

A note of *Ammonites Sugata* FORBES, 1846 (Cretaceous Ammonoidea)

By **W. J. Kennedy**, Oxford, and **R. A. Henderson**, Townsville

With 2 figures in the text

KENNEDY, W. J. & HENDERSON, R. A. (1991): A note on *Ammonites Sugata* FORBES, 1846 (Cretaceous Ammonoidea). – N. Jb. Geol. Paläont. Mh., 1991 (8): 470–476; Stuttgart.

Abstract: The type material of *Ammonites Sugata* FORBES, 1846, a *Damesites* MATSUMOTO, 1942 from the Upper Cretaceous of south India is revised, and photographically documented.

Zusammenfassung: Das Typus-Material von *Ammonites Sugata* FORBES, 1846 (= *Damesites* MATSUMOTO, 1942) aus der Oberen Kreide von Süd-Indien wird revidiert und photographisch dokumentiert.

Introduction

FORBES (1846) provided the first comprehensive account of the Cretaceous invertebrate faunas from south India, including nearly forty species of ammonites. Most of these were from what is now known to be the Upper Maastrichtian Valudavur Formation of Pondicherry and are to be described elsewhere (KENNEDY & HENDERSON, in preparation), but four species were also described from a different locality, Verdachellum. They are significantly older. Two of these, *Ammonites sacya* FORBES, 1846 (p. 113, pl. 14, fig. 10) and its synonym *Ammonites Buddha* FORBES, 1846 (p. 112, pl. 14, fig. 9), as revised and illustrated by KENNEDY & KLINGER (1979: 146, pl. 8, figs. 2, 3), are referred to the genus *Anagaudryceras*. The purpose of this note is to describe and illustrate the type material of *Ammonites Sugata* FORBES, 1846 (p. 113, pl. 10, fig. 2), the first described representative of the genus *Damesites* MATSUMOTO, 1942.

Conventions

Repositories of specimens are indicated as follows: BMNH: Natural History Museum, London; OUM: University Museum, Oxford.

Dimensions are given in millimetres, with D = diameter, Wb = whorl breadth, Wh = whorl height and U = umbilicus. Figures in parentheses are dimensions as a percentage of diameter.

Suture terminology is that of WEDEKIND (1916), as propounded by KULLMANN & WIEDMANN (1970).

Systematic palaeontology

Superfamily Desmocerataceae ZITTEL, 1895

Family Desmoceratidae ZITTEL, 1895

Subfamily Desmoceratinae ZITTEL, 1895

Genus *Damesites* MATSUMOTO, 1942

(ICZN name no. 1349)

[= *Kotoceras* YABE, 1927, p. 36 (ICZN rejected name no. 1264, non KOBAYASHI, 1934, p. 391; *Neokotôceras* ANDERSON, 1958, p. 219].

Type species: *Desmoceras damesi* JIMBO, 1984, p. 172, pl. 1, figs. 2, 3; ICZN Opinion 555, 1959.

Diagnosis: Small, very involute, generally compressed, flanks subparallel, ventrolateral shoulders rounded, with sharp siphonal keel. Ornament of growth lines or fine ribs, with falcoid, concave or sinuous constrictions that are most prominent on internal moulds.

Occurrence: Cenomanian to Campanian, France, Angola, Zululand (South Africa), Madagascar, south India, Japan, British Columbia, California.

Damesites sugata (FORBES, 1846)

Figs. 1, 2

- 1846 *Ammonites Sugata*. – FORBES, p. 113, pl. 10, figs. 2a–c.
 1864 *Ammonites Sugata* FORBES. – STOLICZKA, p. 60, pl. 32, figs. 4–6; pl. 33, figs. 1, 2.
 non 1890 *Desmoceras sugata* FORBES. – YOKOYAMA, p. 185, pl. 20, fig. 11 (= *Damesites damesi intermedius* MATSUMOTO, 1942).
 1898 *Desmoceras Sugata* FORBES. – KOSSMAT, p. 111 (176), pl. 18 (24), fig. 11; pl. 19 (25), fig. 1.
 1921 *Hauericeras sugata* (FORBES). – SPATH, p. 46, pl. 6, fig. 3.
 ? 1931 *Desmoceras sugata* (FORBES). – BASSE, p. 21, pl. 2, figs. 19, 20.
 1942 *Damesites sugata* (FORBES). – MATSUMOTO, p. 27, text-fig. 1f.
 1955 *Damnesites sugata* (FORBES). – MATSUMOTO & OBATA, p. 128, pl. 26, figs. 4, 5; pl. 27, figs. 3, 4; text-fig. 3.
 1961 *Damesites sugatus* (FORBES). – COLLIGNON, p. 67, pl. 27, figs. 1, 2; text-fig. 7.
 1965 *Damesites sugatus* (FORBES). – COLLIGNON, p. 20, pl. 421, fig. 1751.
 1989 *Damesites sugata* (FORBES, 1846). – HAGGART, p. 195, pl. 8.4, figs. 14–23 (with additional synonymy).

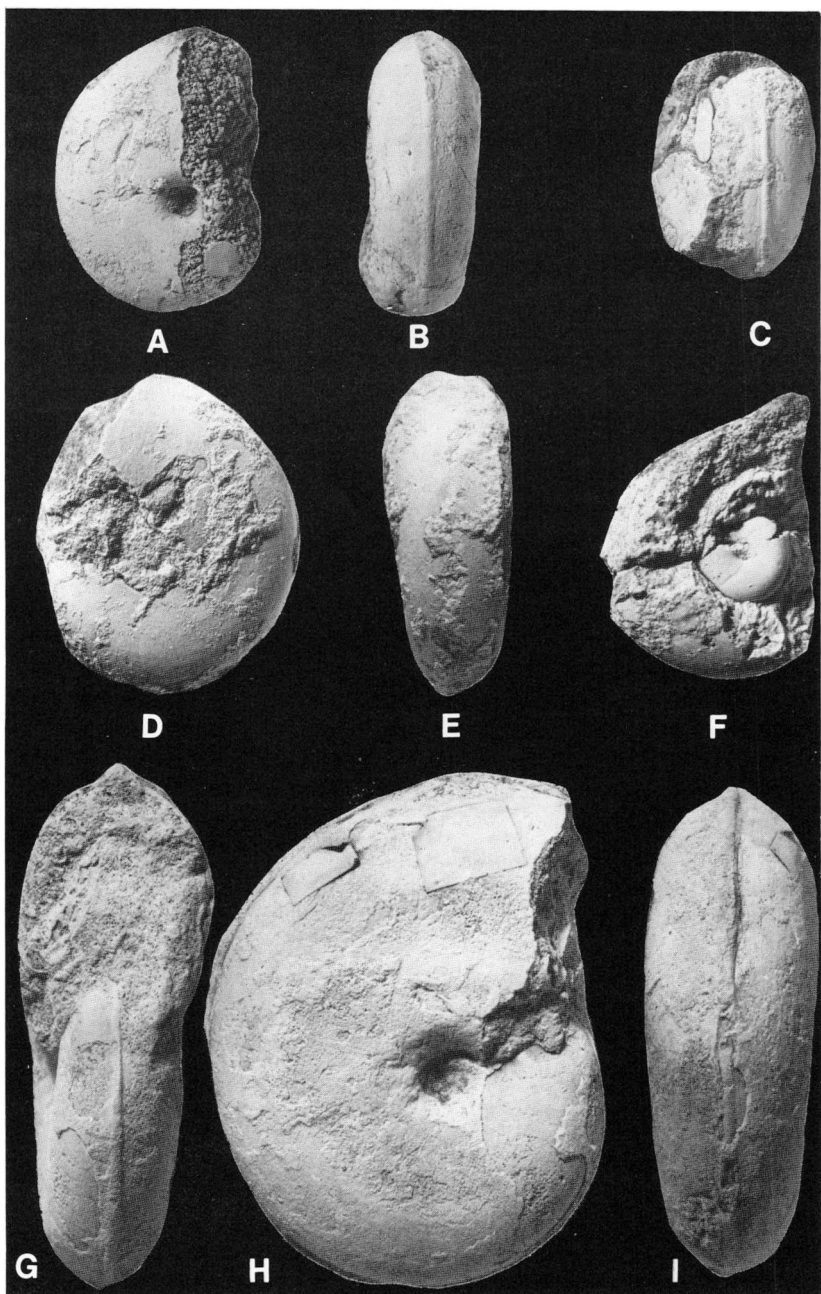
Types: Lectotype is BMNH C22674, the original of FORBES 1846 (pl. 10, figs. 2a-c), GSC 10485. Paralectotypes are BMNH C22675 (mentioned by SPATH, 1921: 46), BMNH 24196a and b (mentioned by KOSSMAT, 1898: 111 (176) and SPATH, 1921: 47), all KAYE and CUNLIFFE Collection, ex Geological Society of London Collections, from Vridachellum (Verdachellum), South India. Topotypes are BMNH C51017-20, ex Geological Society of London Collection, and BMNH C3561a, b, with no history, although C3561a is actually a fragment of BMNH C22675, suggesting that C3561a is certainly, and C3561b possibly, a further syntype.

Dimensions	D	Wb	Wh	Wb:Wh	U
BMNH C24196b	26.0 (100)	12.0 (46.2)	14.2 (54.6)	0.85	3.0 (11.5)
BMNH C22674	37.0 (100)	15.2 (41.1)	19.2 (51.9)	0.79	3.5 (9.5)
BMNH C24196a	39.0 (100)	16.0 (41.0)	22.0 (56.4)	0.73	3.5 (9.0)
BMNH C51018	38.0 (100)	16.0 (42.1)	19.0 (50.0)	0.84	- (-)
OUM KX 449	67.5 (100)	22.8 (33.8)	36.0 (53.3)	0.63	7.4 (10.9)

Description: The lectotype consists of phragmocone only, and none of the paralectotypes show more than a short section of body chamber, being at maximum an estimated 45 mm in diameter. Coiling is very involute, with a tiny umbilicus, comprising 9-11.5% of the diameter, the umbilical wall vertical, convex at the umbilical seam but curving outwards to a narrowly rounded umbilical shoulder. The flanks are subparallel and only very feebly convex, with the greatest breadth in the mid-flank region; whorl breadth to height ratios vary between 0.85 and 0.63. The ventrolateral shoulders are broadly rounded, as are those parts of the venter flanking the strong, blunt siphonal keel. The shell surface is smooth, except for feeble, distant, narrow ribs that precede faint constrictions in juveniles. These are straight and prorsiradiate on the umbilical shoulder and dorsal flanks, but swing forward and are feebly convex on the ventrolateral shoulders and venter. Constrictions are much more pronounced on internal moulds (Fig. 1F) and no specimens bear more than one per half whorl. A few juveniles show faint, irregular, spiral striations. Suture line with L considerably deeper than E and trifid; U with numerous auxiliary elements.

Discussion: BMNH C51017 (Fig. 2E, F) has a feeble constriction at a whorl height of 25 mm. OUM KX 449 (Fig. 1G-I), from Andoor, South India, is much larger than the type series, and retains recrystallized shell that is smooth but for faint growth lines.

Fig. 1. *Damesites sugata* (FORBES, 1846). A, B - lectotype, BMNH C22674; C, F - paralectotype, BMNH C22675; D, E - topotype, BMNH C51018. All from Vridachellum (Verdachellum), South India. G-I - OUM KX 449, from the Trichinopoly Group of Andoor, South India. All figures are $\times 1$.



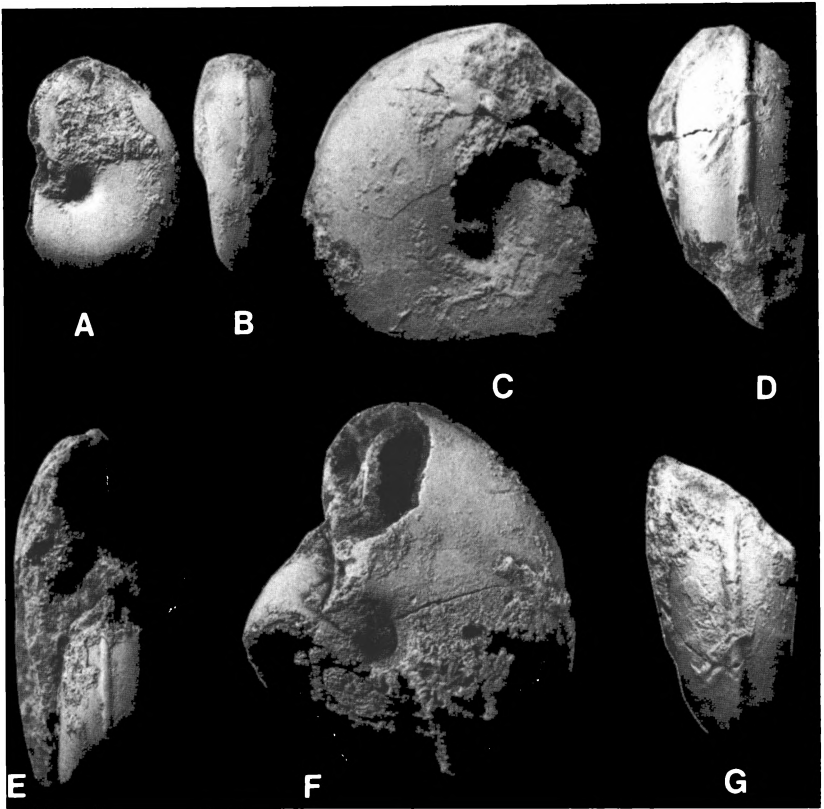


Fig. 2. *Damesites sugata* (FORBES, 1846). A, B – paralectotype, BMNH C24196b; C, D – topotype, BMNH C24196a; E, F – topotype, BMNH C51017; G – topotype, BMNH C51019. All from Vridachellum (Verdachellum), South India; $\times 1$.

Damesites compactus VAN HOEPEN, 1921 (p. 21, pl. 4, figs. 5, 7; see COLLIGNON, 1961: 70, pl. 26, fig. 4; text-fig. 8) has a much stouter whorl section than *D. sugata*, but may be no more than a variant of the present species; we cannot be certain until additional South African material is described. *D. damesi* (JIMBO, 1894) (p. 172, pl.1, figs. 2, 3) also has a stouter whorl section, and biconvex constrictions.

Occurrence: The type material is said to be from the Ariyalur (Arrialoor) Group of Vridachellum (Verdachellum), Madras State, South India. BLANFORD (1865: 145) located the source of this material more precisely as Pulliyur (Paroor), a village 8.25 km (5 miles) NW of Verdachellum, but noted that many of the fossils recorded by FORBES (1846) as from Verdachellum are Trichinopoly Group species. BLANFORD concluded that either there was an outlier of

Trichinopoly Group in the area, or that FORBES' fossils were actually from some other locality, preferring the latter view. STOLICZKA (1864: 61) recorded *D. sugata* from both Arialoor and Trichinopoly Groups, KOSSMAT (1898: 111 [176]) recorded it from the lower part of the Arialoor and upper part of the Trichinopoly Group at a number of localities other than Verdachellum, indicating a Coniacian-Santonian age for the species. In Madagascar, *D. sugata* ranges from Coniacian to Santonian (COLLIGNON 1961). In Japan, MATSUMOTO & OBATA (1955, table on p. 147) record it from the Santonian and Lower Campanian. Pondoland (South Africa) material (SPATH 1921) is from either the Upper Santonian or Lower Campanian. In British Columbia the species occurs in the Santonian according to HAGGART (1989).

Acknowledgements

We thank the staff of the Geological Collections, Oxford University Museum, and Department of Earth Sciences, Oxford, for technical assistance. KENNEDY acknowledges the financial support of the Natural Environment Research Council (UK), HENDERSON that of the Australian Research Grants Committee and James Cook University of North Queensland. We thank Dr. K. AYYASAMI of the Geological Survey of India for stratigraphic data on the south Indian Cretaceous.

References

- ANDERSON, F. M. (1958): Upper Cretaceous of the Pacific Coast. – Mem. geol. Soc. Amer., 71: xi + 378 pp. 75 pls.
- BASSE, E. (1931): Monographie paléontologique du Crétacé de la Province de Maintirano. – Mém. geol. Serv. Min. Madagascar, 1931: 86 pp., 13 pls.
- BLANFORD, H. F. (1865): On the Cretaceous and other rocks of South Arcot, and Trichinopoly Districts, Madras. – Mem. geol. Surv. India, 4: 1–217, 7 pls., map.
- COLLIGNON, M. (1961): Ammonites néocrétacées du Menabe (Madagascar). VII, Les Desmoceratidae. – Ann. géol. Serv. Mines de Madagascar, 31: 115 pp., 32 pls.
- (1965): Atlas des fossils caractéristiques de Madagascar (Ammonites), XIII (Coniacien. – (Serv. Géol., Tananarive, vii + 88 pp., pls. 414–454.
- FORBES, E. (1846): Report on the Fossil Invertebrata from southern India, collected by Mr. KAYE and Mr. CUNLIFFE. – Trans. geol. Soc. London, (2): 7, 97–174, pls. 7–19.
- HAGGART, J. (1989): New and revised ammonites from the Upper Cretaceous Nanaimo Group of British Columbia and Washington State. – Bull. geol. Surv. Canada, 396: 181–221, pls. 8.1–8.6.
- HOEPEN, E. C. N. VAN (1921): Cretaceous Cephalopoda from Pondoland. – Ann. Transvaal Mus., 7: 142–147, pls. 24–26.
- JIMBO, K. (1894): Beiträge zur Kenntnis der Fauna der Kreideformation von Hokkaido. – Pal. Abh., (N.S.) 2: 147–194, pls. 17–25.
- KENNEDY, W. J. & KLINGER, H. C. (1979): Cretaceous faunas from Zululand and Natal, South Africa. The ammonite family Gaudryceratidae. – Bull. Brit. Mus. natur. Hist. (Geol.), 31, (2): 121–174, 14 pls.

- KOBAYASHI, T. (1934): The Cambro-Ordovician Formations and Faunas of South Chosen. – J. Fac. Sci, Tokyo Imp., Univ., **3**: 329–519.
- KOSSMAT, F. (1895–1898): Untersuchungen über die Südindische Kreideformation. – **9**: (1895): 97–203 (1–107), pls. 15–25 (1–11); **11**: (1897): 1–46 (108–153), pls. 1–8 (12–19); **11**: (1898): 89–152 (154–217), pls. 14–19 (20–25).
- KULLMANN, J. & WIEDMANN, J. (1970): Significance of sutures in phylogeny of Ammonoidea. – Paleont. Contrib. Univ. Kansas, **44**: 1–32.
- MATSUMOTO, T. (1942): A note on the Japanese Cretaceous ammonites belonging to the Subfamily Desmocerotinae. – Proc. Imp. Acad., **18**: 24–29.
- MATSUMOTO, T. & OBATA, I. (1955): Some Upper Cretaceous Desmocerotids from Hokkaido and Saghalien. – Mem. Fac. Sci. Kyushu Univ., (D: Geology), **5** (3): 119–151, pls. 24–30.
- SPATH, L. F. (1921): On Cretaceous Cephalopoda from Zululand. – Ann. S. Afr. Mus., **12**: 217–321, pls. 19–26.
- STOLICZKA, F. (1863–1866): The fossil cephalopoda of the Cretaceous rocks of southern India. Ammonitidae with revision of the Nautilidae etc. – Mem. geol. Surv. India (1), Pal. Indica, **3**: (1), 41–56, pls. 26–31 (1863); (2–5), 57–106, pls. 32–54 (1864); (6–9), 107–154, pls. 55–80 (1865); (10–13), 155–216, pls. 81–94 (1866).
- WEDEKIND, R. (1916): Über Lobus, Sutrallobus und Inzision. – Zentbl. Miner. Geol. Paläont., **1916**: 185–195.
- YABE, H. (1927): Cretaceous stratigraphy of the Japanese Islands. – Sci. Rep. Tohoku Imp. Univ., (2), **11**: 27–100, pls. 3–9.
- YOKOYAMA, M. (1890): Versteinerungen aus der japanischen Kreide. – Palaeontographica, **36**: 159–202, pls. 18–25.
- ZITTEL, K. A. (1895): Grundzüge der Paläontologie (Paläozoologie). vii + 927 pp.; München und Leipzig.

Bei der Tübinger Schriftleitung eingegangen am 11. Dezember 1990.

Anschriften der Verfasser:

Dr. W. J. KENNEDY, University of Oxford, Dept. of Earth Sciences, Parks Road, Oxford, OX1 3PR, Großbritannien; Dr. R. A. HENDERSON, Dept. Geology, James Cook University, Townsville, Queensland Q 4811, Australien.