

**Phylogenetic Systematics and Biogeography
of the Intertidal Liparocephalini
(Coleoptera: Staphylinidae: Aleocharinae)**

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Members of the aleocharine tribe Liparocephalini, all of which are exclusively restricted to the coasts, have been recognized as a monophyletic group among polyphyletic Phytosini by Ahn and Ashe in 1996. Natural history and history of the classification of the Liparocephalini are discussed. Recently, two new liparocephaline species (*Amblopusa magna* Drugmand, and *Paramblopusa eoa* Ahn and Maruyama) have been described, and four species including two genera (*Halorhadinus aequalis* Sawada, *H. inaequalis* Sawada, *Amblopusa pacifica* Sawada, and *Baeostethus chiltonii* Broun) have been transferred to the Liparocephalini from other different tribes.

The monophyly of the Liparocephalini is tested by cladistic reanalyses adding these six members. The ingroup consisted of 24 species of the following genera: *Amblopusa* Casey (5 spp., Asia and North America), *Baeostethus* Broun (1 sp., Campbell Plateau, New Zealand), *Diaulota* Casey (8 spp., Asia, Mexico and North America), *Halorhadinus* Sawada (2 spp., Asia), *Liparocephalus* Mäklin (4 spp., Asia and North America), *Paramblopusa* Ahn and Ashe (2 spp., Asia and Alaska), and *Salinamexus* Moore and Legner (2 spp., Mexico). *Heterota* Mulsant and Rey, *Phytosus* and *Leptusa* were included as outgroups. Phylogenetic analyses of the species of the Liparocephalini are presented based on larval (21 characters, 57 states), adult (49 characters, 115 states), and a combination of larval and adult characters (70 characters, 172 states). The data were analysed with aids of MacClade, NDE, PAUP* and WinClada. The settings used in PAUP* for tree searches included branch and bound, and character states were treated as unordered. Branch support was determined by Bremer support using Autodecay and by bootstrap. Character polarity was determined by selecting

outgroup taxa. To further resolve relationships and find consistency for character congruence in these trees, successive approximations character weighting was performed on the resulting trees. Ambiguous characters were optimized using standard ACCTRAN and DELTRAN.

Four equally parsimonious trees (Length=175, CI=0.634, RI=0.366) are produced with the following patterns of generic relationships (Outgroup (*Salinamexus* (*Halorhadinus* (*Amblopusa* (*Paramblopusa* (*Diaulota* (*Baeostethus*, *Liparocephalus*)))))). Successive approximation weighting resulted in two trees (Length=873, CI=0.796, RI=0.911). The tribe Liparocephalini is hypothesized to be a monophyletic group based on the following synapomorphies: setae distributed only on mesal surface of galea and apex with setae and contiguous mesocoxal cavities. The cladograms support hypothesis that genera *Halorhadinus* and *Baeostethus* should be classified as members of the Liparocephalini.

The majority of Liparocephalini are distributed along the coasts of the northern Pacific rim, some 9000 km away from *B. chiltoni*. Most are apterous, and with *Baeostethus* as a relatively derived member of the group, it is difficult to reconcile the biogeographic pattern based on a dispersal event from the northern Pacific to the Campbell Plateau. I argue that the trans-Pacific pattern in Liparocephalini is due to an older contiguous distribution along the coastal margins of Pangea. The data are supported by area cladograms derived from other tree rooting methods, congruence with a Pacific rim pattern seen in intertidal Aegaliinae (Salpingidae), *Hadrotes* (Staphylininae) and the distribution and phylogeny of terrestrial Gymnusiini (Aleocharinae).