

TAXONOMIC STATUS OF *PENICILLUS* KUMAR ET HAMEED, 1993 AND ITS ONLY SPECIES, *P. INDICUS* KUMAR ET HAMEED, 1993 (PENNELLIDAE, SIPHONOSTOMATOIDA, COPEPODA)

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Benz G.W. 2005. Taxonomic status of *Penicillus* Kumar et Hameed, 1993 and its only species, *P. indicus* Kumar et Hameed, 1993 (Pennellidae, Siphonostomatoida, Copepoda). *Acta Ichthyol. Piscat.* 35 (2): 139–141.

Abstract. It is argued that *Penicillus indicus* Kumar et Hameed, 1993 represents two species; a member of *Pennella* Oken, 1815 (Pennellidae, Siphonostomatoida, Copepoda) with lepadid (Lepadidae, Lepadomorpha, Cirripedia) phoronts attached to its abdomen. This conclusion, while not founded on examination of the type and only specimens of *P. indicus*, seems robust based on observations that: 1) the species description of *P. indicus* is unquestionably similar to a combination of the aforementioned copepod and barnacle taxa, i.e. one copepod with several attached barnacles, 2) records of *Pennella* representatives with attached striped goose barnacles, *Conchoderma virgatum* (Spengler, 1790) (Lepadidae) are well known, and 3) this interpretation explains why the type series of *P. indicus* exhibits considerable intraspecific variation regarding numbers of appendages and numbers and placement of unusual abdominal organs. Based on this explanation, it is recommended that monotypic *Penicillus* Kumar et Hameed, 1993 and *P. indicus* be rejected as legitimate taxa and that the record of *P. indicus* be considered a unique report of a *Pennella* sp. infecting several species of sharks.

Key words: *Penicillus*, *Pennella*, Pennellidae, copepod, *Conchoderma*, Lepadidae, barnacle, fish parasite, shark parasite

Penicillus Kumar et Hameed, 1993 was erected to accommodate the unusual species *P. indicus* Kumar et Hameed, 1993. The diagnosis of *Penicillus*, description of *P. indicus*, and remarks that followed (see Kumar and Hameed 1993) all detailed the new taxa as being strikingly similar to and yet different from representatives of *Pennella* Oken, 1815; with *P. indicus* possessing an abdomen with five to ten, bell-shaped structures along its sides (in no recognizable pattern regarding size, shape or position). These abdominal structures were described as hollow, strengthened by a chitinous border, possessing an open margin, and brown with longitudinal white striations (Kumar and Hameed 1993). Each bell-shaped structure contained a subspherical and folded organ with seven pairs of pointed, biramous, and multimerous appendages bearing spinules on the upper surface and setules along the lower surface (Kumar and Hameed 1993).

More than a decade has passed since the discovery of *P. indicus*; however, the species has not been reported again or otherwise mentioned in the literature. This is surprising because of the remarkable morphology of *P. indicus*, its large size (ca. 6.35 cm total length), and the fact

that the species was reported (Kumar and Hameed 1993) from three widespread species of sharks, “*Eulamia melanopectera*” (= *Carcharhinus melanopecterus* (Quoy et Gaimard, 1824) according to Compagno 1984), “*E. elliotti*” (= *Hemipristus elongatus* (Klunzinger, 1871) according to Compagno 1984), and “*E. dussumieri*” (= *C. dussumieri* (Valenciennes, in Müller et Henle, 1839) according to Compagno 1984), captured at different localities in the Arabian Sea off Cochin, Mangalore, and Lakshadweep, India. Furthermore, while adult pennellids (Pennellidae) have been reported from teleosts, cetaceans, and a pinniped (e.g. see Yamaguti 1963, Kabata 1979, Dailey et al. 2002, Boxshall 2004), the report of Kumar and Hameed (1993) is the only record of a pennellid infecting an elasmobranch. As such, one might consider monotypic *Penicillus* to represent a sort of host breakthrough for pennellids.

Based on the report of Kumar and Hameed (1993), I believe the type specimens of *P. indicus* each represent a combination of two taxa that are well-known to associate with one another. The copepod member of this pair is most certainly a representative of *Pennella*. Evidence for

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this stems from observations that with the exception of the odd, bell-shaped abdominal structures and their contents, all details provided by Kumar and Hameed (1993) regarding the type and only specimens of *P. indicus* are entirely consistent with at least one *Pennella* representative and almost entirely consistent with all *Pennella* spp. (see Kabata 1979, Hogans 1988 and references therein). Pillai (1985) listed eight *Pennella* spp. as having been reported from waters off India, of which, two (*P. diodontis* Oken, 1816 and *P. instructa* Wilson, 1917) were considered valid taxa, five (*P. biloba* Kirtisinghe, 1935; *P. elegans* Gnanamuthu, 1957; *P. longicauda* Gnanamuthu, 1957; *P. platycephalus* Gnanamuthu, 1957; and *P. robusta* Gnanamuthu, 1957) were considered species inquirendae, and one (*P. selaris* Kirtisinghe, 1964) was not mentioned by Hogans (1988) in his review of *Pennella*.

Regarding the bell-shaped abdominal structures of *P. indicus*, I believe each represents a lepadid (Lepadidae, Lepadomorpha, Cirripedia) phoront, and in all likelihood, the striped goose barnacle, *Conchoderma virgatum* (Spengler, 1790). The description of the bell-shaped structures provided by Kumar and Hameed (1993) matches *C. virgatum* remarkably well, with the hollow bell and its aperture, chitinous border, and brown coloration with white striations surely representing the barnacle's capitulum. The subspherical organ within the bell-shaped structure no doubt represents the body, while the folded portions represent the barnacle's mouthfield or trophi (a compact unit bearing a series of flap-like appendages; see McLaughlin 1980, Schram 1986). Regarding the seven pairs of legs reported by Kumar and Hameed (1993) within each of the bell-shaped structures, six of these likely represent the six pairs of biramous, cirriform legs of

C. virgatum; cf. figure 1d in Kumar and Hameed (1993) with figure 17f in McLaughlin (1980). The seventh pair of legs reported by Kumar and Hameed (1993) is possibly a filamentary appendage (see McLaughlin 1980). Further evidence for these conclusions stems from the observation that the cirriform legs of lepadids exhibit spinules along the outer margin and setae along the inner margin (i.e. the spinules and setules noted by Kumar and Hameed 1993).

Additional support for the aforementioned argument comes from consideration that Kumar and Hameed (1993) reported the bell-shaped structures, each containing many appendages, as not being distributed in any pattern on the abdomen regarding size, shape or position and that the number of bell-shaped structures per specimen varied from five to ten. Were *P. indicus* a single organism, this situation would be most unusual, i.e., a species in which the ovigerous female can exhibit great variation in the number of appendages as well as no pattern regarding appendage placement on the body. Interpretation of *P. indicus* as representing a pennellid bearing various numbers and sizes of lepadid phoronts in various locations on its abdomen solves this conundrum.

And lastly, it is noted that the literature contains many references of *C. virgatum* attached to crustacean ectoparasites of fishes (e.g. Hastings 1972, Williams 1978, Benz 1984, Williams and Williams 1986, Williams and Bunkley-Williams 1996) and especially pennellids (e.g. see Fig. 1 and Jordan 1907, Hastings 1972, Lazarus and Sreenivasan 1980, Williams and Bunkley-Williams 1996, Merella et al. 2005). Based on the above, I recommend that *Penicillus* and *P. indicus* be rejected as legitimate taxa and that the record of *P. indicus* (Kumar and Hameed 1993) be considered the only report of a *Pennella* sp. infecting sharks.



Fig. 1. *Pennella filosa* (L., 1758), adult female, with many striped goose barnacles, *Conchoderma virgatum* (Spengler, 1790) attached to its trunk and abdomen; one of four *P. filosa* collected by the author (three with attached barnacles, one without) from a striped marlin, *Tetrapturus audax* (Philippi, 1887), landed by local fishermen near La Paz, Baja California Sur, Mexico

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