

## SYSTEMATIC STATUS OF *LEPIDOTEUTHIS*, *PHOLIDOTEUTHIS*, AND *TETRONYCHOTEUTHIS* (CEPHALOPODA: OEGOPSIDA)

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*Abstract.* — The status of the nomenclature and systematics at species, generic, and familial levels for *Lepidoteuthis*, *Pholidoteuthis*, and *Tetronychoteuthis* is reviewed and current knowledge consolidated based on examination of specimens and analysis of literature.

The systematics and nomenclature of the squid genera *Lepidoteuthis* Joubin, 1895, *Pholidoteuthis* Adam, 1950, and *Tetronychoteuthis* Pfeffer, 1900 have become so confused that it is difficult to discuss any of the species without raising doubts concerning the entities involved. During the course of a study of the comparative functional morphology of dermal structures in several species of oceanic squids (Roper & Lu 1989), we were able to make some conclusions about relationships in this group. We present here the results of our examination of numerous specimens and the literature in an effort to clarify the situation.

*Tetronychoteuthis* had been placed for "convenience" in the Lepidoteuthidae with *Lepidoteuthis* and *Pholidoteuthis* (Roper et al. 1969, Voss 1977) because of their common character of dermal "scales," but the actual relationships of these genera have remained obscure because of a lack of specimens to support research. Clarke (1980) and Clarke & Trueman (1988) separated these genera into the monotypic family Lepidoteuthidae (*Lepidoteuthis grimaldii* Joubin, 1895) and the family Pholidoteuthidae, containing *Pholidoteuthis boschmai* Adam, 1950, *P. adami* Voss, 1956, and *Tetronychoteuthis massyae* Pfeffer, 1912. The status of *Tetronychoteuthis dussumieri* (Orbigny) sensu Pfeffer, 1900, in relation to *Onychoteuthis dussumieri* Orbigny, 1839, needs clarification.

Our review suggests that the following situations exist.

1) *Onychoteuthis dussumieri* (Orbigny, 1839 [in 1834-1848] (p. 335, *Onychoteuthis* pl. 13, figs. 1-6; type locality—Mauritius; type depository—Museum National d'Histoire naturelle, Paris?) is a species of *Moroteuthis* Verrill, 1881, based on the presence of two rows of hooks on the tentacular clubs, the dermal structures that are larger and fewer than in *Tetronychoteuthis massyae* Pfeffer, 1912 (pp. 102-104, pl. 14, figs. 15-19), smooth sucker rings on the arm suckers, and an onychoteuthid shape of the gladius, fins and body. Therefore, this species belongs in the family Onychoteuthidae and bears the name *Moroteuthis dussumieri* (Orbigny, 1839 [in 1834-1848]). Furthermore, future research may show it to be a senior synonym of a currently recognized species of *Moroteuthis* Verrill, 1881.

2) The specimen that Pfeffer (1900) referred to *Tetronychoteuthis dussumieri* (Orbigny, 1839) when he established the genus cannot be conspecific with Orbigny's species because it has no hooks on the tentacular clubs and has a gladius very different from that of *O. dussumieri* Orbigny (see Pfeffer, 1912:98-102, pl. 13, figs. 1-3, pl. 14, figs. 10-14). Furthermore, it is so different from any onychoteuthid that it belongs to a different genus and family as well. Pfeffer's specimen, therefore, is a misidentification of the type species of his genus *Tetronycho-*

*teuthis*. So, what is the type species of *Tetronychoteuthis* - the real *dussumieri* of Orbigny or the species that Pfeffer actually had in hand? The case must be referred to the International Commission on Zoological Nomenclature for a decision under Article 70 of the International Code. In such cases, the Commission usually makes a decision based on subsequent usage of the names, with present opinion and usage of active workers weighing heavily (pers. comm., F. M. Bayer). Toll's (1982:247) placement of "*T. dussumieri*" of Pfeffer into the synonymy of *Pholidoteuthis boschmai* Adam, 1950 is premature from the standpoint of the Code (ICZN 1985).

Rees and Clarke (1963:853-854, fig. 1) recorded as *T. dussumieri* (Orbigny) five specimens from the Northwest Atlantic Ocean. We point out for the record that this is a misidentification and that the specimen in the photograph is a *Brachioteuthis* sp. Presumably the other four specimens were *Brachioteuthis* as well.

3) *Pholidoteuthis boschmai* Adam, 1950 (pp. 1592-1598, pls. 1-3, figs. 1-6; type locality—Flores Sea; type depository—Rijksmuseum van Natuurlijke Historie, Leiden) was erected as the type species of a new genus *Pholidoteuthis* and new family, Pholidoteuthidae. It bears "hinged" suckers and no hooks on the tentacular club. The gladius, the dermal structures (Roper and Lu 1989) and the club structure of *P. boschmai* are similar to those of Pfeffer's "*T. dussumieri*," and Adam (1950), Clarke (1980: 129-138, pl. II, figs. 1, 2, text-fig. 94), and Toll (1982:247-252, pl. 28C) suggested that these two taxa are conspecific. We, however, feel that currently there is insufficient information about Pfeffer's species to verify this assertion. If examinations of Pfeffer's specimen of "*dussumieri*" and Adam's type of *boschmai* proves them to be conspecific, the correct generic and specific names will have to be determined by a submission to the International Commission on Zoological Nomenclature (see 2 above).

4) *Pholidoteuthis adami* Voss, 1956 (pp. 132-136, fig. 9; type locality—Gulf of Mexico; type depository—National Museum of Natural History, Washington) shows close familial affinity to *Lepidoteuthis grimaldii* Joubin, 1895 (pp. 1172-1173, 1 fig.; type locality—Azores Islands; type depository—l'Institut Oceanography, Monaco) in the structure of the dermal cushions (formerly called "scales"; see Roper & Lu 1989), the gladius and the shape, conformity, and consistency of the mantle and fins. Therefore, we recommend that *P. adami* Voss, 1956 be placed in the family Lepidoteuthidae.

However, the correct generic designation cannot be determined until the status of *P. boschmai*, the type of the genus, is established. Nor do we know if *adami* and *boschmai* are, in fact, congeneric. Toll (1982:250-251) demonstrated that the gladius of *P. adami* (and *L. grimaldii*) is so different from *P. boschmai* that a congeneric relationship of currently aligned *Pholidoteuthis* species appears untenable.

5) *Tetronychoteuthis massyae* Pfeffer, 1912 (pp. 102-104, pl. 14, figs. 15-19; type locality—48°N 15°W (Atlantic); type depository—unknown). This species has to be retained in the genus *Tetronychoteuthis* until the nomenclatural status of "*T. dussumieri*" of Pfeffer (1900) is resolved (see 2 above) and the relationship between the two species is established. Several authors (Pfeffer 1912; Clarke 1966, 1980; Rancurel 1970) have suggested that *T. massyae* is the juvenile of "*T. dussumieri*" Pfeffer, 1900, but we believe this is not so, especially if "*T. dussumieri*" Pfeffer and *P. boschmai* Adam are conspecific. The specimen of "*T. dussumieri*" Pfeffer, 1900 had a mantle length (ML) of 162 mm (sex and stage of maturity unknown). Clarke (1980) recorded nine specimens of *P. boschmai* from 240 to 580 mm ML, seven of which were mature or spent females. We have a male specimen of *T. massyae* of 105 ML (Museum of Victoria collections) that has developing testis, spermatophoric apparatus, and Needham's sac

(without spermatophores), so it must be approaching maturity and maximum size. At present too few specimens, of sufficient size range, of the two taxa of *Tetronychoteuthis* have been examined to enable us to be certain, but we believe that they are distinct species.

The ultimate solution of these problems lies in an examination of all extant type material, of voucher specimens, and of additional specimens. In the meantime, this summary should provide a basis from which future work can proceed.

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