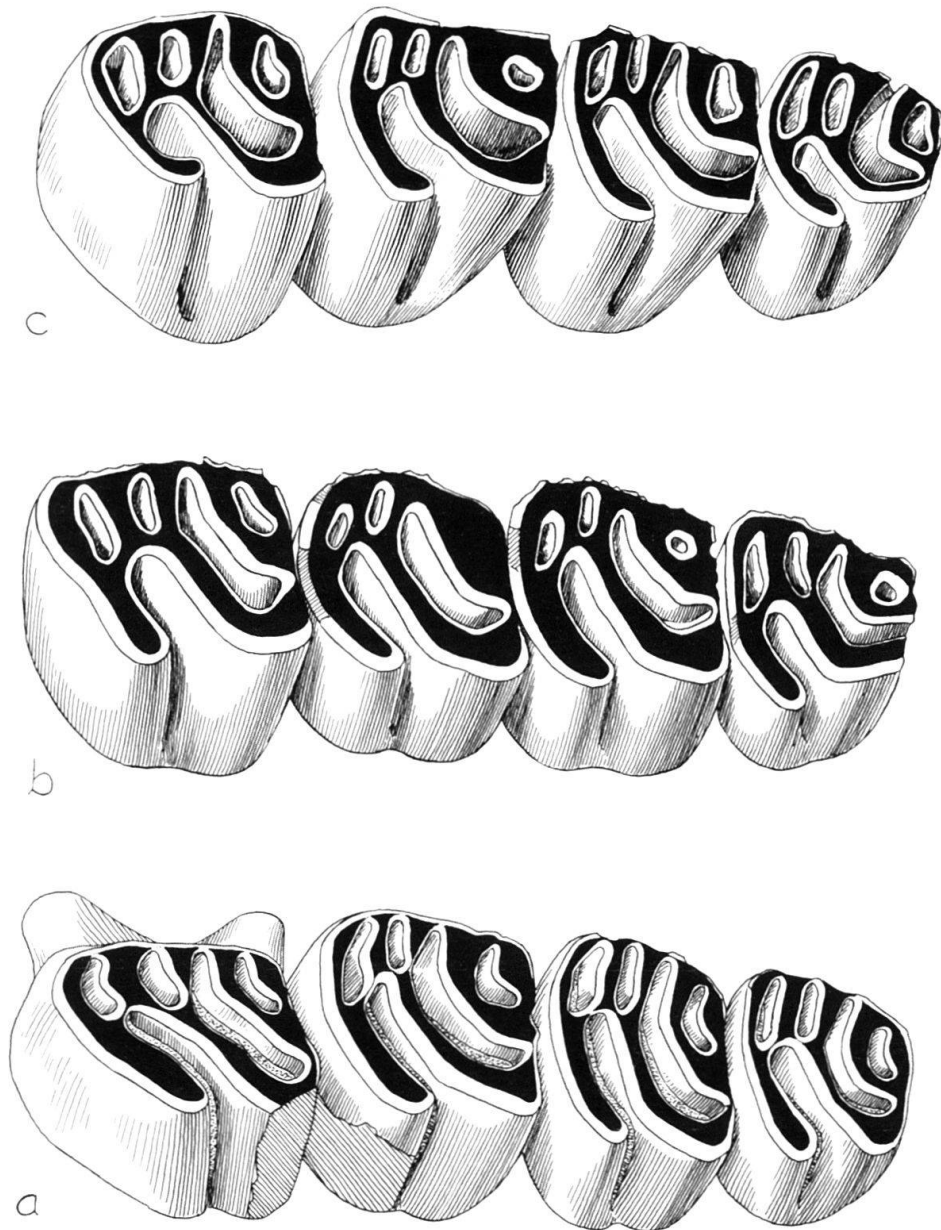


Fig. 27. *Toeniodus curvistriatus* POMEL 1854. a = BM(NH): CCJR 201. P⁴-M³ sin. Sauvetat, France. b = BM(NH): M 27702. P⁴-M³ sin. Sauvetat, France. c = BM(NH): M 27689. P⁴-M³ sin. St. Yvoine, France. - All figures $\times 12,5$.

Table 42: Measurements of the D⁴ and P⁴ of *Toeniodus ernii* n. sp. from Balm (Switzerland)

Tooth	SW	N		range	\bar{X}	S	V
D ⁴	–	1	Sinus height	–	0,83	–	–
		1	Length	–	2,42	–	–
		1	Width	–	1,25	–	–
		1	Crown height	–	1,17	–	–
P ⁴	1	1	Sinus height	–	2,08	–	–
		1	Length	–	1,75	–	–
		1	Width	–	1,50	–	–
		1	Sinus length	–	0,67	–	–
		1	Extrasinus distance	–	0,42	–	–
		1	Crown height	–	2,58	–	–
P ⁴	4	3	Sinus height	1,00–1,17	1,06	0,10	9,29
		3	Length	1,92–2,00	1,95	0,05	2,37
		3	Width	1,75–2,25	2,02	0,25	12,54
		3	Sinus length	0,92–1,25	1,08	0,17	15,23
		3	Extrasinus distance	0,50–0,58	0,55	0,05	8,35
		3	Crown height	1,25–1,58	1,47	0,19	12,96

Stratigraphic range. – Oligocene, Lower “Chattien”, from Grenchen-I (faunal province of Switzerland and Savoy) to St. Yvoine (locality somewhat lower in age than Antoingt) of the West faunal province (see ENGESSER & MAYO 1987).

Geographical distribution. – Central and West Europe.

Table 43: Measurements of the M^{1/2} of *Toeniodus ernii* n. sp. from Balm (Switzerland)

SW	N		range	\bar{X}	S	V
1	1	Length	–	1,50	–	–
	1	Width	–	1,00	–	–
	1	Extrasinus distance	–	0,42	–	–
3	4	Sinus height	1,58–1,83	1,73	0,11	6,10
	3	Length	1,67–1,92	1,78	0,13	7,17
	3	Width	1,42–1,67	1,59	0,14	9,10
	3	Sinus length	0,83–1,08	1,00	0,14	14,48
	3	Extrasinus distance	0,42–0,50	0,47	0,05	9,76
	4	Crown height	1,83–2,17	2,02	0,14	7,15
4	6	Sinus height	1,08–1,42	1,27	0,13	10,71
	6	Length	1,67–1,83	1,74	0,06	3,47
	5	Width	1,50–1,75	1,61	0,13	8,15
	6	Sinus length	0,92–1,33	1,08	0,16	15,23
	4	Extrasinus distance	0,33–0,50	0,44	0,08	18,51
	6	Crown height	1,42–1,92	1,63	0,17	10,67
5	2	Sinus height	0,75–0,83	0,79	0,06	7,16
	2	Length	–	1,67	–	–
	2	Width	1,75–1,92	1,84	0,12	6,55
	2	Sinus length	1,17–1,33	1,25	0,11	9,05
	2	Extrasinus distance	0,42–0,50	0,46	0,06	12,30
	2	Crown height	1,00–1,08	1,04	0,06	5,44

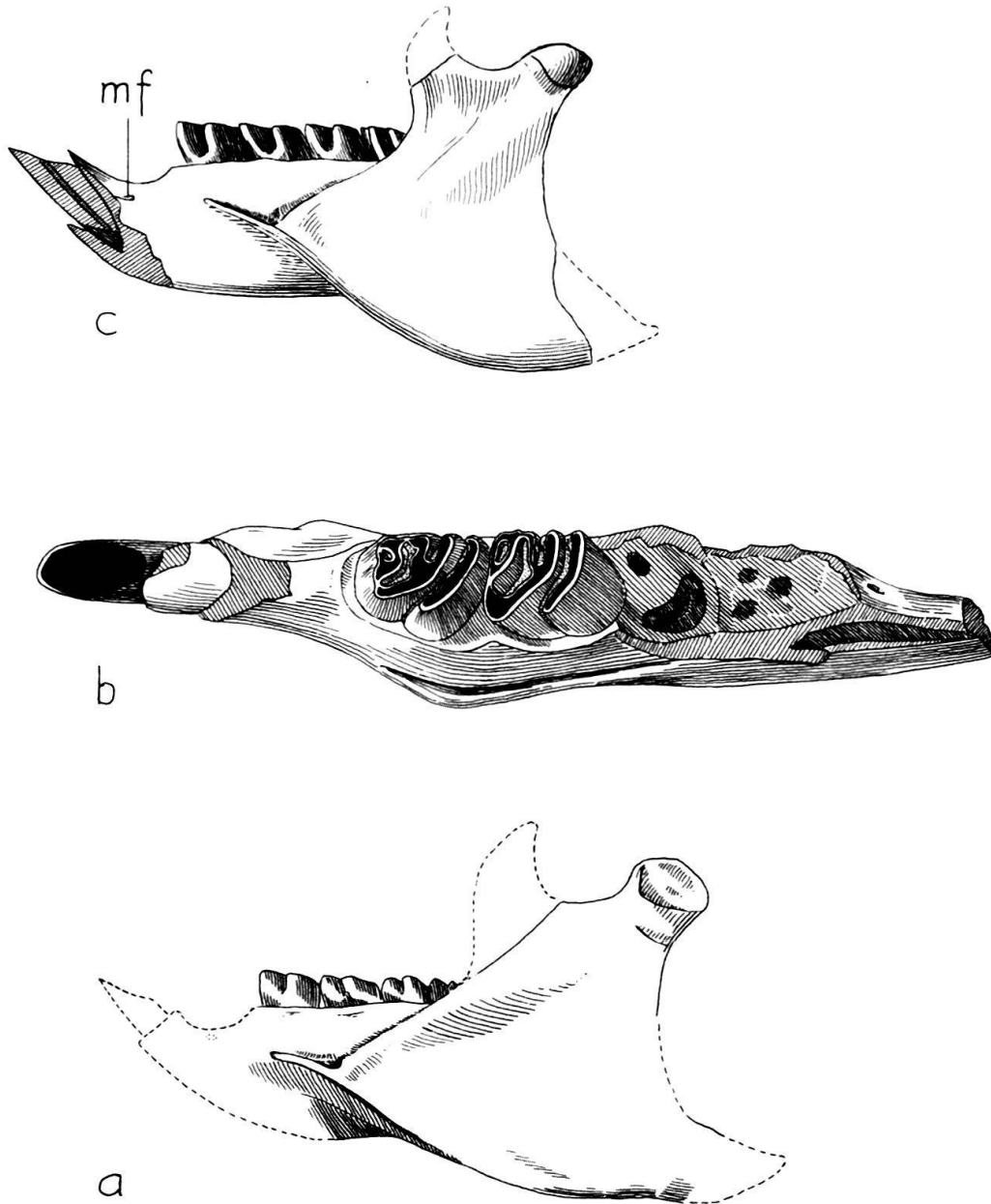


Fig. 28. *Toeniodus curvistriatus* POMEL 1854. a = MNHNP: THE-3. Right mandibular fragment with P₄-M₃ (invers.). Lectotype. Labial view. Sauvetat, France. - × 3. b = MNHNP: THE-4. Left mandibular fragment with P₄-M₁. Paralectotype. Dorsal view. Sauvetat, France. - × 6. c = BM(NH): M 25554a. Left mandibular fragment with P₄-M₃. Labial view. Sauvetat, France. - × 3.

Emended diagnosis. - Species of *Toeniodus* of large size with elevated crown height. Upper teeth pentaantyclines. With anterograben in D₄. Posterior border of the 4 anty-clinid deeply connected with the lingual border of the crown.

Measurement in the Table 41.

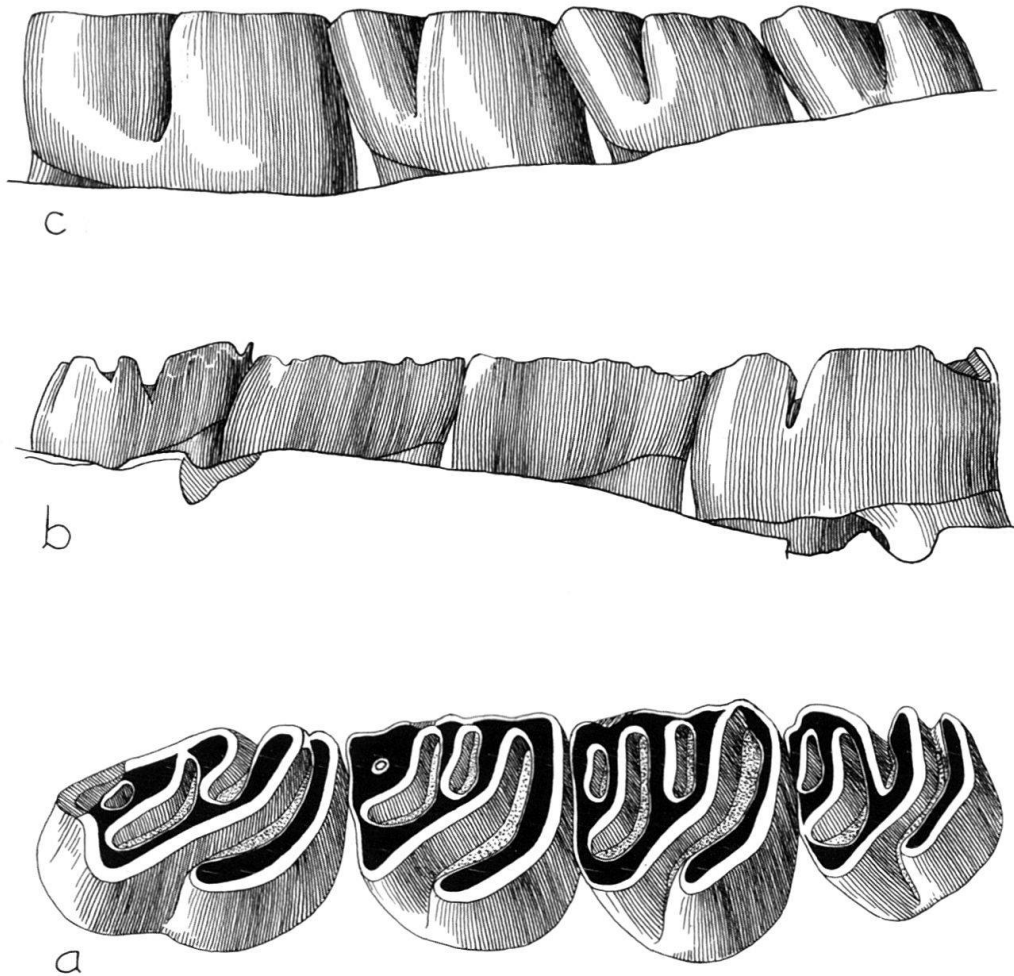


Fig. 29. *Toeniodus curvistriatus* POMEL 1854. a = MNHNP: THE-3. P₄-M₃. Lectotype. Occlusal view. b = lingual view. c = labial view. Sauvetat, France. – All figures × 12,5.

Toeniodus ernii n. sp.

Fig. 31

Synonymy. –

- 1941 *Pararchaeomys* n. sp. STEHLIN, 1941, p. 213, in: ERNI.
 1951 "*Pararchaeomys*" *curvistriatus* SCHAUB, 1951, p. 365, in: STEHLIN & SCHAUB.
 1951 *Taeniodus curvistriatus* SCHAUB, 1951, p. 79, 252, 365, 415 and 416, Fig. 106 and 107.
 1953 *Taeniodus curvistriatus* SCHAUB, p. 41, Fig. 22 and 23.
 1966 *Taeniodus curvistriatus* THALER, p. 74 and 75.
 1979 *Taeniodus curvistriatus* VIANEY-LIAUD, p. 227.

Derivatio nominis. – After the Swiss geologist Dr. A. Erni (1885–1945), collector of a part of the material described here.

Holotype. – NMB: Blm 43 (M_{1/2} sin) in SW-1, figured by STEHLIN & SCHAUB 1951, p. 252, Fig. 416.

Measurements of the Holotype. – Sinus height: 1,67. Length: 1,92, Width: 1,33; Crown height: 2,08.

Paratypes. – D⁴. – NMB: Blm 244. D₄. – NMB: Blm 243f and 246f. SW-1: P⁴. – NMB: Blm 61; M^{1/2}. – NMB: Blm 90f; M³. – NMB: Blm 55 and 223. NMO: Blm 136 and 141. P₄.

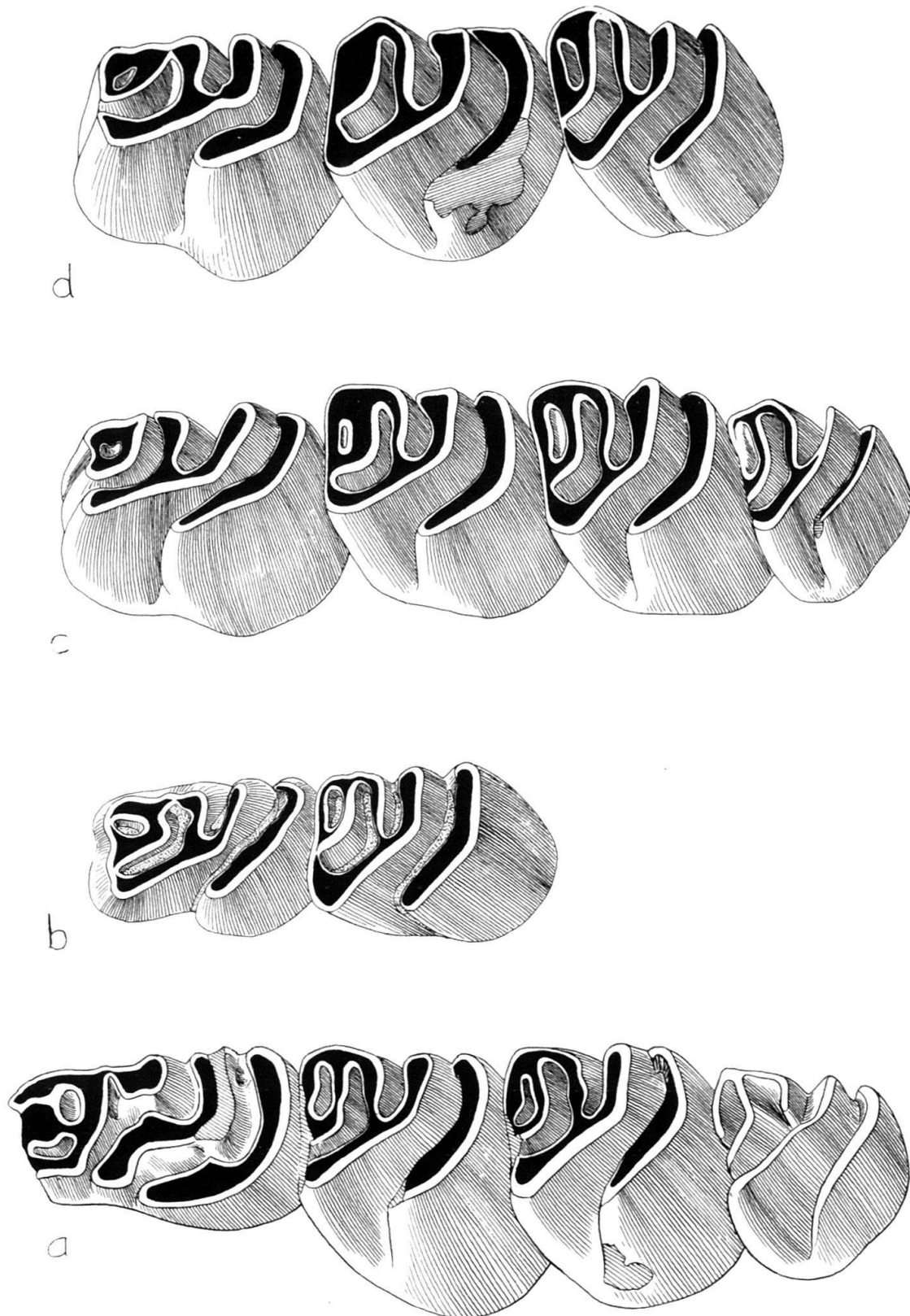


Fig. 30. *Toeniodus curvistriatus* POMEL 1854. a = BM(NH): M 25537. D₄-M₃ sin. b = MNHNP: THE-4. P₄-M₂ sin. Paralectotype. c = BM(NH): 25554a. P₄-M₃ sin. d = BM(NH): M 25554b. P₄-M₂ sin. Sauvetat, France. - All figures × 12,5.

Table 44: Measurements of the M^3 of *Toeniodus ernii* n. sp. from Balm (Switzerland)

SW	N		range	\bar{X}	S	V
1	4	Sinus height	1,33–1,42	1,38	0,05	3,78
	3	Length	1,33–1,67	1,44	0,20	13,60
	4	Width	1,17–1,25	1,21	0,05	3,82
	2	Sinus length	0,76–0,83	0,80	0,05	6,23
	2	Extrasinus distance	0,48–0,50	0,49	0,02	2,89
	4	Crown height	1,83–1,92	1,88	0,05	2,77
2	3	Sinus height	1,25–1,50	1,36	0,13	9,39
	4	Length	1,25–1,50	1,40	0,10	7,54
	3	Width	1,17–1,33	1,28	0,09	7,24
	1	Sinus length	–	0,75	–	–
	1	Extrasinus distance	–	0,58	–	–
	3	Crown height	1,67–1,75	1,72	0,05	2,68
3	7	Sinus height	0,92–1,42	1,22	0,18	15,05
	7	Length	1,33–1,67	1,49	0,13	8,88
	7	Width	1,33–1,58	1,41	0,11	7,67
	7	Sinus length	0,80–1,00	0,90	0,08	9,14
	7	Extrasinus distance	0,50–0,67	0,54	0,06	12,05
	7	Crown height	1,33–1,83	1,56	0,18	11,91
4	2	Sinus height	0,92–1,00	0,96	0,06	5,89
	2	Length	1,33–1,67	1,50	0,24	16,03
	2	Width	1,25–1,42	1,34	0,12	9,00
	2	Sinus length	0,75–0,83	0,79	0,06	7,16
	2	Extrasinus distance	0,42–0,58	0,50	0,11	–
	2	Crown height	1,33–1,42	1,38	0,06	4,63
5	4	Sinus height	0,17–0,67	0,48	0,24	–
	4	Length	1,58–1,75	1,71	0,08	4,98
	4	Width	1,58–1,83	1,71	0,11	6,28
	4	Sinus length	1,00–1,42	1,27	0,18	14,56
	3	Extrasinus distance	0,50–0,60	0,56	0,05	9,45
	3	Crown height	0,67–0,92	0,80	0,13	15,70

– NMB: Blm 92. $M_{1/2}$. – NMB: Blm 45 and 47; NMO: Blm 66. M_3 . – NMB: Blm 39. SW-2: M^3 . – NMB: Blm 211, 225 and 234. NMO: Blm 146. $M_{1/2}$. – NMB: Blm 46, 214 and 218; NMO: Blm 168, 169, 171, 182 and 183. M_3 . – NMB: Blm 215. SW-3: P^4 . – NMB: Blm 222, 238 and 239. $M^{1/2}$. – NMB: Blm 60 and 85; NMO: Blm 138 and 139 (e). M^3 . – NMB: Blm 51, 56 and 62. NMO: Blm 135, 150 and 154. $M_{1/2}$. – NMB: Blm 81, 86 and 91. M_3 . – NMB: Blm 36, 67, 216 and 224. SW-4: $M^{1/2}$. – NMB: Blm 53, 54, 57, 227 and 236; NMO: Blm 147. M^3 . – NMB: Blm 59 and 226 (e); NMO: Blm 134. P_4 . – NMB: Blm 92 and 245. $M_{1/2}$. – NMB: Blm 35, 40, 42, 219 and 229. NMO: Blm 167, 172 and 177. M_3 . – NMB: Blm 212 and 213. SW-5: $M^{1/2}$. – NMO: Blm 155. NMB: Blm 231. M^3 . – NMO: Blm 137, 140, 156 and 157. NMB: Blm 38. $M_{1/2}$. – NMB: Blm 37 and 241. M_3 . – NMB: Blm 247.

Definition of the stage of wear. – Upper teeth: SW-1: unworn or almost unworn. SW-2: lightly worn. SW-3: III syncline open. SW-4: III syncline closed. SW-5: very worn stage. Extrasinus distance longer and Sinus height very reduced. Lower teeth: SW-1: unworn or almost unworn. SW-2: I synclinid open or closed, but others opened. SW-3: II synclinid closed, III synclinid open and graben present. SW-4: almost without graben or

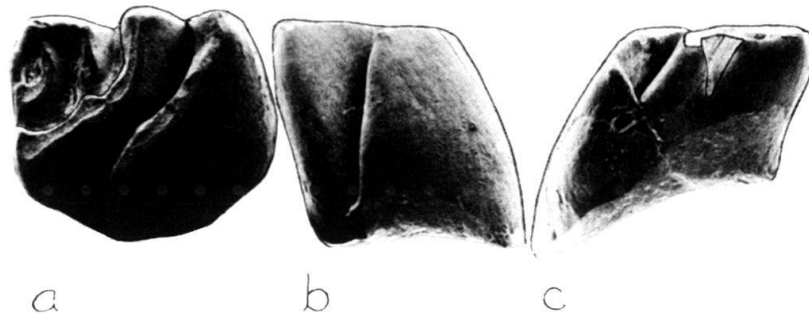


Fig. 31. *Toeniodus ernii* n. sp. NMB: BLM 43. $M_{1/2}$ sin. Holotype. a = occlusal view. b = labial view. c = lingual view. Balm, Switzerland. – All figures $\times 12,5$.

semigraben present, III synclinid closed or slightly open. SW-5: Semigraben with longer Extrasinusid distance and Sinusid height very reduced. (For P_4 SW-4 has place with II or III synclinids opened).

Type locality. – Balm, on the shores of the brook of Balm, canton of Solothurn, Switzerland (see ERNI 1941, Fig. 3 and KFSNMB).

Stratigraphic range. – Lower Oligocene, Rupelien, assemblage zone of Balm (see ENGESSER & MAYO 1987).

Geographical distribution. – Central Europe.

Diagnosis. – Pentaantycline species of *Toeniodus* of small size and low crown height. D_4 with antero-pseudograben or antero-graben. Graben of lower teeth present even in a very advanced stage of wear. Posterior border of 4 antyclinid without a deep connection with the lingual border of the crown. Sinusid height of $M_{1/2}$ in SW-1: 1,83–1,50. Semigraben emerging only in a very advanced stage of wear. Sinusid height of $M_{1/2}$ in SW-5: 0,16–0,12. Extrasinusid distance of $M_{1/2}$ in SW-5: 0,16–2,28.

Differential diagnoses. – *Toeniodus ernii* n. sp. differs from *T. curvistriatus* in the following characters:

- smaller size,
- lower crown height,

Table 45: Measurements of the P_4 of *Toeniodus ernii* n. sp. from Balm (Switzerland)

SW	N		range	\bar{X}	S	V
4	2	Sinusid height	0,58–0,83	0,71	0,18	–
	2	Length	–	2,50	–	–
	2	Width	1,42–1,58	1,50	0,11	7,54
	2	Sinusid length	–	1,50	–	–
	2	Extrasinusid distance	–	0,17	–	–
	2	Crown height	0,92–1,25	1,09	0,23	–
5	1	Sinusid height	–	0,50	–	–
	1	Length	–	2,33	–	–
	1	Width	–	1,58	–	–
	1	Sinusid length	–	1,42	–	–
	1	Extrasinusid distance	–	0,50	–	–
	1	Crown height	–	0,92	–	–

- partial absence of anterogaben in the D₄,
- partial presence of anteropseudogaben in the D₄,
- shallow fusion of the posterior border of the 4 antyclinid with the lingual border of the crown,
- presence of the I synclinid in all stage of wear.

From *T. avus* STEHLIN & SCHAUB 1951 in the:

- slightly smaller size,
- presence of a graben in the lower teeth until a deeply worn stage,
- much longer sinusid length,
much shorter extrasinusid distance.

From *T. hexalophodus* BAHLO 1972 in the:

- smaller size,
- lower crown height,
- absence of hexaantycline morphotype,
- different morphology of the D⁴,
- partially different morphology of the D₄,
- absence of cement in the sinus, sinusid, syncline or synclinid.

Discussion. – STEHLIN (1941, p. 213, in: ERNI) considered the teeth of the new species here described, as a new genus and species: “*Pararchaeomys* n. sp.”. The real generic position of this material was showed by SCHAUB (1951, p. 79 and 252, Fig. 106, 107, 415

Table 46: Measurements of the M_{1/2} of *Toeniodus ernii* n. sp. from Balm (Switzerland)

SW	N		range	\bar{X}	S	V
1	4	Sinusid height	1,42–1,83	1,61	0,18	11,38
	4	Length	1,58–1,92	1,79	0,15	8,17
	4	Width	1,08–1,33	1,17	0,12	10,12
	4	Crown height	1,58–2,17	1,94	0,26	13,41
2	8	Sinusid height	1,00–1,67	1,23	0,25	–
	8	Length	1,75–2,08	1,87	0,11	6,01
	8	Width	1,33–1,75	1,54	0,13	8,25
	8	Crown height	1,33–2,00	1,57	0,30	18,97
3	3	Sinusid height	0,75–1,08	0,89	0,17	19,41
	3	Length	1,67–1,83	1,75	0,08	4,57
	3	Width	1,42–1,67	1,53	0,13	8,34
	3	Crown height	1,00–1,33	1,14	0,17	15,14
4	8	Sinus height	0,42–0,92	0,68	0,18	–
	8	Length	1,75–2,00	1,85	0,09	4,71
	8	Width	1,58–1,92	1,68	0,13	7,92
	8	Crown height	0,67–1,33	0,99	0,25	–
5	2	Sinusid height	0,12–0,16	0,14	0,03	–
	2	Length	1,83–1,92	1,88	0,06	3,39
	2	Width	1,67–1,83	1,75	0,11	6,46
	2	Sinusid length	1,33–1,58	1,46	0,18	12,15
	2	Extrasinusid distance	0,16–0,28	0,22	0,08	–
	2	Crown height	0,50–0,67	0,59	0,12	–

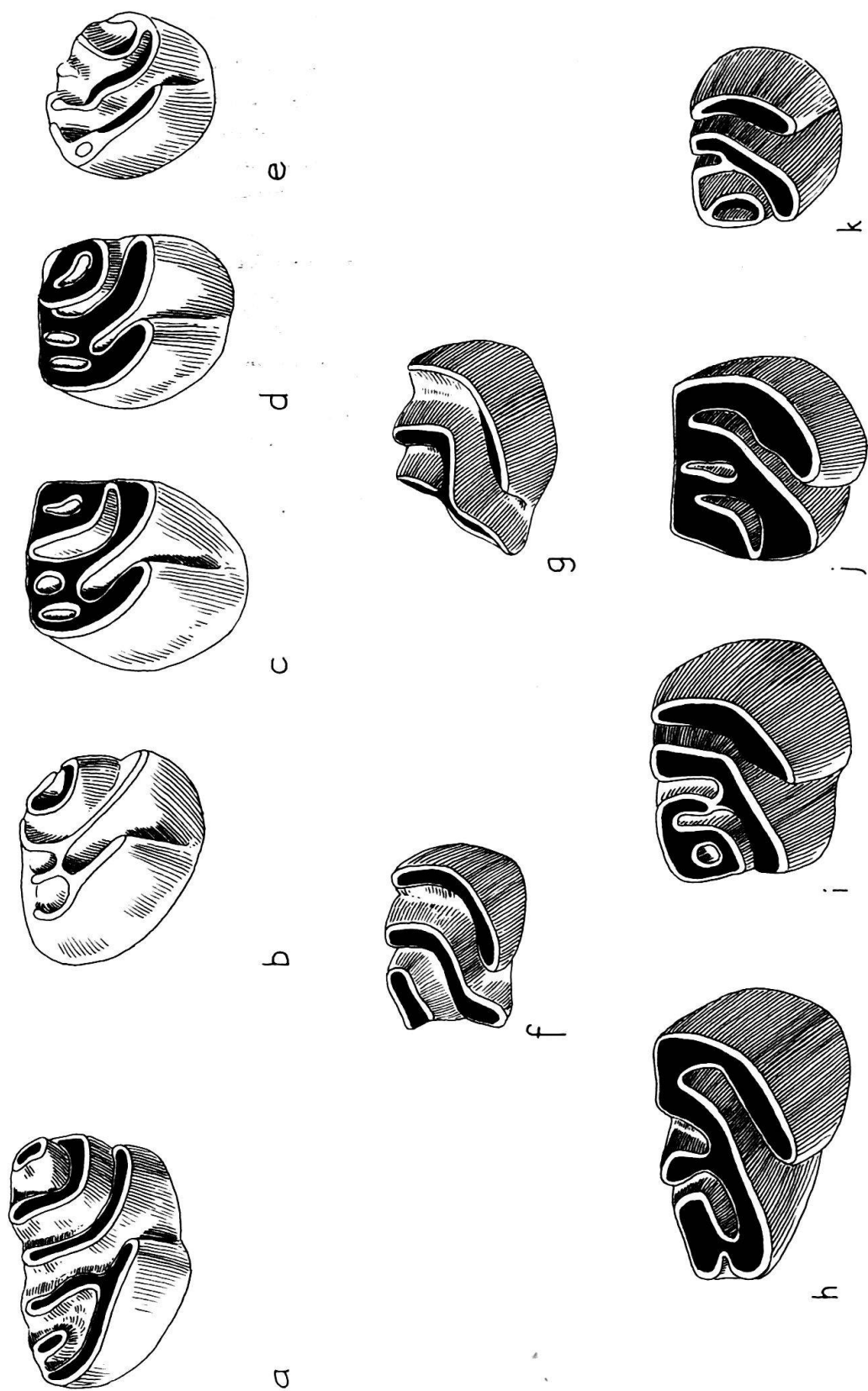


Fig. 32. *Toeniodus ernii* n. sp. a = NMB: Blm 244. D⁴ dex (invers.). b = NMB: Blm 61. P⁴ sin. c = NMB: Blm 53 dex (invers.). d = NMB: Blm 240. M² sin. e = NMB: Blm 141. M³ sin. f = NMB: Blm 243. D₄ dex (invers.). g = NMB: Blm 264. D₄ sin. h = NMB: Blm 245. P₄ sin. i = NMB: Blm 218. M₁ sin. j = NMB: Blm 40. M₂ dex (invers.). k = NMB: Blm 215. M₃ sin. Paratypes. Balm, Switzerland. — All figures × 12,5.

Table 47: Measurements of the M_3 of *Toeniodus ernii* n. sp. from Balm (Switzerland)

SW	N		range	\bar{X}	S	V
1	1	Sinusid height	–	0,83	–	–
	1	Length	–	1,50	–	–
	1	Width	–	1,08	–	–
	1	Crown height	–	1,25	–	–
2	1	Sinusid height	–	0,75	–	–
	1	Length	–	1,42	–	–
	1	Width	–	1,17	–	–
	1	Crown height	–	1,08	–	–
3	3	Sinusid height	0,50–1,00	0,77	0,23	–
	4	Length	1,34–1,68	1,55	0,16	10,41
	4	Width	1,25–1,44	1,34	0,08	5,84
	3	Crown height	0,92–1,25	1,12	0,18	15,83
4	1	Sinusid height	–	0,75	–	–
	2	Length	1,58–1,75	1,67	0,12	7,22
	2	Width	1,25–1,50	1,38	0,18	12,86
	1	Crown height	–	1,00	–	–
5	1	Sinusid height	–	0,58	–	–
	1	Length	–	1,58	–	–
	1	Width	–	1,50	–	–
	1	Sinusid length	–	1,00	–	–
	1	Extrasinusid distance	–	0,33	–	–
	1	Crown height	–	0,92	–	–

and 416, in: STEHLIN & SCHAUB) and by LAVOCAT (1952, p. 80). Nevertheless, the first author estimated in the afore mentioned work and also in his paper of 1953 (p. 41, Fig. 22 and 23) that the teeth from Balm belong to *Toeniodus curvistriatus* POMEL 1854. THALER (1966, p. 74–75) and VIANEY-LIAUD (1979, p. 227) were of the same opinion. However, comparison of the teeth of *T. curvistriatus* from Sauvetat (France) with those of *T. ernii* n. sp. from Balm show clearly, that the first species is more evolved than the second. *T. curvistriatus* is larger, slightly more semihypsodont, and the lamination of the 4 antyclinid is deeper in its fusion with the lingual border of the crown in the lower teeth, than those of *T. ernii* n. sp. In *T. curvistriatus* the anterior border of enamel of the graben is located in the upper portion of the crown, somewhat independent of the posterior enamel border. For instance, it remains open toward the lingual border, even when the very fine posterior enamel border is closed in a semigraben (Fig. 30). The Student t-test shows a high significance (1%) in the comparison of the length of all the $M_{1/2}$ from Balm (21 specimens) with all of the $M_{1/2}$ (recognized without doubt), that came from Sauvetat (13 specimens). The M^3 (NMB: Balm 141, Fig. 32e) is anomalous. It has a small hole in the first antycline, but it is not possible to take it as a real syncline. However, it could be the first stage of development of a syncline. In this case *T. ernii* n. sp. could be an ancestral species of *T. curvistriatus* and *T. hexalophodus*, something that is suggested by the two different morphotypes of the D_4 of *T. ernii* n. sp.

Measurements in the Tables 42–47.

Statistical test in the Tables 54 and 56.

Table 48: Measurements of the P⁴ of *Archaeomys (Archaeomys) kaelini* n. sp. from Fornant-6 (France)

SW	N		range	\bar{X}	S	V
2	1	Sinus height	—	3,75	—	—
	1	Length	—	2,58	—	—
	1	Width	—	1,92	—	—
	1	Sinus length	—	1,50	—	—
	1	Extrasinus distance	—	0,36	—	—
	1	Crown height	—	4,50	—	—
3	4	Sinus height	2,17–2,50	2,34	0,15	6,49
	2	Length	2,50–2,58	2,54	0,06	2,23
	3	Width	2,67–3,08	2,92	0,22	7,45
	3	Sinus length	2,17–2,25	2,20	0,05	2,10
	5	Extrasinus distance	0,08–0,33	0,24	0,12	—
	4	Crown height	2,83–3,17	3,00	0,15	5,11
4	5	Sinus height	1,17–2,83	1,88	0,60	—
	5	Length	2,33–2,75	2,52	0,15	5,97
	5	Width	2,33–2,83	2,68	0,21	7,74
	3	Sinus length	2,42–2,67	2,53	0,13	5,05
	3	Extrasinus distance	0,08–0,25	0,19	0,09	—
	4	Crown height	1,58–2,67	2,17	0,46	—
5	2	Sinus height	0,33–0,67	0,50	0,24	—
	2	Length	2,83–2,92	2,87	0,06	2,21
	4	Width	2,42–2,92	2,57	0,24	9,34
	0	Sinus length	—	—	—	—
	1	Extrasinus distance	—	0,12	—	—
	1	Crown height	—	1,33	—	—

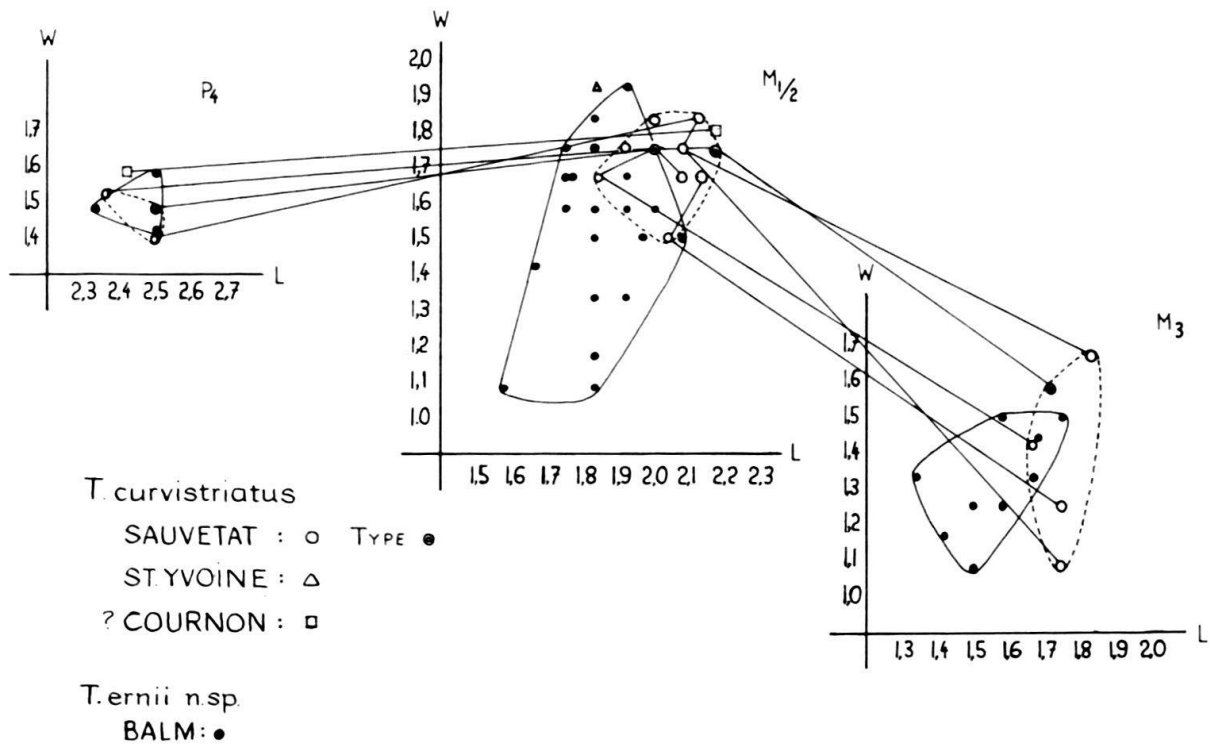


Fig. 33. Scatter diagrams of length against width in P₄, M₁, M₂ and M₃ of *Toeniodus curvistriatus* POMEL 1854 from Sauvetat (Type locality), St. Yvoine and ? Cournon, France and *Toeniodus ernii* n. sp. from Balm, Switzerland.

Genus *Archaeomys* LAIZER & PARIEU 1839Subgenus *Archaeomys* (*Archaeomys*) LAIZER & PARIEU 1839

Type species. – *Archaeomys* (*Archaeomys*) *laurillardi* BRAVARD, in: GERVAIS 1848–52.

Archaeomys (*Archaeomys*) *kaelini* n. sp.

Fig. 34–35

Synonymy. –

- 1984 *A.* (*Archaeomys*) aff. *helveticus* MAYO, p. 16, in: ENGESSER et al.
 1986 *A.* (*Archaeomys*) n. sp. MAYO, p. 5, in: ENGESSER et al.
 1987 *A.* (*Archaeomys*) n. sp. MAYO, p. 29.

Derivatio nominis. – After Mr. D. Kaelin (Balsthal), collector of the material of Breitenhöchi.

Holotype. – NMB: Sav 280 P⁴ in SW-3.

Measurements of the Holotype. – Sinus height: 3,75. Length: 2,58. Width: 1,92. Sinus length: 1,50. Extrasinus distance: 0,36. Crown height: 4,50.

Paratypes. – All in the collections of NMB. D⁴: Sav 281f. and 282f. D₄: Sav 283. P⁴: Sav 284–301. M^{1/2}: Sav 302–339. M³: Sav 340–354. P₄: 355–360. M_{1/2}: 361–390. M₃: 391–397.

Definition of the stage of wear. – To find some regularity in the teeth structure in the middle stage of wear SW-3 and 4 was a difficult matter for the upper teeth, especially in regards the sinus height. As a rule, most of the upper teeth in some advanced stage of wear show a semigraben very closed to the labial border. But with increased of wear, the lamellae of enamel can overtake the labial border of the crown. On the basis of this labile regularity the stages of wear are present in the following way: Upper teeth: SW-1 unworn or almost unworn stage with graben and all the synclines “opened”. SW-2: slightly worn. SW-3: semigraben is present. SW-4: “graben” is present. SW-5: very advanced worn stage;

Table 49: Measurements of the M^{1/2} of *Archaeomys* (*Archaeomys*) *kaelini* n. sp. from Fornant-6 (France)

SW	N		range	\bar{X}	S	V
3	11	Sinus height	1,08–4,08	2,35	0,80	–
	10	Length	2,00–2,42	2,10	0,13	6,22
	12	Width	1,83–3,00	2,57	0,37	14,32
	8	Sinus length	1,83–2,83	2,23	0,38	16,92
	10	Extrasinus distance	0,02–0,17	0,09	0,05	–
	10	Crown height	1,75–4,08	2,93	0,64	–
4	5	Sinus height	0,83–2,92	1,97	0,86	–
	7	Length	2,08–2,50	2,27	0,17	7,62
	8	Width	2,08–3,00	2,54	0,38	14,92
	4	Crown height	1,08–2,75	1,98	0,75	–
5	7	Sinus height	0,08–1,83	0,94	0,68	–
	8	Length	2,00–2,42	2,17	0,14	6,66
	8	Width	2,50–3,08	2,74	0,21	7,68
	5	Sinus length	2,50–2,67	2,57	0,07	2,75
	7	Extrasinus distance	0,08–0,20	0,11	0,05	–
	8	Crown height	0,50–2,67	1,32	0,84	–

Table 50: Measurements of the M³ of *Archaeomys (Archaeomys) kaelini* n. sp. from Fornant-6 (France)

SW	N		range	\bar{X}	S	V
2	1	Sinus height	–	3,58	–	–
	1	Length	–	1,92	–	–
	1	Width	–	1,83	–	–
	1	Sinus length	–	1,67	–	–
	1	Extrasinus distance	–	0,24	–	–
	1	Crown height	–	4,00	–	–
3	7	Sinus height	1,92–2,58	2,20	0,28	12,59
	6	Length	1,83–2,17	2,00	0,12	5,94
	7	Width	1,75–2,33	2,00	0,19	9,57
	3	Sinus length	1,75–2,33	2,02	0,29	14,35
	2	Extrasinus distance	0,04–0,16	0,10	0,08	–
	5	Crown height	2,17–2,67	2,47	0,19	7,72
4	4	Sinus height	0,58–1,75	1,21	0,52	–
	2	Length	2,33–2,42	2,38	0,06	2,68
	3	Width	2,25–2,58	2,39	0,17	7,21
	1	Sinus length	–	2,25	–	–
	1	Extrasinus distance	–	0,04	–	–
	4	Crown height	0,92–2,25	1,69	0,63	–

Table 51: Measurements of the P₄ of *Archaeomys (Archaeomys) kaelini* n. sp. from Fornant-6 (France)

SW	N		range	\bar{X}	S	V
2	2	Sinusid height	2,67–2,75	2,71	0,06	2,09
	2	Length	2,83–2,92	2,88	0,06	2,21
	2	Width	1,50–1,67	1,59	0,12	7,58
	2	Crown height	3,33–3,67	3,50	0,24	6,87
3	4	Sinusid height	2,00–2,42	2,19	0,22	10,04
	2	Length	–	3,58	–	–
	3	Width	1,67–2,08	1,89	0,21	10,93
	4	Crown height	2,92–3,33	3,06	0,18	5,95

Table 52: Measurements of the M_{1/2} of *Archaeomys (Archaeomys) kaelini* n. sp. from Fornant-6 (France)

SW	N		range	\bar{X}	S	V
2	1	Sinusid height	–	2,67	–	–
	1	Length	–	2,00	–	–
	1	Width	–	2,08	–	–
	1	Crown height	–	3,83	–	–
3	4	Sinusid height	1,67–2,25	1,88	0,26	13,78
	6	Length	2,00–2,50	2,17	0,17	8,10
	3	Width	2,08–2,42	2,22	0,18	7,92
	5	Crown height	2,17–2,92	2,57	0,28	11,09
4	12	Sinusid height	0,67–2,08	1,39	0,41	–
	10	Length	2,00–2,42	2,16	0,12	5,68
	9	Width	2,08–2,75	2,38	0,24	10,09
	10	Crown height	1,42–2,75	2,10	0,43	–
5	7	Sinusid height	0,33–1,67	0,81	0,53	–
	6	Length	2,00–2,67	2,20	0,25	11,50
	7	Width	2,33–2,75	2,58	0,20	7,59
	7	Crown height	0,58–2,08	1,52	0,59	–

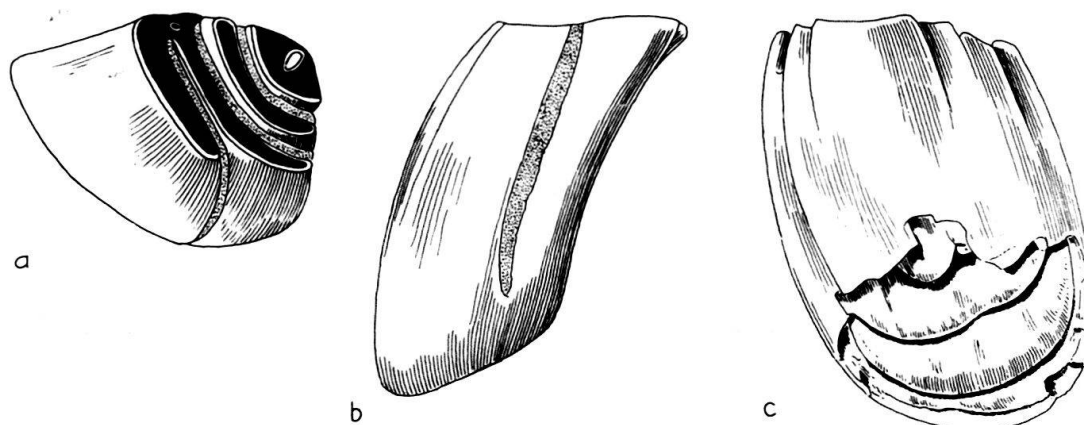


Fig. 34. *Archaeomys (Archaeomys) kaelini* n. sp. NMB: Sav 280. P⁴ sin. a = occlusal view. b = lingual view. c = posterior-labial view. See the filling laminae III and IV synclines. – All figures $\times 8,33$.

sinus height very reduced and semigraben is again present. Lower teeth: SW-1 and SW-2 as in the upper teeth. SW-3: graben is present. SW-4: semigraben is present. SW-5: sinusid height is very reduced. P⁴ with pseudograben or sinus.

Type locality. – Le Fornant river, Le Fornant, High Savoy, near to Frangy (France). See profile in WEIDMANN (1982, p. 18–21, Fig. 5 and 6, in: JUNG).

Other localities. – Breitenhöchi and Le Lendar (Switzerland), Chavanne (Savoy, France).

Stratum type. – Layer 6 of profile of Le Fornant river. See WEIDMANN (1982, p. 18–21, Fig. 5 and 6, in: JUNG).

Type formation. – Molasse rouge (Red Molasse).

Stratigraphic range. – Oligocene, Upper “Chattien”, assemblage zone of Fornant-6 (see ENGESSER & MAYO 1987).

Geographical distribution. – Central Europe.

Diagnosis. – Species of medium size and high semihypsodonty. Filling laminae to fully filling laminae syncline or synclinids in upper and lower teeth. Without semilaminae or

Table 53: Measurements of the M₃ of *Archaeomys (Archaeomys) kaelini* n. sp. from Fornant-6 (France)

SW	N		range	\bar{X}	S	V
3	2	Sinusid height	1,67–2,00	1,84	0,23	12,72
	3	Length	2,08–2,25	2,17	0,08	3,93
	3	Width	2,17–2,25	2,20	0,05	2,10
	2	Crown height	2,67–2,92	2,80	0,18	6,32
4	3	Sinusid height	1,00–1,67	1,28	0,34	–
	2	Length	–	2,08	–	–
	3	Width	2,00–2,25	2,14	0,13	5,97
	3	Crown height	1,42–2,17	1,78	0,38	–
5	1	Sinusid height	–	0,00	–	–
	1	Length	–	2,25	–	–
	1	Width	–	2,50	–	–
	1	Sinusid length	–	2,67	–	–
	1	Extrasinusid distance	–	0,04	–	–
	1	Crown height	–	0,50	–	–

Table 54: Values of the Pearson's coefficient of variation (V) for the length of the upper and lower teeth

Tooth	N	Taxon	range	\bar{X}	S	V
M ^{1/2}	3	<i>I. bumbachensis</i> n.sp.	2,25–2,50	2,36	0,13	5,41
M _{1/2}	4	<i>B. blainvillei</i>	2,12–2,40	2,28	0,13	5,55
M ₃	3	<i>B. blainvillei</i>	1,88–2,25	2,02	0,20	10,07
P ⁴	6	<i>B. stehlini</i> n.sp.	2,25–2,83	2,44	0,22	9,05
M ^{d/2}	6	<i>B. stehlini</i> n.sp.	2,17–2,33	2,22	0,06	2,94
M ³	5	<i>B. stehlini</i> n.sp.	1,92–2,33	2,15	0,18	8,31
P ₄	7	<i>B. stehlini</i> n.sp.	2,50–3,25	2,95	0,33	11,05
M _{1/2}	9	<i>B. stehlini</i> n.sp.	2,17–2,58	2,31	0,13	5,56
P ⁴	20	<i>I. (S.) weidmanni</i> n.subg.n.sp.	1,58–2,00	1,72	0,10	5,84
M ^{1/2}	24	<i>I. (S.) weidmanni</i> n.subg.n.sp.	1,58–2,08	1,84	0,12	6,37
M ³	12	<i>I. (S.) weidmanni</i> n.subg.n.sp.	1,75–2,00	1,87	0,10	5,24
P ₄	4	<i>I. (S.) weidmanni</i> n.subg.n.sp.	1,92–2,17	2,06	0,10	5,04
M _{1/2}	28	<i>I. (S.) weidmanni</i> n.subg.n.sp.	1,75–2,58	2,35	0,18	7,64
M ₃	6	<i>I. (S.) weidmanni</i> n.subg.n.sp.	1,75–2,33	2,07	0,19	9,30
P ⁴	9	<i>I. (S.) oppligeri</i> n.sp.	1,83–2,17	1,98	0,11	5,54
M ^{1/2}	15	<i>I. (S.) oppligeri</i> n.sp.	1,75–2,33	2,02	0,15	7,39
M ³	12	<i>I. (S.) oppligeri</i> n.sp.	1,67–2,83	2,00	0,32	16,19
P ₄	4	<i>I. (S.) oppligeri</i> n.sp.	2,00–2,33	2,13	0,16	7,46
M _{1/2}	21	<i>I. (S.) oppligeri</i> n.sp.	2,08–2,75	2,44	0,19	7,79
M ₃	6	<i>I. (S.) oppligeri</i> n.sp.	2,17–2,42	2,29	0,10	4,49
P ⁴	5	<i>I. (S.) rickenbachensis</i> n.sp.	1,50–1,83	1,68	0,14	8,12
M ^{1/2}	19	<i>I. (S.) rickenbachensis</i> n.sp.	1,83–2,33	2,01	0,13	6,46
M ³	7	<i>I. (S.) rickenbachensis</i> n.sp.	1,83–2,17	1,99	0,10	5,16
P ₄	5	<i>I. (S.) rickenbachensis</i> n.sp.	1,75–2,25	2,02	0,20	9,87
M _{1/2}	17	<i>I. (S.) rickenbachensis</i> n.sp.	2,17–2,75	2,36	0,15	6,32
M ₃	4	<i>I. (S.) rickenbachensis</i> n.sp.	1,12–1,20	1,16	0,03	2,82
D ⁴	3	<i>N. balmensis</i> n.sp.	1,50–1,60	1,53	0,06	3,77
P ⁴	3	<i>N. balmensis</i> n.sp.	1,33–1,50	1,42	0,08	6,00
M ^{1/2}	24	<i>N. balmensis</i> n.sp.	1,33–1,58	1,45	0,07	5,18
M ³	13	<i>N. balmensis</i> n.sp.	1,16–1,42	1,26	0,12	9,36
P ₄	3	<i>N. balmensis</i> n.sp.	1,50–1,67	1,59	0,08	5,37
M _{1/2}	29	<i>N. balmensis</i> n.sp.	1,32–1,67	1,50	0,08	5,17
M ₃	9	<i>N. balmensis</i> n.sp.	1,33–1,75	1,52	0,12	8,13
P ⁴	3	<i>O. ravellensis</i> n.gen.n.sp.	1,75–1,92	1,83	0,08	4,64
M ^{1/2}	8	<i>O. ravellensis</i> n.gen.n.sp.	1,50–1,92	1,78	0,13	7,65
P ₄	4	<i>O. ravellensis</i> n.gen.n.sp.	1,42–2,00	1,71	0,24	13,98
M _{1/2}	10	<i>O. ravellensis</i> n.gen.n.sp.	1,68–2,17	2,00	0,13	6,69
M ^{1/2}	7	<i>O. huerzeleri</i> n.sp.	2,25–2,50	2,37	0,09	4,03
M _{1/2}	10	<i>O. huerzeleri</i> n.sp.	2,33–2,75	2,52	0,15	5,85
P ₄	4	<i>T. curvistriatus</i>	2,33–2,50	2,42	0,09	3,73
M _{1/2}	13	<i>T. curvistriatus</i>	1,84–2,17	2,03	0,09	4,37
M ₃	5	<i>T. curvistriatus</i>	1,67–1,83	1,74	0,06	3,33
P ⁴	4	<i>T. ernii</i> n.sp.	1,75–2,00	1,90	0,10	5,55
M ^{1/2}	12	<i>T. ernii</i> n.sp.	1,50–1,92	1,72	0,10	5,99
M ³	20	<i>T. ernii</i> n.sp.	1,33–1,75	1,51	0,16	10,95
P ₄	3	<i>T. ernii</i> n.sp.	2,33–2,50	2,44	0,10	4,02
M _{1/2}	25	<i>T. ernii</i> n.sp.	1,67–2,08	1,84	0,10	5,73
M ₃	9	<i>T. ernii</i> n.sp.	1,34–1,75	1,56	0,13	8,45
P ⁴	10	<i>A. (A.) kaelini</i> n.sp.	2,33–2,92	2,60	0,18	6,92
M ^{1/2}	25	<i>A. (A.) kaelini</i> n.sp.	2,00–2,50	2,17	0,16	7,31
M ³	11	<i>A. (A.) kaelini</i> n.sp.	1,83–2,42	2,08	0,20	9,66
P ₄	4	<i>A. (A.) kaelini</i> n.sp.	2,83–3,58	3,23	0,41	12,66
M _{1/2}	23	<i>A. (A.) kaelini</i> n.sp.	2,00–2,67	2,16	0,17	7,89
M ₃	6	<i>A. (A.) kaelini</i> n.sp.	2,08–2,25	2,15	0,08	3,89

laminar syncline or synclinids in worn stage. D^4 with II syncline and without I. P^4 with pseudograben in SW-1 or SW-2 and long sinus and II syncline after SW-3. M^1-M^3 : with graben in SW-1 or SW-2 and semigraben after SW-3; pseudograben, sinus or II syncline absent. Enamel crest on crown surface very thin. Lamellae in lower teeth with angular disposition.

Differential diagnoses. – *A. (Archeomys) kaelini* n. sp. differs from *A. (Archeomys) intermedius* VIANEY-LIAUD 1977 in the following characters:

- robuster shape,
- higher semihypsodonty,
- absence of tubular and pseudolaminar synclines in M^1-M^3 ,
- longer synclines,
- longer semigraben,
- presence of filling to fully filling laminated synclines,
- absence of pseudograben in M^1-M^3 ,
- considerably thicker cellular cement in sinus and sinusid,
- different position of the posterior palatine foramen,
- presence of many foramina in palatine sulcus,
- D^4 without I syncline.

From *A. (Archeomys) helveticus* VIANEY-LIAUD 1977 in the:

- D^4 with II syncline,
- smaller size,

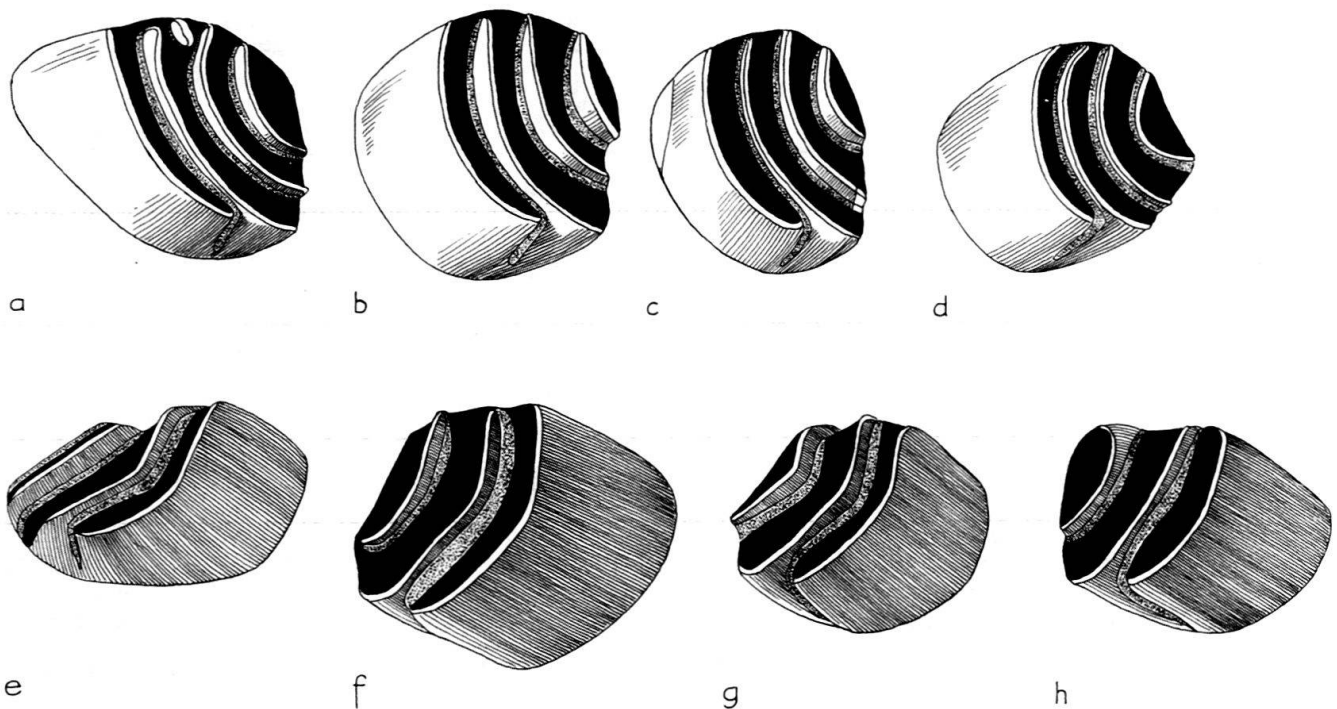


Fig. 35. *Archeomys (Archeomys) kaelini* n. sp. a = NMB: Sav 284. P^4 dex (invers.). b = NMB: SAV 302. M^1 dex (invers.). c = NMB Sav 303. M^2 sin. d = NMB: Sav 340. M^3 dex (invers.). e = NMB: Sav 355. P_4 sin. f = NMB: Sav 361. $M_{1/2}$ dex (invers.). g = NMB: Sav 362. $M_{1/2}$ dex (invers.). h = NMB: Sav 391. M_3 dex (invers.). Fornant-6, Savoy, France. – All figures $\times 8,33$.

DEVELOPMENT AND STRATIGRAPHICAL RANGE OF THE THERIDOMYIDAE
IN THE OLIGOCENE OF THE MOLASSE BASIN OF SWITZERLAND AND SAVOY

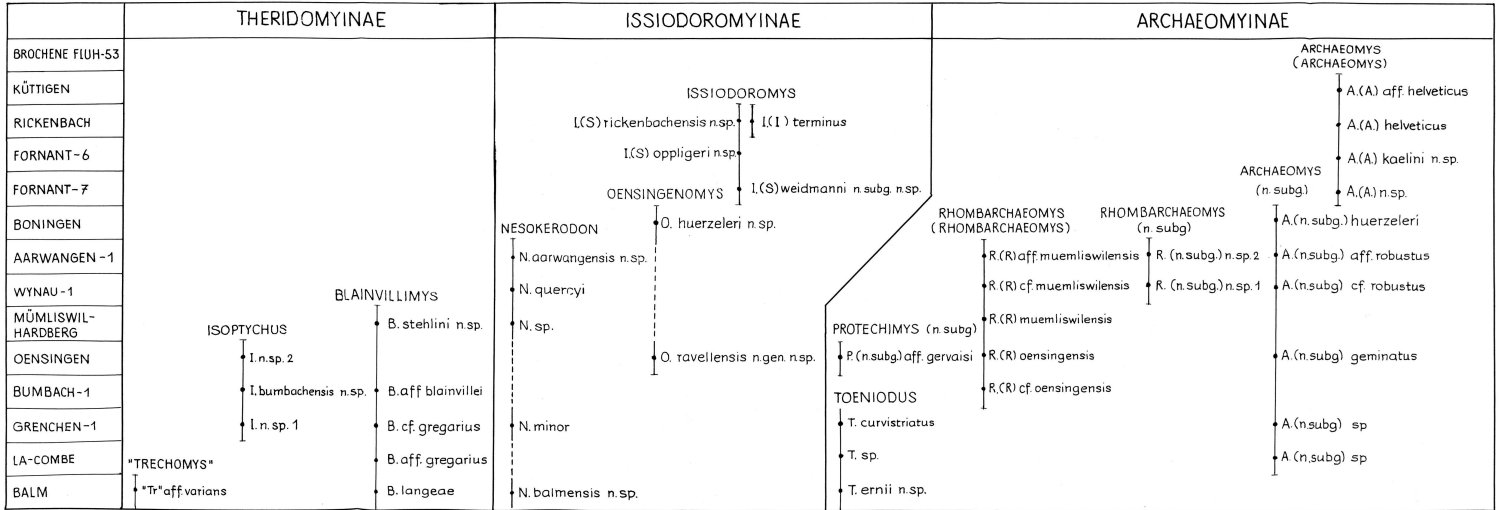


Table 56: Student-t Test for the length of upper and lower teeth

Tooth	SW	N	X ₁	Taxon ₁	X ₂	Taxon ₂	Measurement	σ ²	s	t	95%	99%
M _{1/2}	*	11	1,45	<i>B. blainvillei</i>	1,84	<i>B. stehlini</i>	Sinusid length	0,02	0,10	3,98	+	+
M _{1/2}	*	12	1,45	<i>B. blainvillei</i>	1,16	<i>B. stehlini</i>	Ratio W/sd.l	0,004	0,04	7,79	+	+
P ⁴	3 + 4 + 5	19	1,72	<i>I. (S.) weidmanni</i> (R. du Bey)	1,67	<i>I. (S.) weidmanni</i> (Fornant-7)	Length	0,005	0,04	1,23	-	-
P ⁴	3 + 4	15	1,74	<i>I. (S.) weidmanni</i>	2,06	<i>I. (S.) oppligeri</i>	Length	0,004	0,04	8,68	+	+
M _{1/2}	3 + 4 + 5	35	1,75	<i>I. (S.) weidmanni</i>	2,05	<i>I. (S.) oppligeri</i>	Length	0,112	0,12	2,59	+	+
M _{1/2}	4 + 5	43	2,36	<i>I. (S.) weidmanni</i>	2,44	<i>I. (S.) oppligeri</i>	Length	0,027	0,05	1,60	-	-
M _{1/2}	3 + 4 + 5	31	2,05	<i>I. (S.) oppligeri</i>	2,00	<i>I. (S.) rickenbachensis</i>	Length	0,019	0,05	1,10	-	-
M _{1/2}	4 + 5	38	2,43	<i>I. (S.) oppligeri</i>	2,34	<i>I. (S.) rickenbachensis</i>	Length	0,033	0,06	1,58	-	-
M _{1/2}	*	29	1,49	<i>N. balmensis</i>	1,75	<i>N. medius</i>	Length	0,004	0,04	5,89	+	+
M _{1/2}	*	34	1,99	<i>T. curvistriatus</i>	1,86	<i>T. ernii</i>	Length	0,006	0,03	4,27	+	+

* All the available SW

- lower semihypsodonty,
- constant presence of II syncline in the worn P⁴,
- presence of filling laminar synclines or synclinids,
- shorter synclines or synclinids,
- thinner cellular cement in the sinus and sinusid,
- thinner antyclines or antyclinids.
- thinner enamel crest on upper or lower teeth.

Discussion. – MAYO (1984, p. 16, in: ENGESSER et al.) indicated *A. (Archaeomys) kaelini* n. sp. from Fornant-6 as different to *A. (Archaeomys) helveticus* VIANEY-LIAUD 1977. MAYO (1986, p. 5, in: ENGESSER et al.) identified with some doubt the poor material from Talent-6 as *Archaeomys (Archaeomys)* n. sp. from Fornant-6. It could be expected that some morphotypes with pseudograben in unworn or slightly worn teeth, are placed together with morphotypes with graben instead pseudograben, as in the case of the fissure filling of Pech Desse and Pech du Fraysse (Quercy). But in the 52 upper molars from Fornant-6 there are none with pseudograben or a II syncline. That means that of the population 100% have graben or semigraben and the II syncline is completely absent. On the strength of these characters, *A. (Archaeomys) kaelini* n. sp. is a distinguishably different species to *A. (Archaeomys) intermedius*. On the other hand, of the 18 P⁴ there are none represented without a II syncline (see MAYO 1987, p. 29). This character, the smaller size, lower crown height, etc. permits the separation of *A. (Archaeomys) kaelini* n. sp. from *A. (A.) helveticus*. The examination of the IV syncline is especially recommended in all comparison (see MAYO 1987, p. 27–28, Fig. 3). The characters of the maxilla were observed in the specimen from Breitenhöchi.

Measurements in the Tables 48–53.

Statistical test in the Tables 54 and 56.

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