Nygren, Arne (2003) Autolytinae: molecules, morphology, and reproduction

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Abstract. Autolytines constitute a well delineated group of syllid polychaetes, separated from other syllids by the presence of a sinuous pharynx, lack of ventral cirri and reproduction with dimorphic sexes. The group comprises c. 170 nominal species distributed worldwide, mostly inhabiting hard substrates restricted to the continental shelf. Members of Autolytinae exhibit epitoky, which means substantial morphological change associated with reproduction. There are two basic types of epitoky in Autolytinae: 1) epigamy, where the whole animal is transformed to a sexual individual and 2) schizogamy, where sexual individuals (stolons) are produced at the posterior end of the main individual. Members of the other syllid groups Eusyllinae and Exogoninae reproduce exclusively by epigamy, while members of Syllinae exhibit schizogamy. Several different types of schizogamy are known in Autolytinae. In gemmiparity several successive stolons are produced in a row, while in scissiparity, only one stolon is produced at a time. Scissiparity is further separated into anterior scissiparity where the single stolon is formed behind chaetiger 13, and posterior scissiparity where the stolon is formed at a more posterior position.

In this thesis, phylogenetic relationships within Autolytinae and Syllidae are estimated based on morphological and molecular characters from mitochondrial 16S rDNA and nuclear 18S rDNA sequences. Methods include parsimony, maximum likelihood (ML) and Bayesian analyses. The results indicate three major clades in Autolytinae, corresponding to the different reproductive modes: one with epigamous autolytines (Epigamia), a second with taxa exhibiting posterior scissiparity and gemmiparity (Autolytini), and a third containing taxa with anterior scissiparity (Procerini). However, the relationships between these three groups are uncertain. The resulting phylogenies are used to reconstruct the evolution of reproductive modes using parsimony and ML-methods. The results unequivocally support epigamy as the ancestral reproductive mode in Syllidae, and that schizogamy has evolved separately in Autolytinae and Syllinae. The evolution of reproductive traits is largely unresolved within Autolytinae and either one of the different reproductive modes may constitute the ancestral state.

Furthermore, all autolytines are revised and redescribed from available types, and newly collected specimens. In addition, a number of new taxa are introduced including *Proceraea nigropunctata*, *P. gigantea*, *P. hanssoni* and *Myrianida flava* from the U.S. west coast, *P. rubroproventriculata* from the West Atlantic, and *P. pleijeli* and *P. paraurantiaca* from the North-east Atlantic. Phylogenetic name definitions are given in parallel to a Linnean classification in order to, in future studies, investigate how changes in the phylogenetic hypotheses will affect the names under the two different systems.

Keywords: Phylogeny, systematics, revision, new taxa, PhyloCode, reconstruction of ancestral states.

Göteborg University ISBN 91-89677-09-9