

KOCALIA GEN. N. (FAMILY BEYRICHTITIDAE) FROM MIDDLE ANISIAN

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Riassunto. Viene istituito il n. gen. *Kocalia* con specie-tipo *Aspidites toulai* (Arthaber), attribuito alla fam. *Beyrichitidae* per la forma involuta e compressa, deboli coste diritte o leggermente sinuose e sutura subammonitica, caratteri presenti solo negli individui maturi. Una complessa ontogenesi distingue infatti *Kocalia* dagli altri generi affini.

Abstract. The new genus *Kocalia*, with *Aspidites toulai* (Arthaber) as a type species, is here described. Based on the involute and compressed shape, occurrence of straight to slightly sinuous ribs and subammonitic suture in mature individuals the genus *Kocalia* is attributed to family *Beyrichitidae*. The complex ontogeny distinguishes the genus *Kocalia* from other closed genera.

The representatives of the species *Nicomedites osmani* Toulou, *Nicomedites barrossae* (Toulou) and *Nicomedites toulai* (Arthaber) are common components of the Bithynian (Middle Anisian) ammonoid faunas from the Kocaeli Peninsula (Turkey) (Toulou, 1896; Arthaber, 1914; Fantini Sestini, 1988). The first two species belong with certainty to the genus *Nicomedites* Toulou, 1896. The generic attribution of Arthaber's species, controversial and under debate for years, will be re-examined in this paper.

In 1914 Arthaber made the new species, *toulai*, and attributed it to the genus *Aspidites* Waagen, 1895, now indicated as *Clypeoceras* Smith, 1913, *nomen novum*. In fact, the genus *Aspidites* was already occupied as a reptile genus (Peters, 1877).

The genus, *Clypeoceras*, confined to the Nammalian (Scythian), is characterized by an involute, discoidal shell with a narrowly rounded, almost acute venter and a ceratitic suture. Because Arthaber's species *toulai* possesses a tabulate or rounded venter and a subammonitic suture, it cannot be attributed to the genus *Clypeoceras* (formerly *Aspidites*) as proposed by Arthaber (1914). The latter generic attribution was already rejected by Spath (1934). Although Spath recognized that Arthaber's species exhibited a general shape similar to that of *Clypeoceras*, he attributed the species *toulai* to the genus

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Nicomedites. The pooriness of the available material prevented him from creating a new genus.

Exhaustive analysis of the new and abundant material from Gebze (Kocaeli Peninsula) collected by the late R. Assereto allows us to reject definitively the attribution of the species *toulai* to the genus *Nicomedites*, as formerly accepted (Tozer, 1972; Fantini Sestini, 1988). The characters of both general shape and the suture appear sufficiently important to justify separation at the generic level. A new genus, *Kocaelia* gen. n., is here proposed for the species *toulai*. It is attributed to the Family *Beyrichitidae* Spath, 1934 (Shevyrev, 1986) and not to the Family *Ceratitidae*, subfamily *Beyrichitinae*, according to Tozer's classification (Tozer, 1981). In fact, the sutures in the genus *Kocaelia* show to become subammonitic and complex, whereas in the Family *Ceratitidae* the sutures are ceratitic with unfrilled saddles.

Order Ceratitida

Superfamily *Ceratitacea* Mojsisovics, 1879

Family *Beyrichitidae* Spath, 1934

Genus *Kocaelia* gen. n.

Type species. *Aspidites toulai* Arthaber, 1914

Name derivation. From Kocaeli Peninsula, Turkey.

Diagnosis. Discoidal, compressed; whorls with tabulate venter, which becomes narrowly arched in the body chamber; deep umbilicus with high umbilical wall; smooth or with weak irregular ribs. Subammonitic suture with the first umbilical saddles high and well defined, similar in shape to the E/L and L/U.

Discussion. The general shape of the genus *Kocaelia* changes during ontogeny from evolute to involute, compressed (Pl. 37, fig. 1b, c). The section is subrectangular in the first whorls, but it very rapidly becomes subelliptical (Pl. 37, fig. 1c). The almost flat venter is defined by ventro-lateral shoulders emphasized by a very weak concavity visible on the latero-ventral area of the sides. The venter becomes narrowly arched near the body chamber of mature specimens (Pl. 37, fig. 6, 7). The high umbilical wall overlies that of the previous whorl originating a narrow and very deep umbilicus. In large mature specimens the degree of involution slightly decreases. Conversely, in *Nicomedites* the umbilicus becomes much larger at a lower diameter. Ornaments may be absent, when present they are represented by weak ribs, straight or slightly sinuous, more prominent half way on the flank; very fine striae are occasionally visible on the test. Su-

tures are ceratitic in the first whorls, then they become subammonitic with saddles slightly frilled on the tip.

Occurrence. Bithynian (Middle Anisian).

Kocaelia toulai (Arthaber, 1914)

Pl. 37, fig.1-7; Text-fig. 1-3

1914 *Aspidites toulai* Arthaber, p. 114, pl. 11, fig. 3, 4.

1934 *Nicomedites toulai* - Spath, p. 411.

1972 *Nicomedites* cf. *toulai* - Tozer, p. 31, fig. 4A; pl. 10, fig. 14 a, b.

1988 *Nicomedites toulai* - Fantini Sestini, p. 60, pl. 12, fig. 4 a,b.

Lectotype. The largest specimens out of the two illustrated by Arthaber (1914, pl. 11, fig. 3a, b). In 3b the venter of the inner whorl is not correctly illustrated.

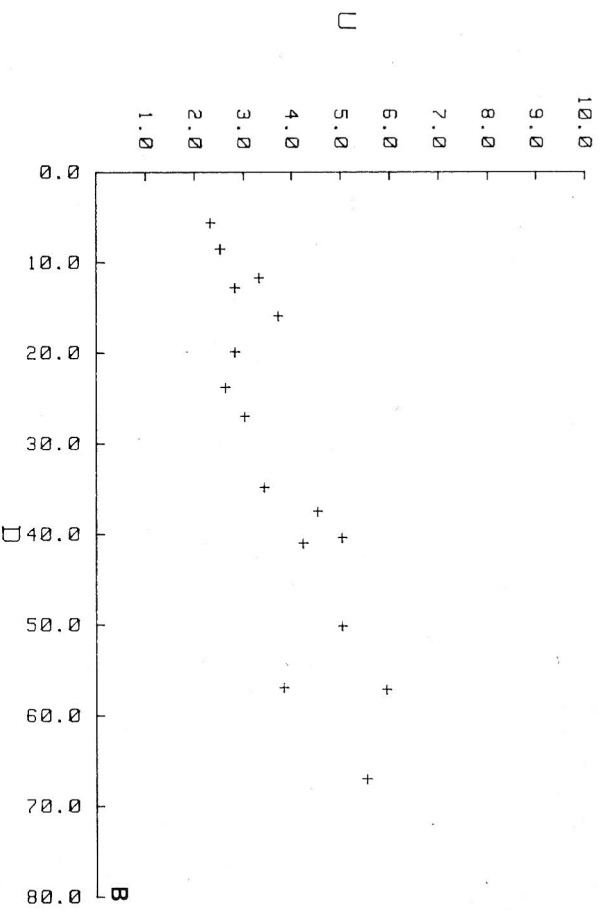
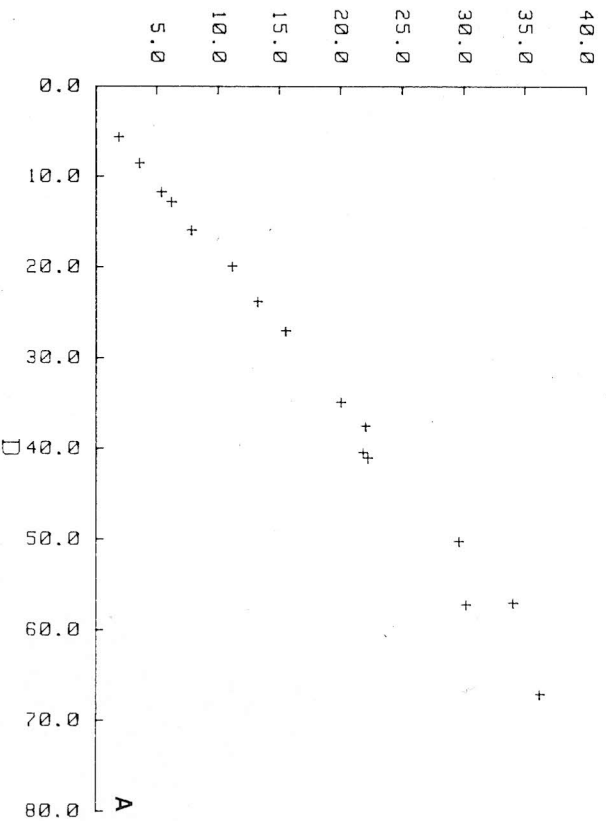
Material. 90 specimens: 3 from Osmani Zone top and 87 from Ismidicum Zone.

Serpenticone, compressed with subrectangular section till 10 mm in diameter, then involute with subelliptical section. Venter from slightly rounded to tabulate, then narrowly arched in the body chamber. Umbilicus large, then narrow and deep with high umbilical wall, only slightly wider in large specimens. Flanks very slightly concave near the ventrolateral shoulders. Growth curves of H, W, and U are plotted in Fig. 1A, B, and C respectively, and in Fig. 2. The height of the whorls increases rapidly and H/D varies from 32% to 58% (Fig. 1A), in the mean time the umbilicus becomes narrower and U/D reduces from 40% to 6-8% (Fig. 2). Very weak, rounded ribs, wider and prominent at mid way of the flank, more slender on the internal moulds of the phragmocone. Striae rarely preserved, visible on the ribs of the body chamber. 4-6 constrictions per whorl in the first inner whorls. Suture subceratitic till 15 mm in diameter, then subammonitic; relatively slender and high saddles, well defined also in U.

Remarks. *Nicomedites* cf. *toulai* figured by Tozer (1972) is closely related to the specimens from the Kocaeli Peninsula in its general shape, but the tip of the saddles is more indented (particularly L/U).

Occurrence. In the type area *Kocaelia toulai* (Arthaber) appears at the top of the *Nicomedites osmani* Zone and persists up to the top of the *Anagymnotoceras ismidicum* Zone. Thus, it also occurs in the interval between the last occurrence of *N. osmani* Toula and the first appearance of *A. ismidicum* (Arthaber) (Assereto, 1972; Fantini Sestini, 1988). This species could replace *A. ismidicum* as the index for the entire biozone. According to the data collected by Assereto in 1969 and 1971, the co-occurrence of *N. osmani* and *K. toulai* at the top of the Osmani Zone prevents application of this suggestion.

K. toulai is also recorded from Central Iran (Anarak Region) associated with *A. ismidicum* (Tozer, 1972).



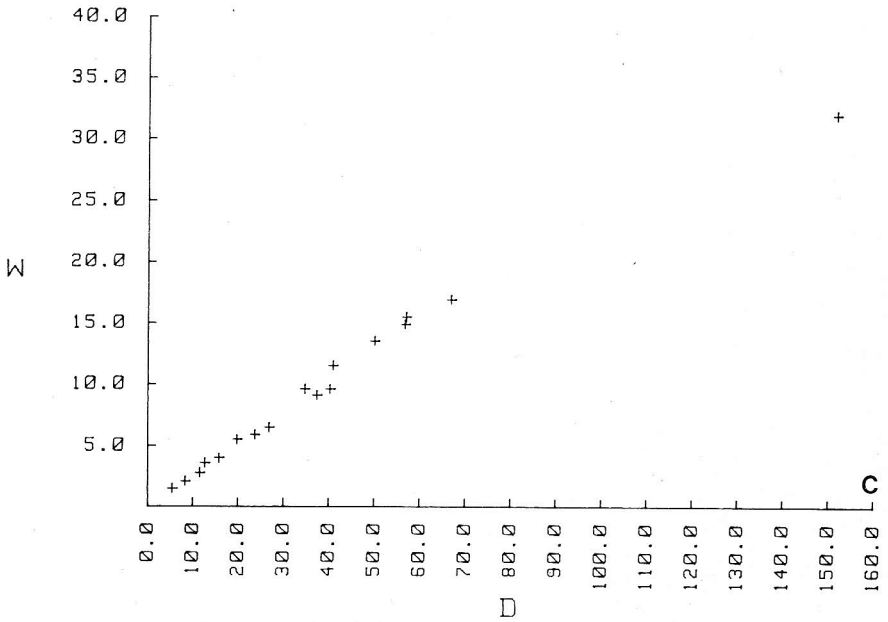


Fig. 1 A,B,C-Relationship between height, width, umbilicus, and diameter of *Kocaelia toulai* (Arthaber).

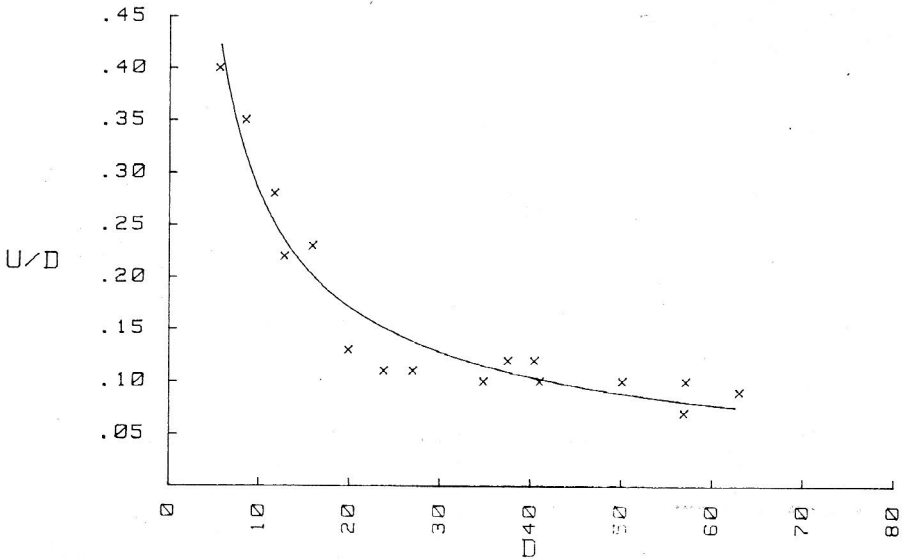


Fig. 2 - Relationship between U/D and diameter. The curve shows the ontogenetic variations in the degree of involution of *Kocaelia toulai* (Arthaber).

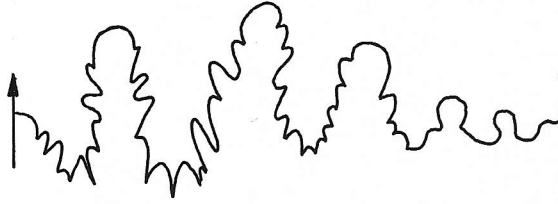


Fig. 3 - Suture line of *Kocaelia toulai* (Arthaber) at height = 17 mm. N. 6066 (T37r); x 4.

REFERENCES

- Arthaber G. v. (1914) - Die Trias von Bithynien (Anatolien). *Beitr. Paläont. Geol. Österr.-Ung.*, v. 27, pp. 85-206, 8 pl., Wien.
- Assereto R. (1972) - Notes on the Anisian biostratigraphy of the Gebze area (Kocaeli Peninsula, Turkey). *Z. Deutsch. Geol. Ges.*, v. 123, pp. 435-444, 2 fig., Hannover.
- Assereto R. (1974) - Aegean and Bithynian: Proposals for two new Anisian substages. *Schriftenr. Erdwiss. Komm. Oesterr. Akad. Wiss.*, v. 2, pp. 23-39, Wien.
- Fantini Sestini N. (1988) - Anisian Ammonites from Gebze area (Kocaeli Peninsula, Turkey). *Riv. Ital. Paleont. Strat.*, v. 94, n. 1, pp. 35-80, 6 pl., 12 fig., Milano.
- Shevyrev A.A. (1986) - Ammonoidei triassici. *Trudy Paleont. Inst.*, v. 217, 184 pp., 100 fig., Moskva.
- Spath L.F. (1934) - The Ammonoidea of the Trias. *Catal. Foss. Cephal. Brit. Mus.*, pt. 4, 521 pp., 18 pl., London.
- Toula F. (1896) - Eine Muschelkalkfauna am Golfe von Ismid in Kleinasien. *Beitr. Paläont. Geol. Österr.-Ung.*, v. 10, pp. 153-191, 5 pl., Wien.
- Tozer E.T. (1972) - Triassic Ammonoids and *Daonella* from the Nakhlak Group, Anarak Region, Central Iran. *Geol. Surv. Iran*, n. 28, pp. 29-39, 10 pl., Tehran.
- Tozer E.J. (1981) - Triassic Ammonoidea: Classification, Evolution and Relationship with Permian and Jurassic Forms. In House M.R. & Senior J.R. (Eds.) - The Ammonoidea. *The Syst. Assoc.*, sp. vol. n. 18, pp. 65-100, 5 fig., Acad. Press, London, New York.

PLATE 37

- Fig. 1a,b,c-*Kocaelia toulai* (Arthaber). Gebze, Kocaeli Peninsula. N. 6065 (T19q). Small specimen showing variations of involution and growth. a) venter, b) side, c) front; x 3.
- Fig. 2 - *Kocaelia toulai* (Arthaber). Gebze, Kocaeli Peninsula. N. 6065 (T19r). Side; x 1.5.
- Fig. 3a,b- *Kocaelia toulai* (Arthaber). Gebze, Kocaeli Peninsula. N. 6066 (T37r). a) venter, b) side; x 1.5.
- Fig. 4a,b- *Kocaelia toulai* (Arthaber). Gebze, Kocaeli Peninsula. N. 6064 (T32ar). a) side, b) venter; x 1.
- Fig. 5 - *Kocaelia toulai* (Arthaber). Gebze, Kocaeli Peninsula. N. 6066 (T73sa). Venter; x 1.
- Fig. 6 - *Kocaelia toulai* (Arthaber). Gebze, Kocaeli Peninsula. N. 6065 (T2br). Venter; x 1.
- Fig. 7 - *Kocaelia toulai* (Arthaber). Gebze, Kocaeli Peninsula. N. 6064 (T32sb). Venter; x 1.

