3 | Biogeography of Nearctic Plecoptera

Although several workers have analyzed various regional stonefly faunas in terms of Pleistocene glacial events (Ricker 1964, Ross & Yamamoto 1967, Ross & Ricker 1971, Stewart et al. 1974, Flannagan & Flannagan 1982), no comprehensive analysis of the entire Nearctic stonefly fauna has been attempted. Baumann (1975) and Stark & Gaufin (1976a) reviewed distributions of world nemourid and perlid taxa and suggested a number of potential dispersals for Nearctic genera, but the most complete commentary, to date, is Surdick's (1985) discussion of chloroperlid phylogeny and biogeography. Most students of plecopteran biogeography have emphasized low vagility of adult stoneflies and the necessity for former land bridges or vicariant events to account for range disjunctions, by citing stringent ecological requirements, poor flight capabilities, absence from oceanic islands, and other characteristics of this type (Stark & Gaufin 1976a, Surdick 1985). However, as Ricker (1964) has noted, a number of species have dispersed northward in postglacial times from refugia in the southern Appalachians and southern Cordillera to successfully colonize much of Canada, and some evidence of waft dispersal among Austroperlidae (McLellan 1975) and *Neoperla* (Zwick 1986) exists in the Southern Hemisphere. Thus, it may be that prevailing ecological conditions around the Bering Straits and North Atlantic have been more significant as barriers or gates to stonefly dispersals than have direct land connections. If the Panamanian land bridge example is instructive, the message may be that Nearctic groups such as *Neoperla* may have failed to move south into Mexico because of competitive interactions with *Anacroneuria* rather than because of presumed dispersal barriers.

The plate tectonics paradigm suggests we might reasonably expect three basic biogeographic patterns among Nearctic Plecoptera. These include groups of Austral-American origin, groups of Asiamerican origin, and groups of Euramerican origin. The first of these, the "Great American Interchange" (Marshall et al. 1982), so distinctive of other faunal groups, is hardly noticeable in Plecoptera. Only the diverse Neotropical perlid genus *Anacroneuria* has successfully crossed the Bolivar trench and colonized Central America, Mexico, and isolated areas of the southwestern United States (Baumann & Olsen 1984, Stark & Baumann 1987), and only *Amphinemura*, among Nearctic genera, has been taken as far south as Mexico City (Baumann & Gaufin 1972). As noted above, the apparent absence of more ecologically tolerant perlid genera such as *Neoperla*, *Perlesta*, and *Hesperoperla* in Mexico may be cansed more by the inability of these groups to compete with *Anacroneuria* than to other factors.

In contrast, the Asiamerican coimection is apparently the most viable and most complex component of the Nearctic plecopteran assemblage (Table 3.1). Two small families, Pteronarcyidae and Peltoperlidae, and several subfamilies and tribes (e.g., Alloper-