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Cover illustration: Cover illustration: The floating plant *Cobbania corrugata* (Lesquereux) Stockey et al. from the Upper Cretaceous of North America inspected by an *Ornithomimus* dinosaur. The quarry in the Dinosaur Provincial Park, Alberta (Canada), produced numerous complete specimens of this plant and the most complete skeleton of the dinosaur (Reconstruction by Marjorie Legin). For details, see Bogner, J.: The free-floating Aroids (Araceae) – living and fossil, pp. 113–128 in this issue.

Umschlagbild: Umschlagbild: Ein *Ornithomimus* Dinosaurier betrachtet die Schwimmpflanze *Cobbania corrugata* (Lesquereux) Stockey et al. aus der Oberkreide Nordamerikas. Im Steinbruch des Dinosaur Provincial Park, Alberta (Kanada), wurden mehrere komplette Exemplare dieser Pflanze und ein nahezu vollständiges Skelett des Dinosauriers gefunden (Rekonstruktion Marjorie Legin). Für weitere Informationen siehe Bogner, J.: The free-floating Aroids (Araceae) – living and fossil, S. 113–128 in diesem Heft.

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This paper is dedicated to the memory of the late Prof. Dr. Volker Fahlbusch

Erinaceidae (Mammalia, Erinaceomorpha) from the Middle Miocene fissure filling Petersbuch 68 (southern Germany)

By
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Abstract

The erinaceid teeth from the fissure filling Petersbuch 68 can be divided into two taxonomically and biostratigraphically independent groups. The specimens from the middle part of the fissure filling (MN 5) represent one species (*Galerix* cf. *symeonidisi*), whereas the fauna from the upper part of the filling is more diversified, containing four species: *Galerix* sp., *Parasorex socialis* and Erinaceinae gen. et sp. indet. I and II. The occurrence of *P. socialis* may suggest that the fauna may belong to MN 7–8. However, we hold the opinion that the sample is better placed in MN 6 based on the absence of the typical MN 7–8 cricetid rodents. The *P. socialis* specimens from Petersbuch 68 represent the earliest occurrence of the genus *Parasorex* in southern Germany, but additional material from stratified deposits will be necessary to confirm this important discovery and clarify its impact on biostratigraphy and paleobiogeography.

Key words: Hedgehog, Gymnure, insectivore, Biostratigraphy, Neogene, North Alpine Foreland Basin.

Zusammenfassung

Die Erinaceiden aus der Spaltenfüllung Petersbuch 68 entsprechen zwei biostratigraphisch unabhängigen Faunen. Die Molarstichprobe aus dem mittleren Teil der Spalte (MN 5) enthält nur eine Art: *Galerix* cf. *symeonidisi*. Die Fauna des obersten Teils der Spalte ist stärker diversifiziert und enthält vier Arten: *Galerix* sp., *Parasorex socialis* und Erinaceinae gen. et sp. indet. I und II. Die Anwesenheit von *P. socialis* könnte erlauben, die Fauna mit MN 7–8 zu korrelieren. Aufgrund des Fehlens von typischen Cricetiden für MN 7–8 Cricetid Arten, wird die Fauna mit MN 6 korreliert. *P. socialis* aus Petersbuch 68 entspricht den ältesten Vorkommen der Art in Süddeutschland, aber neue Funde aus stratifizierten Ablagerungen sind notwendig, um diese bedeutende Beobachtung zu bestätigen und die Auswirkungen auf die Biostratigraphie und Paläobiogeographie zu zeigen.

Schlüsselwörter: Igel, Gymnure, Insektenfresser, Biostratigraphie, Neogen, Nordalpines Vorlandbecken

1. Introduction

The karsts of the Franconian and Swabian alb plateau (South Germany) contain rich and well-preserved fossil faunas (see for example references in Rummel 1993 and Prieto & Rummel 2009). The richest of these karsts come from the White Jura-δ of Petersbuch near Eichstätt, with more than 100 fossil faunas discovered to date.

The cricetid rodent assemblage from the infilling Petersbuch 68 can be divided into two biostratigraphically distinct samples (Prieto & Rummel 2009). The sample collected from the top of the fissure contains *Democricetodon* aff. *crassus*, *D. mutilus, D.* aff. *freisingensis, Megacricetodon minor*, *M.* aff. *similis* and *M.* aff. *germanicus*; the absence of *M.* aff. *gregarius* indicates MN 6 (youngest part). The evolutionary level of the larger *Megacricetodon* species corresponds well with that seen in the specimens from the Swiss locality Zeglingen (Kälin 1993, 1997). The test sample collected approximately two meters below contains MN 5 taxa, including *Megacricetodon* aff.

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bavaricus. With regard to the local biostratigraphic scale (see for example Heissig 1997; Abdul Aziz et al. 2008;), this species can be assigned to the unit OSM C+D, which comprises the well-known fossil localities Puttenhausen and Sandelzhausen (Fahlbusch 1964; Fahlbusch & Wu 1981; Wu 1982; Wessels & Reumer 2009).

Faunal associations representing the youngest MN 6 have not yet been discovered in the German part of the North Alpine Foreland Basin (NAFB; Heissig 2006); moreover, the Swiss record, although better documented (Kälin et al. 2001), does at present not allow a detailed reconstruction of the faunal succession during this period of time. In addition, several major immigration waves into the NAFB occurred around MN 7, and this, together with major climatic changes (see Böhme 2003; Böhme et al. 2008), significantly affected the α-diversity of the faunal associations (Kälin et al. 2001). Not much is known to date about the evolution of the insectivores since these animals are underrepresented in most fossil localities. Thus, the exceptional abundance of insectivore fossils from Petersbuch 68 provides a rare opportunity to study a German MN 6 insectivore association. The erinaceids are of special interest with regard to biostratigraphy because morphological changes occurred within this group of animals through time. Moreover, the group displays an interesting paleobiogeographic distribution (Engesser 1980; Van den Hoek Ostende 2001; Selänne 2003).

2. Methods

The terminology used in the description of the dental elements of the Erinaceidae follows Engesser (1980); orientation of the elements during measurement is indicated in Figure 1. All tooth sizes are provided in mm, and all specimens illustrated are in the left orientation. The material is deposited in the Naturmuseum Augsburg (NMA, upper part of the fissure filling) under accession number 2007-x/2017, and in the Bavarian State Collection for Palaeontology and Geology in Munich (BSPG, sample of the middle part of the fissure filling) under accession number 2008 V. Right specimens are figured in left orientation. Measurements of the dental elements (Fig. 1) are consistently given as follows: length x (width1 x width2).

3. Systematic palaeontology

Order: Erinaceomorpha Gregory, 1910
Family: Erinaceidae Fischer von Waldheim, 1817
Subfamily: Galericinae Pomel, 1848
Tribe: Galericini Pomel, 1848

Genus: *Galerix* Pomel, 1848

Diagnosis (emended): Van den Hoek Ostende (2001).

Type species: *Viverra exilis* de Blainville, 1839.

Other species included in *Galerix*: *Galerix stehlini* (Gaillard, 1829), *Galerix africana* Butler, 1956, *Galerix rutlandae* Munthe & West, 1980, *Galerix symeonidisi* Doukas, 1986, *Galerix aurelianensis* Ziegler, 1990, *Galerix saratji* Van den Hoek Ostende, 1992, *Galerix uenayae* Van den Hoek Ostende, 1992, *Galerix remmerti* Van den Hoek Ostende, 2003, *Galerix kostakii* Doukas & Van den Hoek Ostende, 2006. *'Schizogalerix' iliensis* Kordikova, 2000 has been transfered to *Galerix* by Doukas & Van den Hoek Ostende (2006).

Species: *Galerix* cf. *symeonidisi* Doukas, 1986
Figure 2A–D

Diagnosis: Doukas 1986.

Type locality: Aliveri (Greece).

Stratigraphic correlation: Lower Miocene, MN 4.

Origin of the material: middle part of the fissure filling Petersbuch 68.

Material und measurements: mandible with p4 and m2-m3, mandible with m1, mandible with m3, maxillary with P3-P4, maxillary with P3, maxillary with C (BSPG 2008 V 27–32): p4: 1.95 x 1.40; m1: 2.57 x (1.50 x 1.82); m3: 2.08 x (1.40 x 1.23); C: 1.62 x 1.12; P3: 1.78 x (1.30 x 1.33); 2 x (1.55 x 1.48); P4: 2,37 x (2.05 x 2.33).

Description and discussion: The most complete

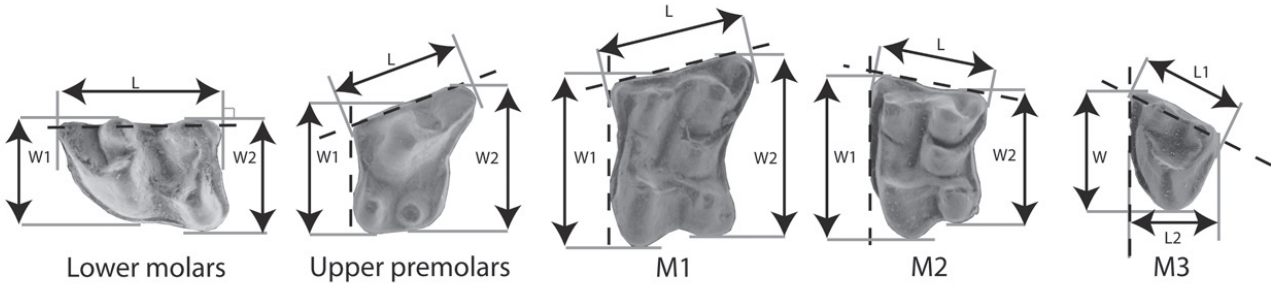

Figure 1: Measurement method. Dotted lines: baselines. In case of T-shaped teeth (for example part of the P3, D3) the width (W) will be measured perpendicular to the length (L). In case of a reduced talonid (for example lower premolars) only the W1 is measured.

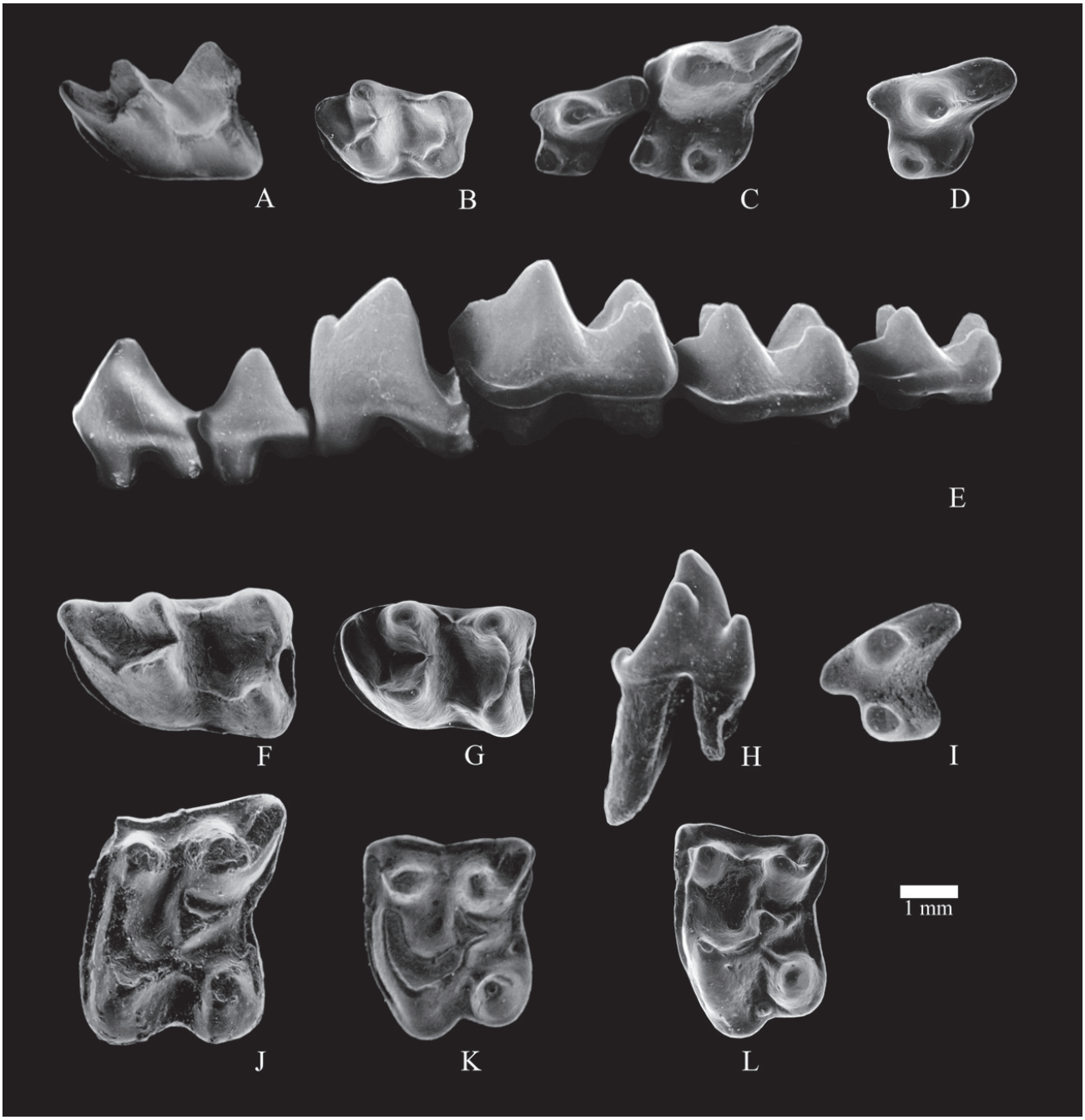

Figure 2: *Galerix* Pomel, 1848 from Petersbuch 68. All teeth are shown in left orientation. **A–D:** *Galerix* cf. *symeonidisi* Doukas, 1986. **A:** left m1 (BSPG 2008 V 30); **B:** right m3 (BSPG 2008 V 29); **C:** right maxillary with P3-P4 (BSPG 2008 V 31); **D:** right P3 (BSPG 2008 V 32). **E–L:** *Galerix* sp.. **E:** left mandible with p2-m3 (NMA 2007-166/2017); **F:** right m1 (NMA 2007-173/2017); **G:** right m2 (NMA 2007-167/2017); **H:** right p4 (NMA 2007-169/2017); **I:** left P3 (NMA 2007-171/2017); **J:** right M1 (NMA 2007-172/2017); **K–L:** right M2 (NMA 2007-168 and 170/2017). A–D, F, G, I–L in occlusal view; E in labial view; H in lingual view.

mandible has the p4, m2 and m3 preserved in situ; six alveoli are present before the p4; the p2 was originally at least as large as the p3, or larger; the mental foramen lies under the anterior alveolus of the p3; the apophyse of the coronoid process is broken; the morphology of the articular condyle and angular process is similar to *Galerix exilis* from Goldberg (Ziegler 1983: plates 6 and 7). The posterior cingulid connects to the postcristid in one m2; the ectocingulid is complete in one m2 and absent from the labial walls of the protoconid and hypoconid in the second.

The p4 can easily be distinguished from the *Parasorex* specimens based on its larger size and lack of a distinct paralophid. Moreover, the relative size of the p2/p3 argues against affinities of the fossil with *Parasorex*. Although the p4 can be attributed to *Galerix*, it clearly differs in size and morphology from *Galerix* sp. from the upper part of the fissure (see below). One of the two P3 has a single lingual cusp (Fig. 2D), whereas the second has two cusps (Fig. 2C). The number of internal cusps in the P3 of *Galerix* is regarded as an important diagnostic feature. Ziegler & Fahlbusch (1986) postulated the existence

of a lineage *G. symeonidisi* (with two internal cusps) – *G. exilis* (with one cusp) in the Miocene of South Germany. Van den Hoek Ostende (2001) and Van den Hoek Ostende & Doukas (2003), however, questioned this hypothesis and concluded that *G. exilis* slowly replaced *G. symeonidisi* (see also Ziegler 2005: 138). The latter theory would imply that the two *Galerix* species may co-occur in the same sample. However, we cannot entirely rule out that the P3 from Petersbuch 68 with a single lingual cusp may belong to *Galerix* sp.

Based on the limited number of specimens available and unresolved taxonomical problems, the specimens are here assigned to *G.* cf. *symeonidisi*.

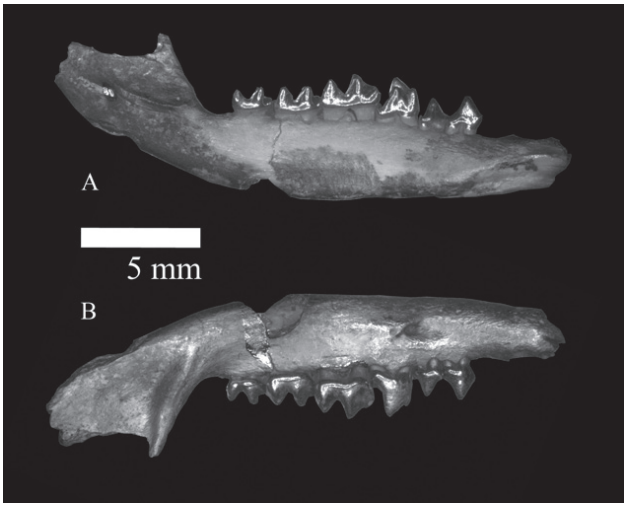

Figure 3: *Galerix* sp. from Petersbuch 68: left mandible with p2-m3 (NMA 2007-166/2017); **A:** lingual view; **B:** labial view.

Species: *Galerix* sp.
Figure 2E–L; Figure 3

Origin of the material: upper part of the fissure filling Petersbuch 68.

Material und measurements: one fragmentary mandible with p2-m3, 12 isolated teeth (NMA 2007-166 to 178/2017): p2: 1.93 x 1.03; p3: 1.80 x 1.03 p4: 2.33 x 1.52, 2.15 x 1.33; m1: 3.17 x (2.03 x 2.25), 3.25 x (1.88 x 2.02); m2: 2.70 x (1.83 x 1.87), 2.73 x (1.78 x 1.87), 2.57 x (1.80 x 1.85); m3: 2.25 x (1.60 x 1.35); P3: 2 x 1.73; M2: 2.05 x (2.87 x 2.40); 2.25 x (2.78 x-); 2.28 x (2.92 x 2.65); 2.10 x (2.73 x 2.53); 2.42 x (3.17 x 2.95).

Description and discussion: The base of the ascendens ramus is preserved in the lower jaw (Fig. 3); originally, the condylar process lied somewhat above the tooth row; the ventral edge of the internal temporal fossa also lies under the tooth row; the anterior part of the horizontal ramus is broken off; the mental foramen is positioned below the p3/p4.

The posterior cingulid does not connect the entoconid in the m1 and m2; the P3 has one lingual cusp and the parastyle is well developed; the liaison protocone-hypocone-metaconule is variable in the two first upper molars: the liaison protocone-metaconule may be reduced (Fig. 2J), or the hypocone is isolated (Fig. 2K); All three crests are present in some specimens (Fig. 2L); the posterior cingulum is continuous in M1 and M2.

The following complement of morphological characters permits assignment of the teeth from Petersbuch 68 to the genus *Galerix*:

-the p4 does not have a paralophid, but possesses a cuspidate paraconid.

-the p2 is larger than p3.

-the posterior arm of the metaconule does not extend to the posterior cingulum in the M1 and M2.

The large *Galerix* from Petersbuch 68 shares several metrical and morphological features with *G. stehlini* and *G. aurelianensis*. For example, the mandible from Peterbuch 68 corresponds to that seen in the specimens from La Grive in France (Van den Hoek Ostende 2001: fig. 8B). Ziegler (1990, 2000) proposes that *G. aurelianensis* from the South German Lower Miocene may represent the ancestor of *G. stehlini* from the Middle Miocene of La Grive M and L7 (Ziegler 1983; Mein & Ginsburg 2002). The two species mainly differ in the position of the mental foramen, and the p4 of *G. aurelianensis* has a higher paraconid and stronger metaconid (Ziegler 1990). Since the position of the mental foramen is variable in *G. aurelianensis* and this character is useful for large collections of mandibles. The height of the paraconid in the p4 from Petersbuch 68 does not correspond with *G. stehlini* because this structure is very low in the latter form (Ziegler 1983: fig. 89). It is also higher than in *G. aurelianensis* and the metaconid is less pronounced. In addition, the species from Petersbuch 68 differs from *G. aurelianensis* from Petersbuch 2 in:

-the m1, the narrower trigonid basin; this suggests that the paraconid is positioned more labially in *G. aurelianensis* than in Petersbuch 68, where this cuspid is almost in line with the metaconid; the anterior cingulid regularly extends from the protoconid to the paraconid in *G. aurelianensis*; this cingulid is clearly more convex in Petersbuch 68.

-the lower molars, the higher paralophid in Petersbuch 68.

-the M1 and M2, the shorter metastyle.

If Ziegler's (1990) suggestion that *G. aurelianensis* and *G. stehlini* belong to one lineage is correct, the p4 of intermediate species should display a paraconid with intermediate height. However, this is not the case in the material from Petersbuch 68. Moreover, Ziegler (2000) described a large representative of *Galerix* from Sandelzhausen (late part of OSM C+D according to the local biostratigraphic scale; see Abdul-Aziz et al. 2008; Moser et al. 2009) that clearly represents an intermediate form and differs from Petersbuch 68 in the p4. The four premolars from Sandelzhausen have a distinct posterior basal cuspule (Ziegler 2000: pl. 2, fig. 26), whereas the postcingulid is isolated from the main cusp in the material from Petersbuch 68, or a narrow ridge may ascend in Petersbuch 2.

Taking the preceding considerations into account, it is impossible to assign the species from Petersbuch 68 to the same lineage that includes *G. aurelianensis*, *G. aurelianensis-stehlini* (Sandelzhausen) and *G. stehlini*. As a result, the exact taxonomic position of the species remains conjectural. We cannot rule out that the specimens from Petersbuch 68 represent a new species.

Genus: *Parasorex* von Meyer, 1865

Diagnosis (emended): Van den Hoek Ostende (2001).

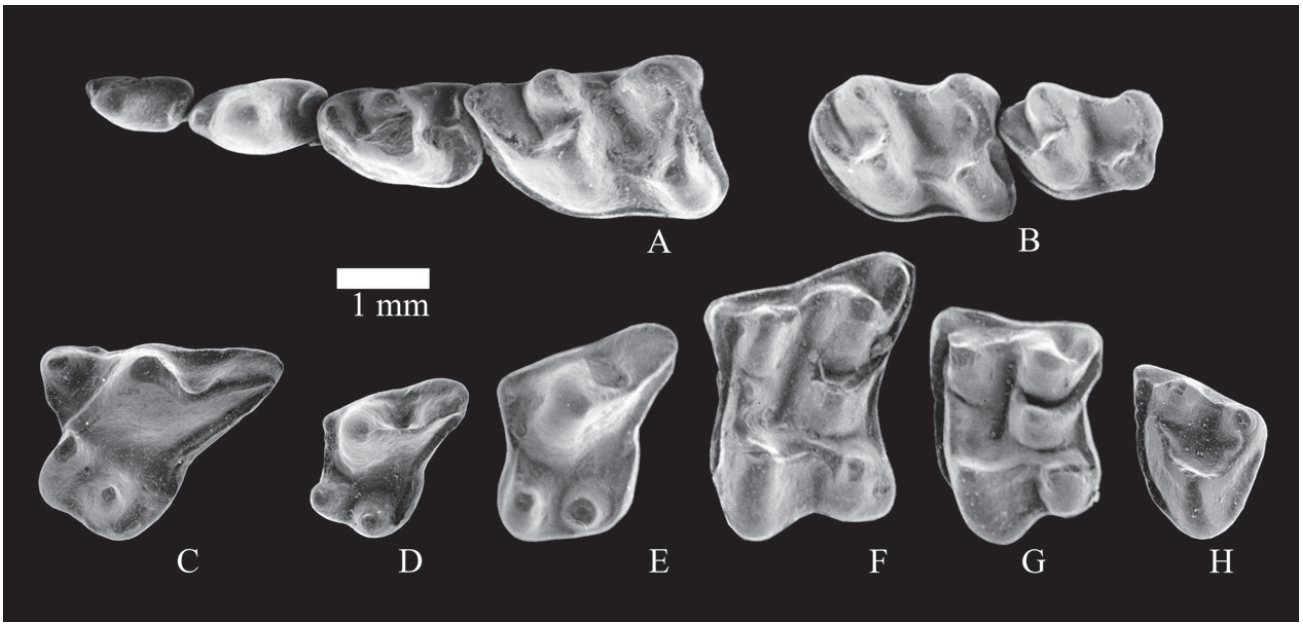

Figure 4: *Parasorex socialis* von Meyer, 1865 from Petersbuch 68. All specimens are shown in left orientation and in occlusal view. **A:** right mandible with p2-m1 (NMA 2007-195/2017); **B:** right mandible with m2-m3 (NMA 2007-196/2017); **C:** right D4 (NMA 2007-198/2017); **D:** left P3 (NMA 2007-199/2017); **E:** left P4 (NMA 2007-199/2017); **F:** left M1 (NMA 2007-197/2017); **G:** left M2 (NMA 2007-201/2017); **H:** right M3 (NMA 2007-204/2017).

Type species: *Parasorex socialis* von Meyer, 1865.

Other species included in *Parasorex*: *Parasorex depereti* (Crochet, 1986), *Parasorex iberica* (Mein & Martin-Suarez, 1993). Doukas & Van den Hoek Ostende proposes to place *Schizogalerix pristina* Ziegler, 2003 in the genus *Parasorex*.

Species: *Parasorex socialis* von Meyer, 1865
Figure 4

Diagnosis (Emended): Ziegler (1983: 135)

Type locality: Steinheim a.A.

Stratigraphic correlation: Middle Miocene (MN 7).

Origin of the material: upper part of the fissure filling Petersbuch 68.

Material and measurements: 56 fragmentary mandibles, 7 fragmentary maxillaries and 752 isolated teeth (NMA 2007 - 195 - 876, 881 - 1023/2017); measurements: see Table 1 and Figure 5.

Description and discussion: Ziegler (2005) described

Table 1: *Parasorex socialis*, sample statistics of the teeth. n: number of specimens; min: minimum; max.: maximum. See Figure 1 for methods and complementary legends.

		L			W1 (L2 for M3)			W2		
	n	min.	mean	max.	min.	mean	max.	min.	mean	max.
D3	5	1.78	2.09	2.42	1.13	1.21	1.3			
D4	11	2.38	2.62	2.9	1.83	1.96	2.17	1.85	2.16	2.37
P3	45	1.63	1.87	2.07	1.4	1.71	2	1.57	2.01	2.5
P4	42	2.13	2.36	2.65	2.13	2.39	2.65	2.33	2.76	3.17
M1	70	2.22	2.5	2.73	2.67	2.92	3.27	2.75	3.11	3.43
M2	66	1.93	2.05	2.18	2.65	2.86	3.02	2.42	2.59	2.83
M3	36				1.25	1.42	1.63	1.17	1.32	1.5
d3	8	1.5	1.76	2.02	0.87	0.94	1.02			
d4	17	1.67	1.91	2.13	1.05	1.18	1.3			
p2	16	1.17	1.29	1.4	0.63	0.73	0.82			
p3	30	1.37	1.56	1.73	0.78	0.9	1.05			
p4	24	1.58	1.84	2.02	1.15	1.27	1.4			
m1	38	2.53	2.74	3.12	1.57	1.78	2.07	1.72	1.93	2.25
m2	63	2.13	2.34	2.63	1.25	1.75	2.03	1.13	1.75	2.08
m3	42	1.83	2	2.17	1.18	1.33	1.62	1	1.14	1.37

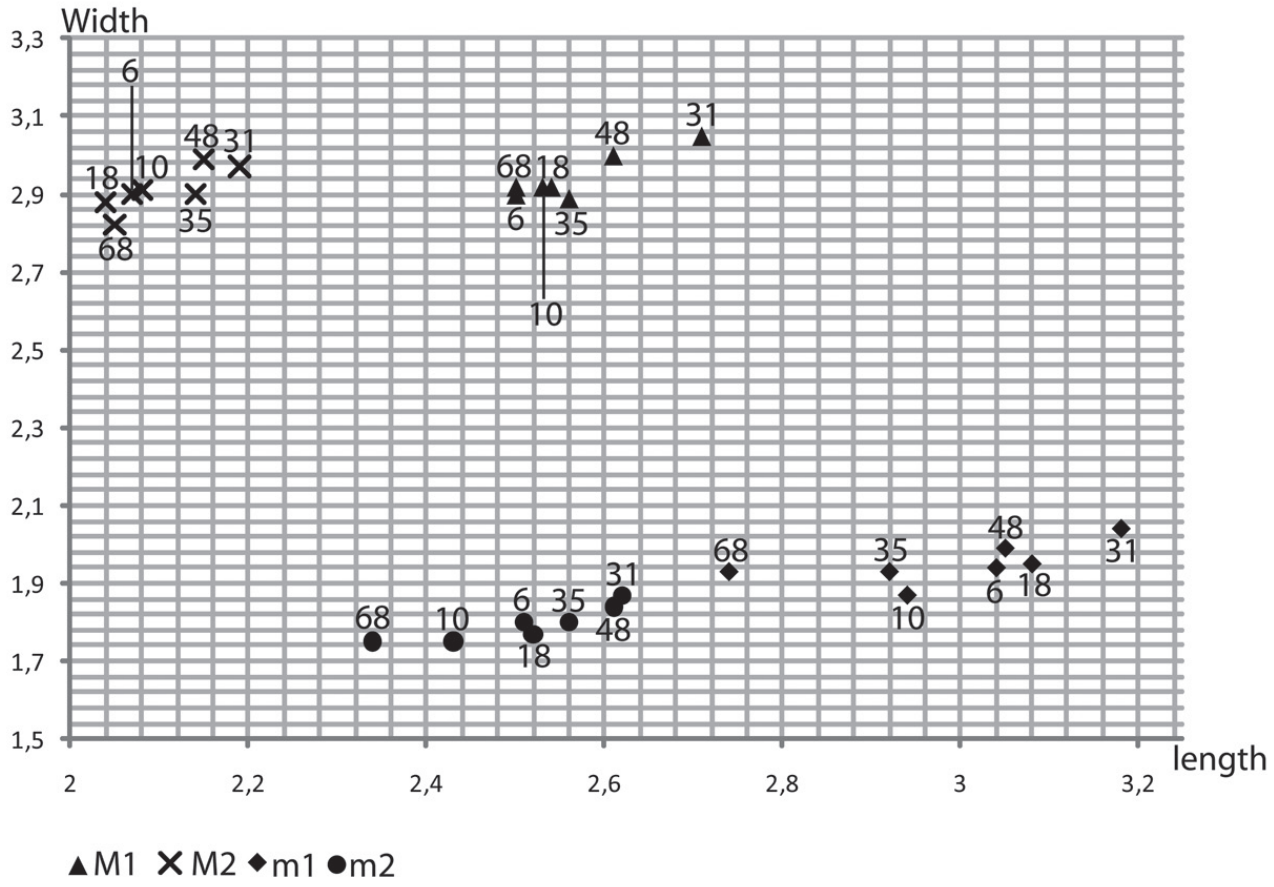

Figure 5: *Parasorex socialis* von Meyer, 1865: Scatter diagram of the mean measurements of the first two upper and lower molars from Petersbuch (Petersbuch 6–48 after Ziegler 2005). The names of the fissure fillings are included in the diagram (example: 68 for Petersbuch 68).

the extremely rich *Parasorex socialis* tooth assemblages from the fissure fillings Petersbuch 6, 10, 18, 31 and 48 (MN 7–MN 8). The material from Petersbuch 68 does not significantly differ from these populations, and thus a detailed description of the material is not necessary; all P3 and P4 are characterized by two lingual cusps; the posterior arm of the metaconule extends to the metastyle in M1 and M2; the mesostyle is undivided and not S-shaped like in *Schizogalerix*; the p3 is larger than the p2; the paralophid is developed in all p4; the posterior cingulid of the two first lower molars is not connected to the entoconid.

The teeth from Petersbuch 68 are smaller than the teeth contained in the samples from Petersbuch 35 and 48 (MN 8), Petersbuch 31 (MN 7), Petersbuch 6 and 18 (earliest MN 8?, Fig. 5) analyzed by Ziegler (2005). They are even smaller than the specimens from Petersbuch 10 (earliest MN 8?). Ziegler hypothesized that these size differences reflect intraspecific variability, and hence are without taxonomic consequences. Unfortunately, the stratigraphic correlation of Petersbuch 6, 10 and 18 remains difficult, and thus it is not possible currently to determine based on the material from these fissure fillings whether the molars of *Parasorex socialis* experienced a successive increase in size.

Subfamily: Erinaceinae Fischer von Waldheim, 1817

Erinaceinae gen. indet.

Erinaceinae gen. et sp. indet. I.
Figure 6A–F

Origin of the material: upper part of the fissure filling Petersbuch 68.

Material and measurements: seven isolated teeth (NMA 2007-179 to 185/2017): p2: 2.63 x 1.78; p3: 2.10 x 1.80, 2.20 x 1.73; m2: 4.50 x (2.88 x 3); P2: 2.10 x 1.47; P3: 2.35 x 1.73; M3: 2.97 x 1.52.

Description and discussion: These molars are grouped together based on their size range. The species from Petersbuch 68 is slightly smaller than "*Mioechinus*" sp. from Petersbuch described by Ziegler (2005). Since the sample from Petersbuch 68 consists of only a few fossils, attribution of the specimens to any of the existing species is impossible.

Erinaceinae gen. et sp. indet. II
Figure 6G–K

Origin of the material: upper part of the fissure filling.

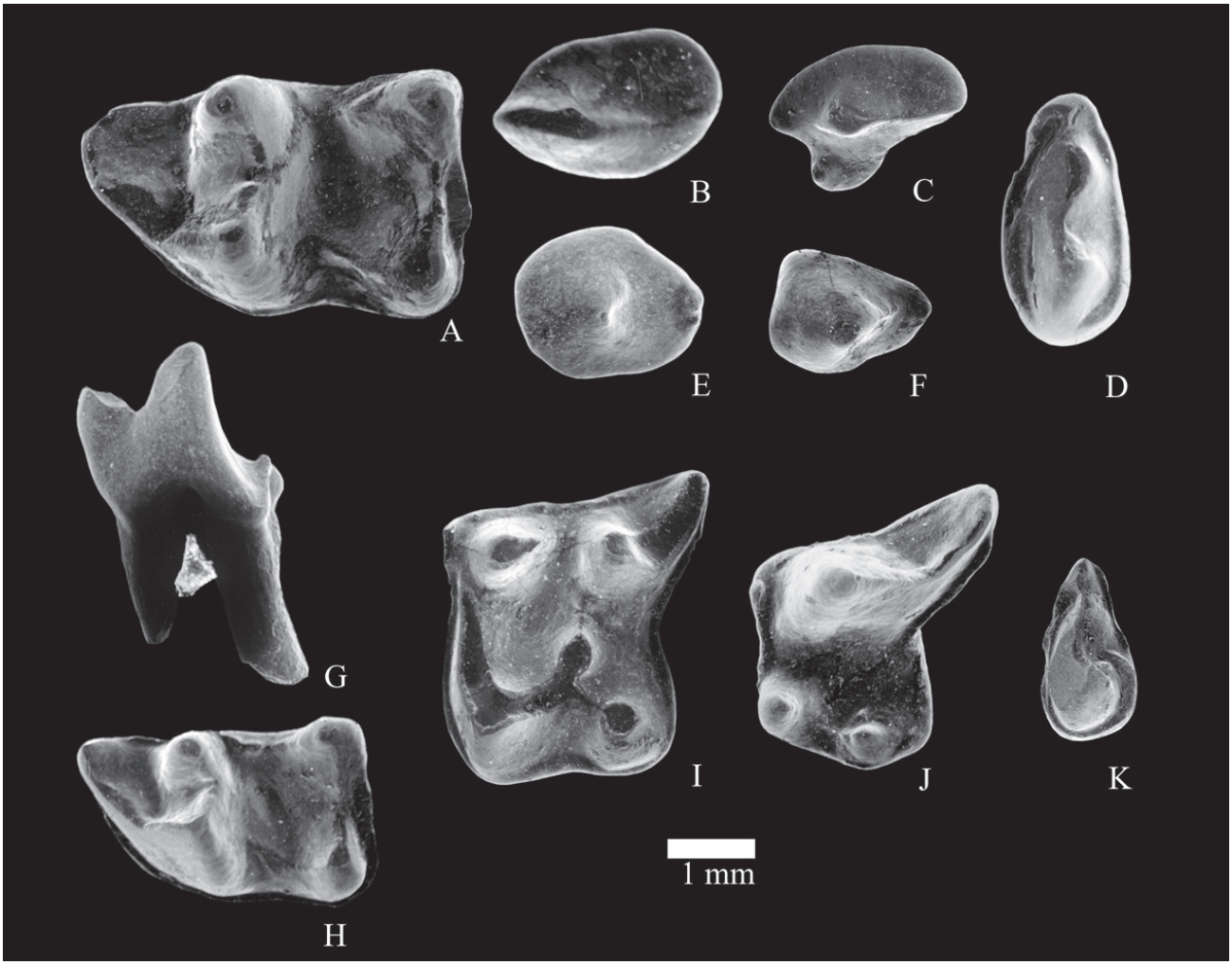

Figure 6: Erinaceinae from Petersbuch 68. All teeth are shown in left orientation. **A–F:** Erinaceinae gen. et sp. indet. I. **A:** right m2 (NMA 2007-179/2017); **B:** right p2 (NMA 2007-185/2017); **C:** right P3 (NMA 2007-184/2017); **D:** right M3 (NMA 2007-180/2017); **E:** left p3 (NMA 2007-181/2017); **F:** right P2 (NMA 2007-183/2017). **G–K:** Erinaceinae gen. et sp. indet. II. **G**: left p4 (NMA 2007-188/2017); **H:** right m1 (NMA 2007-192/2017); **I:** right M1 (NMA 2007-186/2017); **J:** right P4 (NMA 2007-187/2017); **K:** right M3 (NMA 2007-189/2017). A-F in occlusal view, G in labial view; H–K in occlusal view.

Material and measurements: 9 isolated teeth (NMA 2007-179 to 185/2017): p4: 2.07 x 1.60; 2.30 x 1.38; 2.22 x 1.35; m1: 3.55 x (2.17 x 2.35); P4: 2.67 x (2.35 x 2.78); M1: 3.33 x (3.20 x 3.38); M3: 1.17 x 1.98.

Description and discussion: The p4 has a conical paracone; the postcingulid is well developed but does not extend on the labial side of the tooth; in the m1 the postcingulid is well developed as well and extends to the labial border of the molar; the P4 has two lingual cusps, a reduced parastyle and the posterior cingulid does not extend to the metastyl; the metaconule of the M1 is connected to the protocone; the two lingual cusps are isolated.

The small Erinaceinae from Petersbuch 68 differs from the Erinaceinae gen. et sp. indet. from the fissure fillings Petersbuch 6, 10, 18, 31, 35, 48 (possible mix of several species; see Ziegler 2005) in:

- the p4, the absence of ectocingulid.
- the labial outline of the M1. In Petersbuch 68, this border is almost rectilinear, whereas it is marked by a clear depression in specimens from the other fissures.

The material cannot be identified to genus level because essential morphological traits are missing. For the same reason, we refrain from allocating the specimens from Petersbuch 68 to any one of the known species.

4. Biostratigraphic correlations

We follow Kälin et al. (2001) in the separation of the mammal-"zones" 7 and 8. This separation is used as a regional zonation (North Alpine Foreland Basin), but does not imply a general separation of MN 7/8 in the MN zonation. In this context, MN 7 is characterized primarily by the presence of *Megacricetodon gregarius*.

Middle part of the fissure filling: Although certain taxonomic problems cannot be resolved, the presence of *Galerix* cf. *symeonidisi* may suggest that the tooth sample correlates with

MN 3–MN 5 (Ziegler 2006). *G. exilis* is expected to occur in MN 6 (Ziegler 2006). The cricetid rodent sample from the middle part of Petersbuch 68 indicates MN 5 (Prieto & Rummel 2009).

Upper part of the fissure filling: Hedgehog remains do not represent good biostratigraphic index fossils. Based on the inherent taxonomic problems, *Galerix* sp. does not give clear indications with regard to the relative age of the sample.

Parasorex socialis is the most abundant small mammal in the sample. It is traditionally believed to appear not before MN 7 (first occurrence in South Germany in Steinheim; see Ziegler 1999). The last occurrence of the species in South Germany and Switzerland has been recorded for MN 8 localities (e.g. Anwil, Kleineisenbach, Giggenhausen; see Engesser 1972; Prieto 2007). In the North Alpine Foreland Basin regional biostratigraphy, MN 7 is characterizised by the occurrence of *Megacricetodon* aff. *gregarius* (*M. gregarius* in Kälin et al. 2001). *Parasorex socialis* and *M.* aff. *gregarius* co-occur at Steinheim, Helsighausen and Petersbuch 31 (Ziegler 1999; Bolliger 1994; Kälin et al. 2001).

Prieto & Rummel (2009) correlate the cricetid rodent fauna from Petersbuch 68 (upper part of the fissure filling) with MN 6. This correlation implies that *Parasorex* migrated to Germany and Switzerland earlier than *Megacricetodon* aff. *gregarius*.

As a result, the biostratigraphic assignment of the sample either to MN 6 or MN 7 is dependent on the definition used for these zones. The occurrence of *M.* aff. *gregarius* in the NAFB is a very short and characteristic event that has been documented in detail from stratified deposits (Kälin et al. 2001). For this reason, we conserve under these lines this definition and propose to correlate the sample with MN 6, in spite of the presence of *P. socialis*.

5. Conclusions

The occurrence of two biostratigraphically independent faunal assemblages at Petersbuch 68, which has previously been suggested based on cricetid rodents, is here confirmed based on erinaceid dental remains. The middle part of the fissure filling, which contains *Galerix* cf. *symeonidisi* and *Megacricetodon* aff. *bavaricus*, is correlated with MN 5, whereas the upper part is clearly younger (MN 6) based on the presence of *Parasorex socialis* and *Megacricetodon* aff. *germanicus* (sensu Kälin 1997, see comments in Prieto & Rummel 2009). The latter association indicates that *P. socialis* is present in the fossil record before MN 7, i.e. prior to the first occurrence of *Megacricetodon* aff. *gregarius*. This discovery has important implications for biostratigraphy and paleobiogeography, and thus should be investigated in greater detail based on stratified deposits.

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