

MICROBIOLOGICAL AND PHYSIOLOGICAL STUDIES ON BACTERIA POPULATIONS IN THE PERICARDIAL COELOM OF *NAUTILUS POMPILIUS* L.(CEPHALOPODA, TETRABRANCHIATA).

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Cytological studies on the excretory pericardial appendages of *Nautilus pompilius* L. and *N. macromphalus* G.B. Sowerby revealed abundant bacterial colonies within cavities of the pericardial coelom and the brush border of the coelomic epithelia, an environment with a high ammonia concentration³⁾. First attempts at a microbiological characterization classified them as species belonging to the genus *Pseudomonas*⁴⁾. More recent microbiological studies on *Nautilus p.*, however, give evidence that there are several genera and species of bacteria. From each of 4 adult animals from Philippine coastal reefs 4, 8, 14 and 12 different types of bacterial colonies were cultivated using different nutrient media. In the standard I nutrient agar and the tryptic soy agar containing 2% NaCl most of the colony types were isolated. By means of several microbiological methods - Gram stain, spores staining, O/F-test and tests on the motility, the carbohydrate utilization, the acid production from different sources of carbohydrates, the pattern of enzymatic activities, the gelatine stab test as well as the numerical analysis of fatty acid patterns²⁾ - twelve isolates (three from each animal) were identified:

Animal-No	Colony Type	Genus/Spec. of Bacteria	Animal-No	Colony Type	Genus/Spec. of Bacteria
12/95	orange	<i>Deinococcus</i> sp.	1/97	orange	<i>Nocardia asteroides</i>
	cream-white	<i>Brevibacterium linens</i>		cream-white	<i>Rhodococcus</i> sp.
	light yellow	<i>Micrococcus linens</i>		light yellow	<i>Micrococcus varians</i>
3/96	red-orange	<i>Deinococcus</i> sp.	4/97	orange-red	<i>Micrococcus roseus</i>
	cream-white	<i>Brevibacterium linens</i>		light yellow	<i>Micrococcus varians</i>
	light yellow	<i>Micrococcus luteus</i>		light yellow	<i>Micrococcus varians</i>

All species are Gram-positive, chemoorganotrophic, non-motile coccoid forms without sporulation and showed cyclic morphological changes during their growth. Neither of them had been found in cephalopods up to now but all are typical of marine habitats¹⁾⁵⁾. With regard to their possible role as symbiotics of *Nautilus* it is of interest, that in ammonia tests (method of Berthelot) at least in mixed cultures - except for *M. roseus* - all species were able to significantly reduce the ammonia concentration in a minimal medium; *M. luteus*, *N. asteroides* and *Rhodococcus* sp. showed this also in pure cultures. The lack of homogeneity in the populations of the pericardial organs of the 4 specimens, however, suggests the need for further studies with bacteria from freshly captured animals.

References: 1) Hanlon, R.T. and Forsythe, J.W., 1990: Diseases of mollusca: cephalopoda: Diseases caused by microorganisms. In: Diseases of marine animals. Vol.3. ed. O.Kinne. Biologische Anstalt Helgoland, Hamburg, pp. 23-46. 2) Kämpfer, P. and Kroppenstedt, M., 1996: Numerical analysis of fatty acid patterns of coryneform bacteria and related taxa. *Can. J. Microbiol.* 42, 989-1005. 3) Schipp, R., Martin, A.W., Liebermann, H. and Magnier, Y., 1985: Cytomorphology and function of the pericardial appendages of *Nautilus* (Cephalopoda, Tetrabranchiata). *Zoomorphology* 105, 16-29. 4) Schipp, R., Chung, Y.S. and Arnold, J.M., 1990: Symbiotic bacteria in the coelom of *Nautilus* (Cephalopoda, Tetrabranchiata). *J. Cephalopod Biol.* 1(2), 59-74. 5) Travis, J., 1996: An illuminating partnership for squid. *Science News* 150, 167.

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