

# Tor G. Karling – 65 years of research on turbellarian flatworms

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Tor G. Karling making notes during collection of material near Tvärminne Biological Station on the south coast of Finland, 1973.

Tor G. Karling, professor emeritus at the Swedish Museum of Natural History, Stockholm, Sweden, died on the 23<sup>rd</sup> of September 1998 at the age of 89 years. His first scientific paper, dealing with a rhabdocoel turbellarian, was published in 1930. His two last ones were published in 1995. During this period of 65 years he published a little less than one hundred scientific papers. The majority of them dealt with the morphology, taxonomy and systematics of turbellarian flatworms.

The third international symposium on the biology of the Turbellaria was held in honour of Tor G. Karling, in Diepenbeek, Belgium, in 1980. At that time I was asked to give a biography of him which was published (HENDELBERG, 1981). Much of what was reported then, after his first 50 years of research, will not be repeated here. I will just focus on some of his most important contributions to our knowledge of the Platyhelminthes.

Karling's doctoral dissertation (KARLING, 1940) was defended during a peace-period of the Second World War in an icy cellar in Helsinki, Finland, with Alex Luther as the opponent. It dealt with the morphology and systematics of the Prolecithophora, a new order Karling recognized for the Cumulata of the divided earlier order Alloeocoela, and the Neorhabdocoela (nowadays just called Rhabdocoela), another new order for the Lecithophora of the earlier order Rhabdocoela which also included the Macrostromida. The thesis meant a big step forwards for the systematics of the turbellarian flatworms. It is interesting to see that many of the conclusions drawn by Karling at that time about the interrelationships of the taxa he included in the Prolecithophora, are strongly supported sixty years later by a parsimony-based hypothesis, based on analysis of 18S rDNA sequences (JONDELIUS *et al.*, 2001).

Karling early adopted Hennig's ideas of cladistic analysis. An example of this was given at the first international symposium on the Turbellaria, the Hyman Memorial

Symposium in Chicago, 1970, where he discussed the affinities of the turbellarian sub-groups (KARLING 1970, 1974). He also constructed a theoretical turbellarian archetype. His detailed discussions have been of great value for later generations of turbellarian scientists.

A lot of Karling's papers contained descriptions of new species. Already in the field he made careful notes about the habitat from which he collected his material (Fig.), mostly turbellarians of meiofauna-size. In the beginning he mainly studied turbellarians collected at the Finnish and Swedish coasts of the Baltic, and he described about a fourth of the turbellarian species known from this brackish water sea. Eventually he published a synopsis of the turbellarian fauna of the Baltic (KARLING, 1974). This contains keys to the identification of all the species, based on morphological characters easy to observe, and also valuable information about the ecology and biogeography of the species.

Later on Karling continued to describe turbellarian species from many other geographical regions, always in the same careful way and with concise interpretation of structural details. As an example of this I showed, at this ninth international symposium on the biology of the Turbellaria, in Barcelona 2000, overheads of some of the figures in 'New taxa of Kalyptorhynchia (Platyhelminthes) from the N. American Pacific coast' (KARLING, 1989). Like most of his taxonomic papers with descriptions of new species, this one contains a lot of detailed drawings of live unsqueezed and squeezed specimens, drawings of reconstruction from series of sections, and also photographs of details in squeezed specimens and of sections, all of very high quality.

A rich source of knowledge about turbellarians in the North Sea and the Baltic was published by Josef Meixner just before the Second World War (MEIXNER, 1938). However, this book contained a lot of nomina nuda, as the second special part of the publication, intended to describe the species, was never published. The reason for this was the death of the author in the war. A great number of the nomina nuda belonged to species of the taxon Kalyptorhynchia. Karling, who probably knew this group better than any other scientist, devoted much of his time to identifying the many nomina nuda species of this group (KARLING, 1992). He also gave additional information about their morphology and distribution. This meant that Meixner's book became a much more valuable source of information.

Most of Karling's papers contained a lot of information about the morphology of the free-living flatworms, based on studies by light microscope methods. But he did not only describe the morphology. He also discussed the function and evolution of structures, e.g. the male copulatory organs (KARLING, 1956) and the proboscis (KARLING, 1961) of the Kalyptorhynchia, the defecation apparatus in a genus of the Proseriata (KARLING, 1966b) and the nematocysts and similar structures in some other turbellarians (KARLING, 1966a). One of his ideas was that the evolution

from a primitive to a more complex structure often follows the same course in different turbellarian organs, for instance those formed by the body wall, e.g. the pharynx, the copulatory apparatus, and the proboscis starting with a simple folding of the epidermis and its underlying muscular layers, and continuing with more complicated changes (KARLING, 1963)

Karling will not only be remembered for his contribution to our knowledge of the turbellarian flatworms. He was always very helpful and encouraging. He led international courses and took part in organizing symposia. And wherever he was, he made friends who will remember him as the great man he was.

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