Zitteliana

An International Journal
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Series A/Reihe A
Mitteilungen der Bayerischen Staatssammlung
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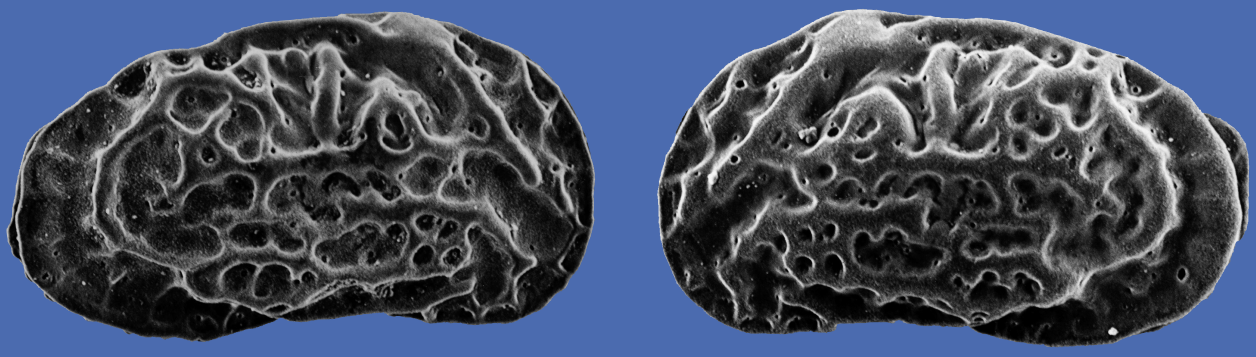

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Cover illustration: Ostracod *Callistocythere intricatoides* (Ruggieri, 1953) from the Thyrrenian of Altinova (Turkey). Left: Right valve, external view, BSPG 1980 X 1313 (length 0.640 mm). Right: Left valve, external view, BSPG 1980 X 1314 (length 0.646 mm). SEM Photograph: R. Matzke-Karasz (LMU München, Department für Geo- und Umweltwissenschaften, Sektion Paläontologie)

Umschlagbild: Ostrakode *Callistocythere intricatoides* (Ruggieri, 1953) aus dem Thyrrenium von Altinova (Türkei). Links: Rechte Klappe, Außenansicht, BSPG 1980 X 1313 (Länge 0,640 mm). Rechts: Linke Klappe, Außenansicht, BSPG 1980 X 1314 (Länge 0,646 mm). REM-Foto: R. Matzke-Karasz (LMU München, Department für Geo- und Umweltwissenschaften, Sektion Paläontologie)

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Hemitrichas stapfi n. sp. (Teleostei, Atherinidae) with otoliths *in situ* from the late Oligocene of the Mainz Basin

Dedicated to the renowned collector of fossils, palaeontologist, and co-founder of the Palaeontological Museum (Heimatmuseum) Nierstein Mr. Arnulf Stapf (Nierstein am Rhein, Germany) on the occasion of his 70th birthday.

By
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Abstract

A new atherinid teleostean species, *Hemitrichas stapfi*, is described on the basis of articulated skeletons, partly with otoliths *in situ*, from the quarry „Am Katzenrech", near Oppenheim in the Mainz Basin. From the same locality, the new species was already mentioned as *Dapalis* sp. and as *Smerdis* sp; and isolated otoliths of the new species had been described from the Landschneckenkalk of the quarry Hochheim-Flörsheim as *Hemitrichas* sp. 1. The skeletons of *Hemitrichas stapfi* n. sp. were collected by Arnulf and Harald Stapf (Museum Nierstein am Rhein) from the basal layers of the „lower part" of the Upper Cerithium Beds. These strata, as well as the Landschneckenkalk, belong to the late Oligocene according to published data. They are characterized by marine-euryhaline fossil assemblages including bivalves, gastropods, foraminifers, ostracods, and fish otoliths. Up to date, all the Eocene to Miocene species of the extinct genus *Hemitrichas* Peters, 1877 have been described from brackish and freshwater environments. *Hemitrichas stapfi* n. sp. is the first *Hemitrichas* species that is recorded from brackish-marine waters.

Key words: Atherinidae, *Hemitrichas*, Oligocene, Mainz Basin, otoliths

Erweiterte deutsche Zusammenfassung am Ende des Artikels

1. Introduction

Species of *Hemitrichas* Peters, 1877 are widespread in euryhaline strata of the late Oligocene and early Miocene of the Mainz and Hanau Basins. They mostly appear in monospecific or low diversified fish communities, and often occur in high numerical abundances. For the Mainz and Hanau Basins, the following species have been recorded, primarily based on isolated otoliths (Reichenbacher 2000): *H. schaeferi* Reichenbacher, 2000 from the Middle Cerithium Beds (late Oligocene), *H. rotunda* (Weiler, 1963) from the Wiesbaden Formation (= Lower Hydrobia Beds, lower Miocene), *H. miocenica* (Weiler, 1942) from the Wiesbaden Formation and Upper Hydrobia Beds (lower Miocene), and *H. bartensteini* (Malz, 1978) from the Upper Hydrobia Beds (lower Miocene). *Hemitrichas rotunda* (Weiler) is to date the only species reported from the Mainz and Hanau Basins that is also known from complete skeletons, some of which display otoliths *in situ* (Ott 2001; Keller et al. 2002). In this study we describe a new *Hemitrichas* species from the Mainz Basin based on skeletons with otoliths *in situ*. The occurrence of this atherinid species in the quarry „Am Katzenrech" in the Mainz Basin was observed some twenty years ago by the senior author during his first visit to the Museum of Nierstein am Rhein. So far, the species was named *Dapalis* sp. by Malz (1978), *Smerdis* sp. by Schraft (1979) and *Hemitrichas* sp. 1 by Reichenbacher (2000).

2. Locality and Stratigraphy

The *Hemitrichas* material was collected by Arnulf and Harald Stapf (Museum Nierstein am Rhein) in the quarry „Am Katzenrech". The quarry is located at the eastern border of the Mainz Basin, in the vicinity of Oppenheim and near the village Dexheim (Textfig. 1). The quarry was also called Dexheim or Oppenheim/Dexheim in previous studies. According to Schraft (1978, 1979), the sedimentary sequence of „Am Katzenrech" is comprised of the Lower Cerithium Beds and the Upper Cerithium Beds, which are overlain by Pliocene or Pleistocene strata. The complete section is not accessible any more because the quarry is presently being filled with

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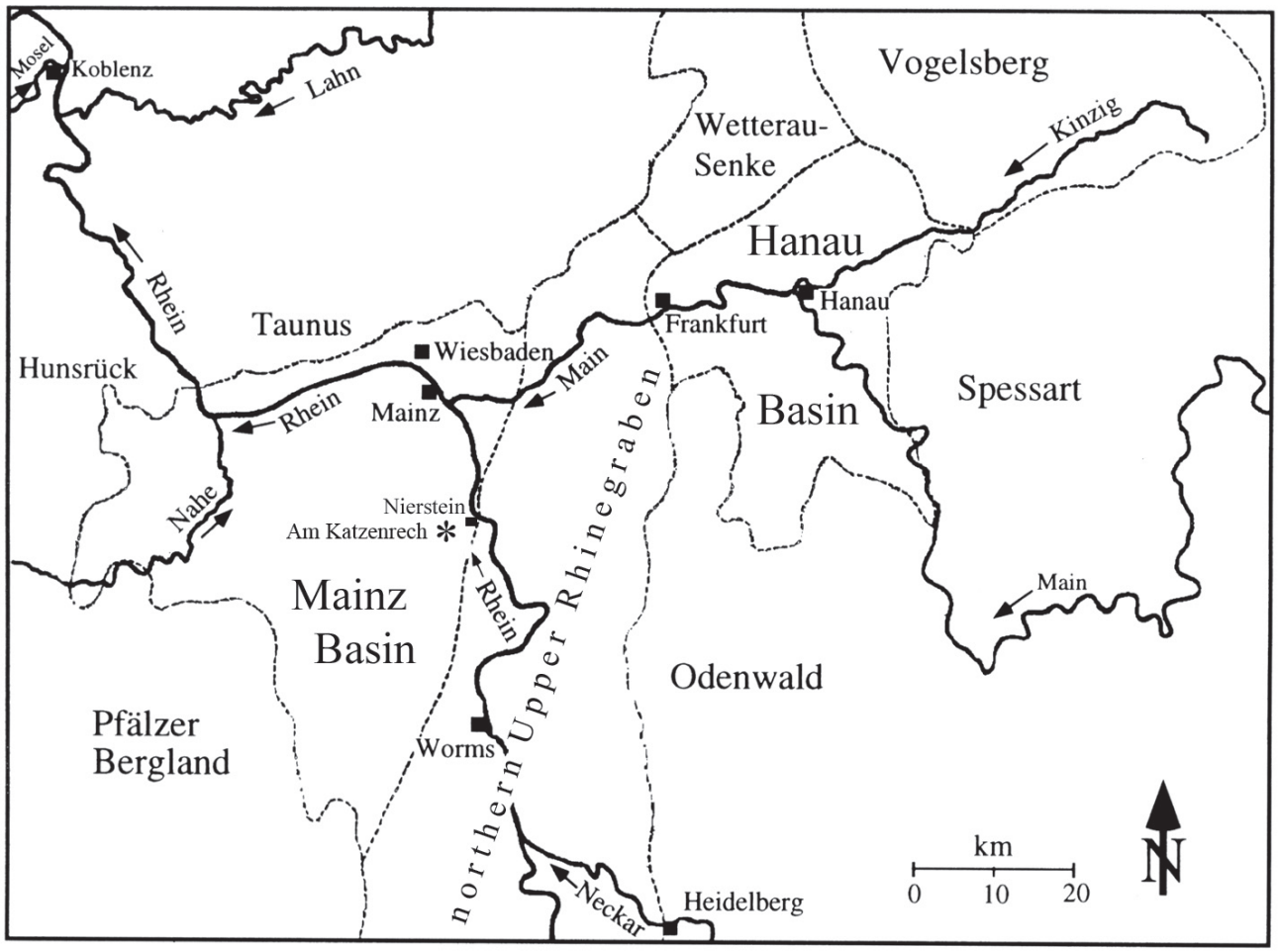


Textfigure 1: Geographic overview and location of the quarry „Am Katzenrech" in the Mainz Basin.

rubbish. The fossil fishes were recovered from the lower part of the Upper Cerithium Beds, within a 190 cm thick clay-marl sequence, and co-occur with marine bivalves, including *Pinna* and "*Mytilus*" (Schraft 1978, 1979; *Mytilus* is probably *Perna faujasii*, according to Försterling 1998).

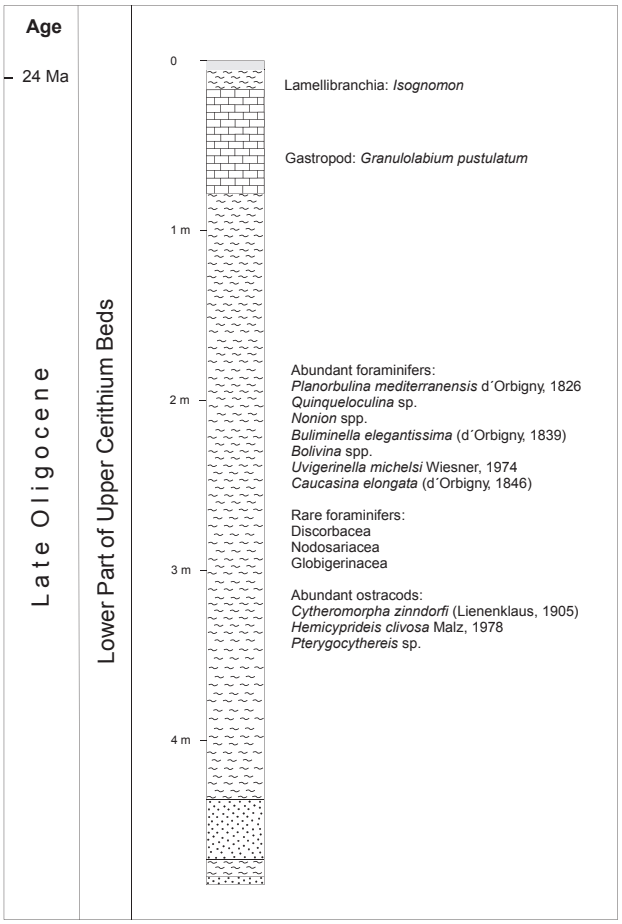
Based on the fossils, the Upper Cerithium Beds, which can reach a thickness of 30 m, have traditionally been subdivided into a „lower part", which is more or less marine, and an „upper part", which is more or less brackish (Doebl et al. 1972). Recently, however, the upper part has been discriminated as Oberrad Formation (Schäfer & Kadolsky 2002). It is obvious that the fossil fishes from the quarry „Am Katzenrech" were found near the basis of the „lower part" of the Upper Cerithium Beds based on the lithostratigraphical and faunistic data given by Schraft (1978, 1979).

The presence of the Upper Cerithium Beds is supported by an exploratory drilling executed by the Geological Survey Rheinland-Pfalz in 2000. This drilling was carried out at the bottom of the present-day quarry and reached up to 4.85 m depth (Textfig. 2); there it was stopped due to the occurrence of a hard limestone bed that could not be drilled. The drilling samples yielded marine bivalves (e.g., *Perna faujasii* Brongniart, 1822), a diverse assemblage of foraminifers and ostracods (see Textfig. 2), juvenile fish otoliths of *Morone*, *Prolebias* and Sciaenids, and fish scales and teeth. These assemblages correspond to the „lower part" of the Upper Cerithium Beds (cf. Doebl et al. 1972; Schäfer 1988; Reichenbacher 2000). It can be supposed from the data provided by Schraft (1978, 1979) and Harald Stapf (pers. comm.) that the *Hemitrichas* skeletons from „Am Katzenrech" were discovered from approximately the same sequence as the exploratory drilling had drilled.

The chronostratigraphy of the Upper Cerithium Beds was debated for a long time. It was previously believed that the entire sequence belongs to the Aquitanian (lower Miocene). However, biostratigraphical data based on nannoplankton and mammals indicate that the lowermost part of the Upper Cerithium Beds is of late Oligocene age (e.g., Tobien 1970; Martini 1978; Mödden 1996, 1998), and that the Oligocene-Miocene boundary is positioned in the middle of the „lower part" of the Upper Cerithium Beds (cf. Reichenbacher 2000: fig. 9). Consequently, the occurrence of the new *Hemitrichas* species near the base of the „lower part" of the Upper Cerithium Beds suggests that it is of late Oligocene age.

3. Previous Studies

Schraft (1978, 1979) reported the presence of *Morone aequalis* (Koken, 1891), *Notogoneus longiceps* (von Meyer, 1851), *Smerdis* sp., and *Gobius* sp. However, *Smerdis* sp. must be assigned to the new *Hemitrichas* species described here (see below). The determination of „*Gobius*" probably relates to a



Textfigure 2: Chronostratigraphy, lithostratigraphy and fossils of the exploratory drilling respectively the fish fossils bearing strata.

few dorso-ventrally embedded *Hemitrichas* specimens since the first appearance of *Gobius* in the Mainz and Hanau Basins is in the distinctly younger Upper Hydrobia Beds (Reichenbacher 2000).

Eikamp (1977) and Malz (1978) described fossil fishes from the so-called Corbicula Beds in the quarry „Am Katzenrech". However, these fishes must also have been collected from the Upper Cerithium Beds because the Corbicula Beds are not present in this quarry. It is almost certain that they were found in the same sequence in which the fish skeletons mentioned by Schraft (1978, 1979) were collected. Eikamp (1977) described a few well preserved skeletons with otoliths *in situ* of *Morone aequalis* (Koken, 1891) [= *Morone alsheimensis* (H. v. Meyer, 1859) according to Gaudant 2000]. Malz (1978) mentioned several so-called *Dapalis* skeletons, in part with otoliths *in situ*. His material is from the collection in the Nierstein Museum, to which also the present study refers. Although Malz (1978) recognized a new species based on the morphology of the otoliths, he described it only in open nomenclature as *Dapalis* sp.

4. Material and Methods

The material consists of 23 articulated skeletons, in part with otoliths *in situ*, that were examined and measured under a stereo-microscope. The material is kept in the collection of the Palaeontological Museum Nierstein under accession number SSN 12DX1-DX22 and SSN12DX50.

5. Results

5.1 Description of the Skeletons

The standard length of the skeletons ranges from 25 to 38 mm. The juvenile individuals possess an elongated body, of which the maximum height equals approximately 15% of the standard length. In adult specimens, the body becomes progressively higher and the maximum height generally reaches between 25 and 30% of the standard length. The head is massive; its length equals 25-33% of the standard length. The orbit is quite large, its horizontal diameter includes about a third of the head length. The length of the mandible is about 25% of the head length. Because of the great length of the lower portion of the preoperculum, the lower jaw articulation is positioned immediately behind the anterior edge of the orbit. The oral edge of the upper jaw is entirely covered by the premaxilla; the maxilla is reduced to a slender rod. The operculum is more or less quadrangular; its width slightly exceeds 25% of the head length. The vertebral column consists of (32?) 33-34 vertebrae, 15-16 in abdominal and 17-19 (more frequently 18) in postabdominal position. There are about 12 pairs of long and rather robust pleural ribs. Their distal ends almost reach the ventral edge of the abdomen. The caudal fin is relatively small. Its length measures about 20-22% of the standard length. The posterior edge is concave, as the length of its axial rays equals approximately 75% of the longest rays of each lobe. There are 17 principal rays, of which 15 are articulate and furcate. Seven to 10 precurrent rays are present dorsally and ventrally. The caudal fin formula is 7-10+I+8/7+I+8-10. The axial caudal skeleton consists of five more or less modified components. A single hypural plate, which is the result of a fusion of the first two hypurals, supports the ventral lobe of the caudal fin, whereas two hypural plates support the dorsal lobe. The uppermost, triangular, hypural plate is larger than the penultimate one. The parhypural is long and narrow. Posteriorly, the uro-terminal complex is prolonged by an uroneural, which is straightened up and forms a 135° angle with the vertebral column axis. Dorsally, three epurals are present. Four preural centra bear long neurapophyses and haemapophyses, which support the first rays of both lobes of the caudal fin. The first dorsal fin is small and positioned approximately in the middle of the body, the distance from the tip of the snout to its origin equals 50-55% of the standard length. It is comprised of seven to eight slender, rather short spines; the length of the longest spine generally equals 60 to 65% of the distance between its base and the origin of the second dorsal fin. The composition of its endoskeleton is unknown due to preservation. The distance from the tip of the snout to the origin of the second dorsal fin is 65-70% of the standard length. The second dorsal fin possesses one slender spine and eight to ten articulate and furcate fin rays; the length of the longest fin ray measures less than 65% of the maximum height of body. Its endoskeleton generally includes nine to 10 pterygiophores. The anal fin is inserted slightly behind the second dorsal fin. The anteanal distance generally equals 65-71% of standard length. There

are one slender, rather short spine and (8) 9 to 10 articulate and furcate rays. The anal fin is supported by 10-11 pterygiophores. The pectoral fins are positioned relatively low on the flank, approximately in its lower third. There are 13-14 rays of moderate size; the distal end of the longest ray does not reach the base of the pelvic fins. The pelvic fins are opposed to the origin of the first dorsal fin; the antepelvic distance equals 50-53% of standard length. There exist one rather short slender spine and five articulate and furcate rays. The length of the longest ray ranges from 65 to 75% of the pelvo-anal distance. The cycloid scales are relatively large. Their number was approximately 30 in the lateral line. Their surface is ornamented by concentric circuli, the density of which is about 20 per millimetre.

5.2 Description of the Otoliths

The skeleton of the holotype displays the convex inner side of a well-preserved left sagitta (Pl. 1, Fig. 3). Its length is approximately 1.5 mm, its height 0.9 mm, and the L/H index 1.7. The shape of the sagitta is elongate with a slightly pointed posterior end and moderately rounded dorsal and ventral rims. The rostrum is rather long, especially in comparison to otoliths of other *Hemitrichas* species. The antirostrum is thickened and rounded, the excisura deeply incised. The sulcus is long, narrow, and straight. As is generally the case in *Hemitrichas* species, the ostium is small and more deepened than the cauda. The end of the cauda is rounded and faintly bent in downward direction. A thick crista superior runs along the deep dorsal area; the crista inferior is thin. The ventral line is distinctly incised. A second skeleton displays both sagittae *in situ*. The inner side of the left sagitta is visible, whereas the right sagitta displays the outer side. The left sagitta shows the same shape and characters as the sagitta from the holotype, apart from a slightly higher dorsal rim, which bears a weak tip in its posterior portion. The dimensions are (in mm): length: 0.77, height: 0.47, L/H: 1.6. The right sagitta displays a smooth concave outer side. Altogether, these sagittae *in situ* show the same characters as the two isolated sagittae from the Landschneckenkalk of Hochheim-Flörsheim, which were described and figured as *Hemitrichas* sp. 1 in Reichenbacher (2000).

5.3 Characterization of *Hemitrichas stapfi* n. sp.

The relationships between *Hemitrichas rotunda* (Weiler, 1963) and all other presently known species of *Hemitrichas* Peters, 1877 have recently been analyzed by Keller et al. (2002). For that reason, the *Hemitrichas* skeletons considered here will only be compared to those species that also bear a first dorsal fin consisting of seven or eight slender spines. These forms are *H. rotunda* (Weiler, 1963) from the Wiesbaden Formation of the Kalkofen quarry („Am Hambusch") in Wiesbaden Biebrich (Keller et al. 2002) and *H. giraudi* (Piton, 1936) from the upper Oligocene or lower Miocene of the Puy de Mur massif (Puy-de-Dôme, France) (Gaudant 1993). The *Hemitrichas* species from „Am Katzenrech" differs from *H. rotunda* in its slightly higher vertebral number: (32?) 33-34, compared to 30-31, and in the slightly higher number of abdominal vertebrae (15-16 compared to about 12). In addition, it differs from *H. giraudi* in the lower number of vertebrae (36-37 in *H.giraudi*).

The otoliths preserved *in situ* in the skeletons from „Am Katzenrech" differ from all other otolith based *Hemitrichas* species in their elongate shape with the pointed posterior end and slender and rather long rostrum. Otoliths of *H. rotunda* are more rounded, less elongate, and fitted with a short robust rostrum. Unfortunately, the otoliths of *H. giraudi* have not been discovered to date.

In conclusion, the atherinid skeletons from the quarry „Am Katzenrech" belong to a new species:

Class Osteichthyes Huxley, 1880
Subclass Actinopterygii Cope, 1887
Division Teleostei Müller, 1846
Order Atheriniformes Rosen, 1964
Family Atherinidae Risso, 1827
Genus *Hemitrichas* Peters, 1877

Hemitrichas stapfi n. sp.
Pls 1, 2

1978 *Dapalis* sp. – Malz: 462, figs 2-4.
2000 *Hemitrichas* sp. 1. – Reichenbacher: 72, pl. 6, fig. 13.

Holotype: Specimen SSN12DX12, kept in the Palaeontological Museum (Heimat Museum) at Nierstein am Rhein (Pl. 1, Figs 1-3).

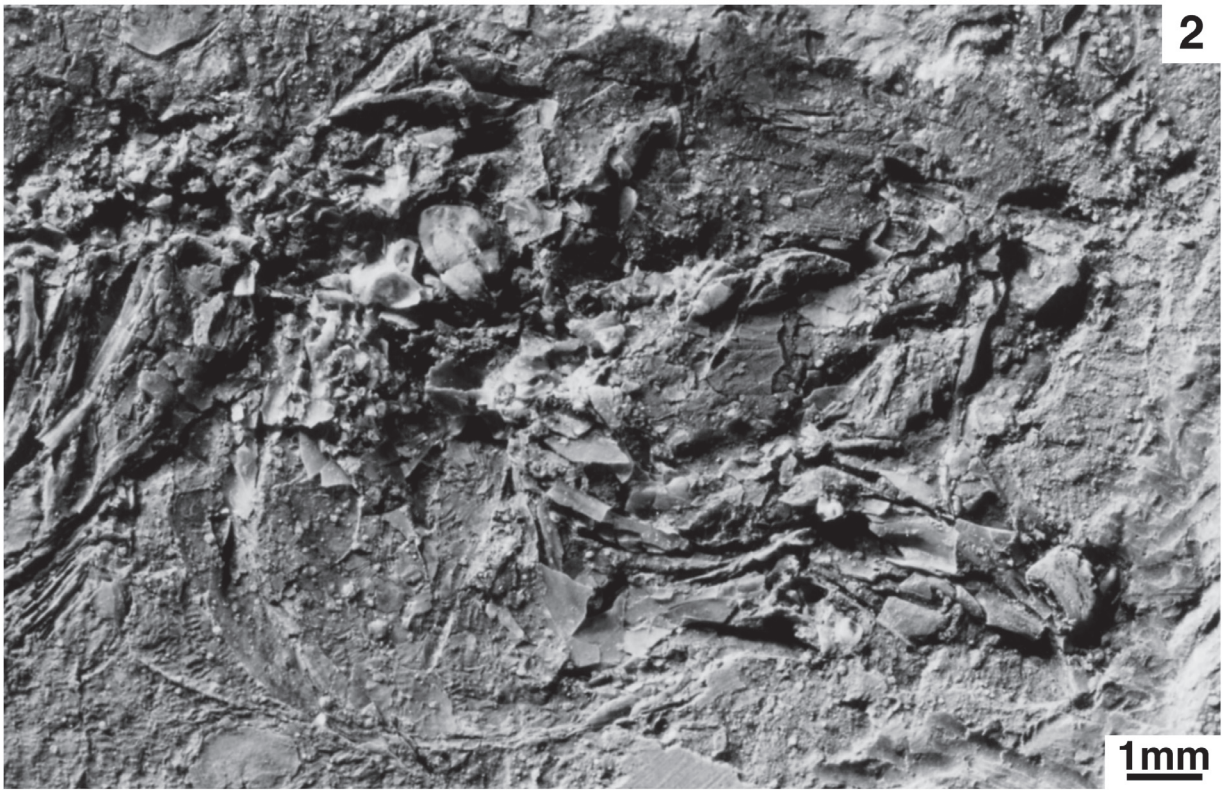
Derivation of name: The new species is dedicated to the renowned collector of fossils and amateur palaeontologist Mr. Arnulf Stapf (Nierstein am Rhein, Germany) on the occasion of his 70th birthday. His excellent collection is on exhibit in the Palaeontological Museum (Heimatmuseum) Nierstein am Rhein, Germany.

Type locality: „Am Katzenrech" quarry, near Dexheim.

Type strata: "Lower part" of the Upper Cerithium Beds; Landschneckenkalk from Hochheim-Flörsheim; uppermost Oligocene.

Plate 1: *Hemitrichas stapfi* n. sp. from the „lower part" of the Upper Cerithium Beds of the quarry „Am Katzenrech", near Dexheim; holotype (specimen SSN12DX12, kept in the Palaeontological Museum (Heimat Museum) at Nierstein am Rhein) [Photographs D. Serrette].
Fig. 1: General view of body.
Fig. 2: Head.
Fig. 3: Otolith preserved *in situ*.


1
5mm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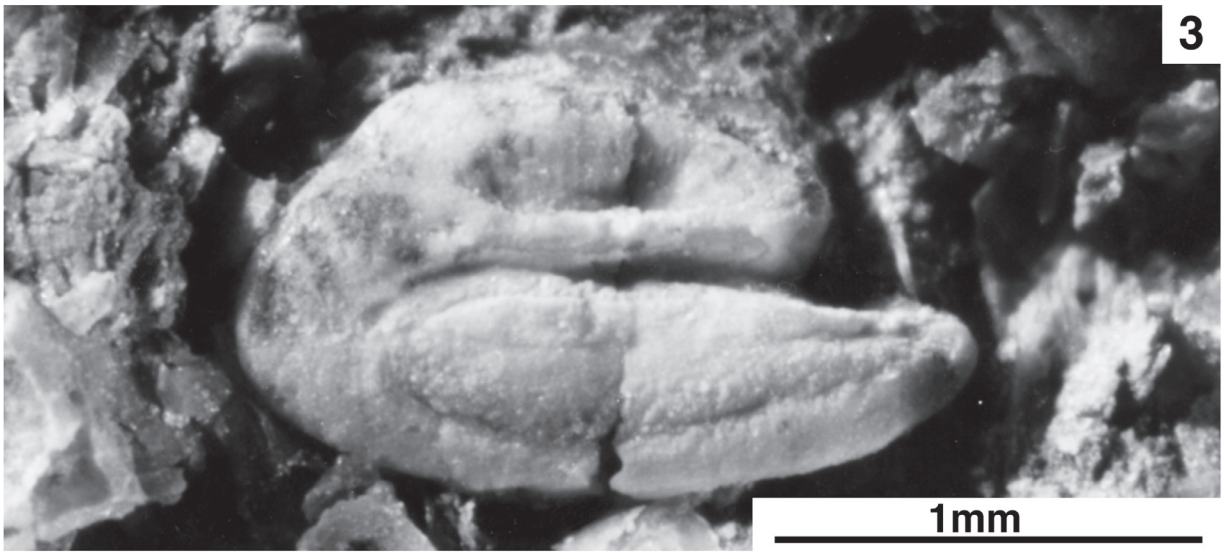
3
1mm

Studied material: 23 skeletons, in part with otoliths *in situ*.

Diagnosis: Small atherinid fishes; standard length does not seem to have exceeded 38 mm; body elongated, the maximum height of body in adults is 25-30% of standard length; head massive, the head length is 25-33% of standard length; vertebral column including (32?) 33-34 vertebrae, 17-19 being postabdominal; caudal fin small, moderately indented posteriorly, 7-10+I+8/7+I+8-10 rays; first dorsal fin small, approximately situated in the middle of the body, 7-8 slender spines; second dorsal fin placed in the posterior third of the body, one slender spine and 8-10 rays, supported by 9-10 pterygiophores; anal fin opposed to the second dorsal fin, one slender spine and (8) 9-10 fin rays, supported by 10-11 pterygiophores; pectoral fins of moderate size inserted at the lower third of the flank, 13-14 rays; pelvic fins subabdominal, opposed to the origin of the first dorsal fin, one slender spine and five rays; rather large cycloid scales, about 30 in lateral line; otoliths elongate with a pointed posterior rim and a long, slender rostrum.

Measurements: see Tab. 1

6. Palaeoecology

The genus *Hemitrichas* Peters, 1877 has to date only been recorded for brackish and freshwater sediments. *Hemitrichas giraudi* (Piton, 1936) from the late Oligocene or early Miocene (?) of Puy de Mur in Central France, which is preserved in diatomitic layers that yield a brackish diatomitic flora (Gaudant 1993), and all *Hemitrichas* species that have been described from the Oligocene and Miocene of the Mainz and Hanau Basins (Reichenbacher 2000; Keller et al. 2002) belong to the brackish water category. Moreover, most *Hemitrichas* species from the late Oligocene and early Miocene of the western Paratethys (with the exception of *H. bergeri* (Reichenbacher)) are known from oligohaline environments (Reichenbacher & Weidmann 1992; Reichenbacher 1993, 1996; Reichenbacher et al. 2004, 2005). It must be mentioned that the *Hemitrichas* otoliths from the western Paratethys were initially described as *Palaeoatherina* Gaudant, 1976 (in Reichenbacher 1996) and *Atherina* Linnaeus, 1758 (in Reichenbacher & Weidmann 1992; Reichenbacher 1993).

Two late Eocene species can perhaps be assigned to the freshwater group: *Hemitrichas formosa* (Gaudant in Chedhomme & Gaudant, 1984) from Orgnac-l'Aven (Ardèche, France), which is associated to amiid remains (*Cyclurus* sp.), and *H. vardinis* (Sauvage, 1883) from the Alès Basin (Gard, France) because it is found together with relatively rare umbrids (Gaudant, unpublished data). It is also supposed that the type-species, *H. schisticola* Peters, 1877, which is preserved in

	SSN12DX12 holotype (Pl. 1, Figs 1-3)	SSN12DX50 = Malz 1978: fig. 3 (Pl. 2, Fig. 1)	SSN12DX10
Total length	40.5	45	32.5
Standard length	34.5	38	28.5
Maximum height of body	10	9.5	7
Head length	11	11	9
Distance to first dorsal fin	19	19	15
Distance to second dorsal fin	23.5	25	19.5
Distance to anal fin	24.5	24	19.5
Distance to pectoral fins	13	12.5	10.5
Distance to pelvic fins	17.5	18.5	15
Length of first dorsal fin	3	4	2.5
Length of second dorsal fin	4.5	ca. 5	4.5
Length of anal fin	4.5	6	4.5
Length of pectoral fins	ca. 4	—	3.5
Length of pelvic fins	ca. 3.5	4.5	3.5
Basal length of first dorsal fin	1.5	1.5	1.5
Basal length of second dorsal fin	2.5	3	2
Basal length of anal fin	3	3.5	2
Length of caudal pedicle	6.5	7.5	6
Height of caudal pedicle	4	4.5	3.5

Table 1: Measurements in mm of three specimens of *Hemitrichas stapfi* n. sp., from the quarry „Am Katzenrech", near Dexheim (material kept in the Palaeontological Museum Nierstein am Rhein).

Plate 2: *Hemitrichas stapfi* n. sp. from the „lower part" of the Upper Cerithium Beds of the quarry „Am Katzenrech", near Dexheim; material kept in the Palaeontological Museum (Heimat Museum) at Nierstein am Rhein. [Photographs D. Serrette].
Fig. 1: General view of specimen SSN12DX50, already figured by Malz (1978, Abb. 3)
Fig. 2: General view of specimen SSN12DX15.


5mm
1


5mm
2

a paper shale, was a freshwater species (GAUDANT 1998).

The occurrence of a low diversified fish assemblage in the fish-skeletons-bearing beds of the quarry „Am Katzenrech" seems to be indicative of a more or less brackish water environment. In fact, it is significant that both stenohaline marine fishes and stenohaline freshwater fishes (like cyprinids) are absent from these layers. However, the microfossils and molluscs from the exploratory drilling (Textfig. 2) point to marine or marine-brackish conditions. Thus, *Hemitrichas stapfi* n. sp. is the first *Hemitrichas* species that is recorded for brachyhaline or marine waters.

Acknowledgements

The senior author acknowledges H. MALZ (Bramsche), who suggested to him to visit the Palaeontological Museum (Heimatmuseum) at Nierstein am Rhein. We thank H. STAPF who provided additional information about the fossiliferous layers in the quarry „Am Katzenrech". We are grateful to P. SCHÄFER (Mainz) for his interest in the stratigraphy, the organisation of the exploratory drilling, the determination of the foraminifers and ostracods, and the helpful review of the manuscript. We thank J. KRIWET (Munich) for a constructive review of the manuscript, and M. POSCHMANN (Mainz) for making available some additional *Hemitrichas* species from the Stapf-collection from the quarry „Am Katzenrech". We thank D. SERRETTE (Paris) for the photographs.

Erweiterte Zusammenfassung

Mehrere Arten der ausgestorbenen Gattung *Hemitrichas* PETERS,1877 sind bislang aus dem brackischen und lagunären Ober-Oligozän und Unter-Miozän des Mainzer und Hanauer Beckens beschrieben worden. Die Arten treten überwiegend in monospezifischen oder gering diversen Fischgemeinschaften auf, in denen sie sehr häufig werden können. Die bisher aus dem Mainzer und Hanauer Becken beschriebenen Arten *H. schaeferi* REICHENBACHER, 2000, *H. rotunda* (WEILER, 1963), *H. miocenica* (WEILER, 1942) und *H. bartensteini* (MALZ, 1978) sind überwiegend auf der Grundlage von Otolithen nachgewiesen, mit Ausnahme von *H. rotunda* (WEILER, 1963), von der auch die Skelette bekannt sind (OTT 2001, KELLER et al. 2002). Eine Besonderheit der hier vorgestellten neuen Art *Hemitrichas stapfi* ist, dass auch sie anhand von Skeletten mit Otolithen *in situ* vorliegt.

Die Skelette von *Hemitrichas stapfi* wurden von Arnulf und Harald STAPF Mitte der 70er Jahre im Steinbruch „Am Katzenrech" bei Oppenheim geborgen und befinden sich heute im Museum in Nierstein. Diese Fisch-Fossilien stammen aus einer 190 cm mächtigen Ton-Mergelfolge an der Basis der Oberen Cerithienschichten (SCHRAFT 1978, 1979). Das Profil ist heute nicht mehr aufgeschlossen, da Teile des Steinbruchs verfüllt sind. Deshalb teufte das Landesamt für Geologie und Bergbau Rheinland-Pfalz im Jahr 2000 eine Bohrung auf der heutigen Sohle des Steinbruchs ab. Die Bohrung musste nach 4.85 m beendet werden, da eine harte Kalksteinbank allen Bohrversuchen widerstand. Die überwiegend marinen Mikrofossilien und Mollusken der Bohrproben belegen die Zugehörigkeit der Schichten, deren Äquivalente auch die Skelette der neuen *Hemitrichas*-Art geliefert haben, zum „unteren Teil" der Oberen Cerithienschichten.

Bereits MALZ (1978: Abb. 2-3) hatte die Fischskelette aus der Aufsammlung von Arnulf und Harald STAPF im Steinbruch „Am Katzenrech" abgebildet (als *Dapalis* sp.) und vermutet, dass es sich um eine neue Art handeln könne. Es sei angemerkt, dass die von MALZ angegebene Herkunft der Fische aus den „Corbicula-Schichten" auf einem Irrtum beruht, da im Steinbruch „Am Katzenrech" über den Oberen Cerithienschichten direkt plio-/pleistozäne Sedimente folgen (SCHRAFT 1978, 1979). Auch SCHRAFT (1978, 1979) erwähnte die Funde der hier beschriebenen neuen Art, und bezeichnete sie als *Smerdis* sp.

Die Diagnose von *Hemitrichas stapfi* n. sp. lautet wie folgt: Kleine Fische aus der Familie der Atheriniden, deren Standardlänge 38 mm nicht überschreitet. Der Körper ist schlank, die maximale Körperhöhe etwa 3-4 mal in der Standardlänge enthalten. Der Kopf ist kräftig und groß, seine Länge beträgt 25-33% der Standardlänge. Die Wirbelsäule umfasst (?32) 33-34 Wirbel, von denen 17-19 postabdominal gelegen sind. Die kleine Schwanzflosse ist mäßig eingebuchtet, die Flossenformel lautet 7-10+I+8/7+I+8-10. Die erste Rückenflosse ist klein und befindet sich etwa in der Mitte des Körpers. Sie umfasst 7-8 dünne Stacheln. Die zweite Rückenflosse beginnt im hinteren Drittel des Körpers und ist aus einem dünnen Stachel und 8-10 Strahlen aufgebaut, die wiederum von 9-10 Pterygophoren gestützt werden. Die Afterflosse liegt der zweiten Rückenflosse gegenüber und umfasst einen Stachel und (8)9-10 Strahlen sowie 10-11 Pterygophoren. Die mäßig großen Brustflossen sind im unteren Drittel der Flanke anzutreffen und aus 13-14 Strahlen aufgebaut. Die Bauchflossen aus jeweils einem Stachel und 5 Strahlen liegen subabdominal, etwa gegenüber dem Beginn der ersten Rückenflosse. Die Cycloid-Schuppen sind ziemlich groß, etwa 30 befinden sich entlang der Seitenlinie. Die rundlichen, relativ gestreckten Otolithen weisen einen zugespitzten Hinterrand und ein schlankes Rostrum auf, und unterscheiden sich dadurch von den Otolithen anderer *Hemitrichas*-Arten.

Die größte Ähnlichkeit mit der neuen Spezies weisen *Hemitrichas rotunda* (WEILER, 1963) aus der Wiesbaden-Formation (= Untere Hydrobienschichten) des Mainzer Beckens auf sowie *H. giraudi* (PITON, 1936) aus dem Ober-Oligozän oder Unter-Miozän (?) des Puy de Mur Massivs (Puy-de-Dôme, Frankreich). *H. stapfi* n. sp. unterscheidet sich von *H. rotunda* durch die längere Wirbelsäule (?32, 33-34 Wirbel anstelle von 30-31 bei *H. rotunda*) sowie von *H. giraudi*, welcher 36-37 Wirbel besitzt, durch die kürzere Wirbelsäule. Darüber hinaus sind die Otolithen von *H. rotunda* viel rundlicher als die von *H. stapfi* n. sp. Die Otolithen von *H. giraudi* sind bislang nicht bekannt.

Bislang wurden alle Arten der Gattung *Hemitrichas*, die vom Eozän bis zum Miozän verbreitet waren, aus brackischen oder aus Süßwassersedimenten beschrieben. Mit *H. stapfi* liegt erstmals eine *Hemitrichas*-Art aus einem marinen oder zumindest marin-brackischen Milieu vor.

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