https://doi.org/10.5852/ejt.2022.

Supplemental Video S1. *Loimia davidi* sp. nov. Video recording of the living largest specimen. 0–18”: whole body in lateral view, fragmented in two portions; 19–24”: Thorax in ventral view. 25–49”: Anterior end in ventral view, particularly showing the rhythmic contractions of branchial filaments. Accessible at:

<https://saco.csic.es/index.php/s/Ww2kP2ZcrSNbTGz>

Supplemental Table S1. Character codification used in hypervolume calculations.

|  |  |  |
| --- | --- | --- |
| Characters | Type | Definition |
| Maximum body length | 0, <100 mm; 1, >100 mm | Maximum body lengh reported in the literature. |
| Presence of eyespots | 0, absence; 1, present | Presence of pigmented eyespot in the prostomium. The character has been coded as presence for the species as long as it has been reported for some individuals. |
| Presence of lappes segments 1 | 0, absence; 1, present | Lappets on the first segment are observed as lobes originating laterally next to the origin of each branchiae. Sometimes they are fused dorsally forming a contiunous hood-like structure on the segment 1. Further information on their morphology was excluded from our analyses as it is not consistently included in the literature. |
| Presence of lappes segments 2 | 0, absence; 1, present |
| Presence of lappes segments 3 | 0, absence; 1, present |
| Presence of lappes segments 4 | 0, absence; 1, present |
| Relatively size of branchiae | 0, decreasing posteriorly; 1, first pair much longer; 2, similar in size | The relative length of the branchiae has been used in most species descriptions. The information was not available for *L. bermudensis*, which was excluded from the analyses. |
| First ventral shield position | 0, segm 2; 1, segm. 3 | The ventral shield is a glandular specialization of the ventral epidermis of the anterior most segments present in all species of *Loimia.* Both, its starting segment as well as its total exteension are widely used taxonomical characters. We coded the starting segment and the final one a two independent character to capture this variability in our analyses. |
| Extension of th ventral shield | 0, up to segment 10; 1, segm. 11; 2, segm. 12; 3, segm. 13; 4, segm. 14; 5, segm. 15; 6, segm. 6; 7, segm. 7 |
| Types of notochaetae | 0, one type; 1, two types. | One or two types of notochaetae are mentioned in the description of several species of *Loimia*. The presence of a single type of chaetae, as described in some of the oldest descriptions, warrants further investigations. |
| Teeth in abdominal segmens | continues | The number of teeth in abdominal and thoracic segments is a widely used taxonomic character in *Loimia* (and among the whole Terebellidae). We coded it after the maximum number of teeth reported in each species. In those descriptions not distinguishing between abdominal and thoracic teeth, the number was assumed to be the same throughout the body. |
| Teeth in thoracic segments | continues |

Supplemental Table S2. Character codification for the species of *Loimia* used in hypervolume calculations. Accessible at:

<https://doi.org/10.17605/OSF.IO/ANRXZ>

Supplemental Table S3. Summary of the morphological characters of all currently described species of *Loimia*.

<https://saco.csic.es/index.php/s/F4YodKprCZSAwLt>

Supplemental Figure S1. N-dimensional morphospace for the 28 species of *Loimia,* calculated omitting body size; red dots = larger and smaller individuals of *Loimia davidi* sp. nov*.*;large points with white borders = centroids of each hypervolume; hypervolume shape and boundaries defined by 5000 random points; table = summary of hypervolume richness, dispersion, evenness, beta replacement, and difference.

