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Is the ant genus *Camponotus* paraphyletic?

The large cosmopolitan ant genus *Camponotus* contains about 930 described species, apportioned among 46 subgenera. There has been no comprehensive evaluation of the higher classification of the genus for more than 70 years. Here we present the results of a preliminary study of several major lineages of *Camponotus*, using sequence data from a portion (385 bp) of the mitochondrial cytochrome oxidase I gene. We sampled 31 *Camponotus* taxa (29 nominal species) belonging to nine subgenera. In addition we included representatives of three other ant genera from the subfamily Formicinae: *Polyrhachis*, *Formica*, and *Lasius*. The last two were treated as outgroups. The data were analyzed by both maximum parsimony and maximum likelihood, and the findings discussed below were robust to both methods. In our analyses *Camponotus* did not emerge as a monophyletic group. Rather, *Polyrhachis* consistently appeared as the sister group of a Malaysian species of *C. (Colobopsis)* (65% bootstrap support). There was modest support for the monophyly of *Camponotus* + *Polyrhachis* (61% bootstrap support). The mtDNA data also pointed to close relationships among groups of *Camponotus* species in the same subgenus from the same region, e.g., Neotropical *Myrmothrix* (96% bootstrap support), Holarctic *Camponotus* (s.s.) excluding *C. quercicola* (59%), a cluster of three Nearctic species of *Tanaemyrmex* (57%),

two South American *Tanaemyrmex* (82%), and two Nearctic *Colobopsis* (56%). Yet three Nearctic species of *Myrmentoma* became disassociated: one species (*C. clarithorax*) clustered with *Camponotus (Myrmaphaenus) yogi* (72% bootstrap support) while the other two species examined (*C. essigi*, *C. hyatti*) were sister taxa (100% bootstrap support), in another part of the tree. These results should be considered provisional, and subject to revision with additional sequence data and other taxa. Nevertheless, they raise the possibility that (i) several of the *Camponotus* subgenera, such as *Colobopsis* and *Myrmentoma*, are artificial assemblages of convergently similar species, and (ii) *Camponotus*, as currently constituted, is paraphyletic, having given rise to the Old World radiation of arboreal species known as *Polyrhachis*.
