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TAXONOMIC CONGRUENCE AND DISPARITY IN AN INSULAR ANT FAUNA: *RHYTIDOPONERA* IN NEW CALEDONIA

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Abstract.—Patterns of taxonomic congruence were examined in 17 species of *Rhytidoponera* endemic to New Caledonia, using disparate data sets based on allozymes and morphology. These ants belong to four informal "species groups," one of which is monotypic. Both phenetic (UPGMA clustering) and cladistic (minimum-length tree estimation) methods were employed. Adams-2 and strict consensus trees were constructed for all pairs of equivalent rival trees. Since the rival trees were fully resolved or nearly so, the degree of resolution of the consensus trees was used to assess the amount of taxonomic congruence and was measured with the consensus indices of Colless (1980; CI_C) and Rohlf (1982:138; CI_R). In addition, the confidence limits of the minimum-length tree based on the composite (allozymes + morphology) data set were estimated by 20 trial samplings of the data set, using a bootstrap method proposed by Felsenstein (1985).

The rival data sets both produced single phenograms. Several topologically distinct minimum-length trees (cladograms) were found for both data sets. Both phenetic and cladistic methods gave poorly resolved consensus trees ($CI_C = 0.27$, $CI_R = 0.24$ for the strict consensus phenogram; $CI_C = 0.20$ to 0.33, $CI_R = 0.07$ to 0.26, for strict consensus cladograms). In the strict consensus trees, the "species groups" were generally preserved, but species-level relationships were not. The Adams-2 consensus trees were similar but also contained some resolved clusters of species within the largest species group. Bootstrapped confidence limits of the minimum-length tree derived from the composite data set were very broad, indicating that only a few tree partitions (subsets) were statistically significant. These subsets generally corresponded to the "species groups." Based on limited conclusions about relationships among the New Caledonian *Rhytidoponera* (probable monophyly of the three major species groups and of the group as a whole relative to extant congeners in Australia and New Guinea) and on the observation of limited vagility due to the absence of winged queens, I argue that these species represent an archaic element in the ant fauna of New Caledonia, dating back to the early Tertiary. Poor resolution of relationships in the specialized and speciose *pulchella* group may reflect multiple, contemporaneous differentiation of taxa. [Taxonomic congruence; bootstrap; ant phylogeny; *Rhytidoponera*; New Caledonia.]

The concept of taxonomic congruence has come to denote the degree of agreement between different classifications of the same group of organisms (Mickevich, 1978, 1980). When the rival classifications are based on different data sets analyzed by the same taxonomic method, taxonomic congruence provides a measure of the extent to which that method returns similar results in the face of shifting character sets. The character sets may be randomly chosen subsets or nonrandom partitions of the data base. There has been considerable controversy over the relative performance of cladistic and phenetic methods in such tests of taxonomic congruence (Mickevich, 1978, 1980; Rohlf and Sokal, 1980; Schuh and Polhemus, 1980; Schuh and Farris, 1981; Sokal and Rohlf, 1981; Rohlf et al., 1983; Sokal et al., 1984). In the present study, I examine patterns of taxonomic congruence in a group of closely related ponerine ants which have undergone a modest radiation on the island of New Caledonia (Kanaky). In effect, these ants provide the opportunity to test the relative robustness of different taxonomic procedures when applied to a compact but speciose group.

The ant fauna of New Caledonia is notably disharmonic (i.e., taxonomically unbalanced) relative to the presumptive Indo-Australian source fauna (Emery, 1914; Ward, 1984). One of the genera that is disproportionately well represented on the island is *Rhytidoponera*, which accounts for 18 of the 152 ant species (12%), compared with about 100 species out of 3,000 (3%) in Australia (estimates derived from Brown, 1958; Ward, 1984; Ward, unpubl. data). The