



HOKKAIDO UNIVERSITY

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Abstract of Doctoral Dissertation

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Title of Doctoral Dissertation

Systematic Studies on Sea Cucumbers of the Family Stichopodidae (Echinodermata: Holothuroidea)
(シカクナマコ科 (棘皮動物: 海鼠類) の体系学的研究)

Sea cucumbers in the family Stichopodidae are predominantly distributed in a wide range of depths, both in the tropics as well as the temperate waters. Despite their ecological and economic importance, the systematic and phylogenetic position of this family remains problematic and unresolved. Therefore, this dissertation presents a collection of some studies done on the systematics of the family Stichopodidae with the aim to further understand the relationships and systematics of the family. Resulting from these studies, one new genus, one new species, two new species combinations, and one resurrected species name are proposed in this dissertation.

A taxonomic study of species in the genus *Stichopus* was done using specimens collected from the Straits of Malacca. Five species, including one new species, were reported. The new species, *Stichopus fusiformiossa*, has unusual fusiform ossicles in the tentacles, which are not found in the other species of the genus. Pseudo-tables and large perforated plates are newly recorded for *Stichopus herrmanni* and *Stichopus vastus*, respectively.

The taxonomic status of the genus *Apostichopus* has been in a constant change due to the confusions arising from the existence of four nominal taxa, three colour morphs, and two valid species. A revision of this genus was done using the type specimens, as well as additional specimens from Japan, to clarify the taxonomic status by detailed ossicle analysis. Scanning electron micrographs of complete ossicle assemblages from dorsal body, papillae, tentacles, tube feet and cloaca are reported for the first time. This resulted in redescription of this genus with two member species including one resurrected species name (*A. armatus*). Both *A. japonicus* and *A. armatus* can be differentiated by the character of either smooth or spinous rim of the reduced table ossicle in dorsal body.

Lastly, a new genus is proposed in this dissertation to accommodate two species already described from Australia that were previously placed in the genus *Stichopus*. The erection of the new genus, *Notostichopus*, is based on morphology, phylogenetic, genetic distance, and geographical distribution. *Notostichopus* is characterized by the absence of rosette ossicles, and table ossicles only have a single or no crossbeam in dorsal body. This genus is represented by two species revised here (*Notostichopus ludwigi* and *N. ellipes*), distributed in the shallow, subtropical and temperate waters of Australia.

Following the outcome of this dissertation, the family Stichopodidae at present consists of a total of 10 genera and 34 described species after incorporating changes proposed by these studies.