

The Holothurian PEET Project and the Aspidochirotid Working Group: Integrative taxonomy on a large scale.

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We are undertaking a major revision of holothurians, focused on the Aspidochirotida, with support from the NSF PEET program, additional funding from our institutions, governments, and other sources. The project includes reviews of nomina, literature, type specimens, field surveys, DNA sequencing, and revisionary taxonomy. For nomina we are upgrading and databasing Smiley & Pawson's (1990's) manuscript on holothurian names. This is resulting in a comprehensive database of the >2500 available holothurian nomina, with relevant information checked, verified, and captured. Scans of original descriptions of aspidochirotid nomina are being posted on the PEET-cuke web site (<http://67.98.162.85/marinelab/peetcukes/>), together with ca. 4000 references dealing with holothurians. Major repositories with holothurian type material are being surveyed, aspidochirotid type material identified, and fresh ossicle preparations made from relevant tissues of these. Collections in Hamburg, Berlin, Moscow, Paris, London, and our home institutions have now been studied. Many type specimens once considered lost, especially from Semper's work, have been rediscovered. Field surveys have focused primarily on shallow, tropical waters and to date have resulted in large, new collections from the Comoros, Mascarene, Philippine, Vanuatu, Fiji, Mariana, Caroline, Marshall, Cook, Society, Line, and Hawaiian Islands, Australia, Panama, Mexico, Mediterranean basin, Florida, and Washington. Several new species as well as fresh tissue samples from many species were obtained on these trips. DNA has been extracted from >1600 specimens and sequenced from >1100 to date, representing >350 species, focused on aspidochirotids, but covering other available, appropriately-preserved holothurian species. Sequence data, field appearance (including photo-documentation for recently collected material), ossicle complements, and internal anatomy are being integrated to redefine taxa, with many species complex challenges getting sorted out. Student theses and projects are focused on partial to comprehensive revisions of: *Stichopus*, *Actinopyga*, *Bohadschia*, *Holothuria* (*Thymiosycia*), *Holothuria* (*Selenkothuria*), *Holothuria* (*Halodeima*), and *Synapta*, with other projects in the works.
