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ABSTRACT

Reports on the native rodents of the Galápagos Islands range from anecdotal accounts to population ecology studies; however, this is the first study to examine population genetics. The genetic diversity and level of population substructure was elucidated for the 4 remaining endemic species (*Nesoryzomys swarthi, N. narboroughi, N. fernandinae*, and *Aegialomys bauri*) using microsatellites and sequences of the mtDNA d-loop. Tests for linkage disequilibrium, null allele frequency, presence of recent population bottlenecks, Hardy-Weinberg proportions, and *F*- statistics were calculated using microsatellite data. Haplotype diversity, haplotype networks, neighbor-joining phylogenetic trees, *F*- statistics, and time since most recent population expansion were calculated using the mtDNA d-loop sequences. The two locations of *Nesoryzomys swarthi* on Isla Santiago (Eastern Beach and La Bomba) represent a single population (microsatellite F_{ST} = -0.012). Moderate substructure was documented in *Nesoryzomys narboroughi* whereas none was detected between subpopulations of *N. fernandinae* (microsatellite F_{ST} = 0.071 and 0.013, respectively). *Aegialomys bauri* exhibited great differentiation between Sampling Period 1 (collected in 1997) and Sampling Period 2 (collected in 2006), possibly representing a cyclic population bottleneck related to El Niño Southern Oscillation events (microsatellite F_{ST} = 0.158, Hederick's standardized G''_{ST}= 0.241). All species showed high d-loop haplotype diversity with low nucleotide diversity. Interestingly, *N. swarthi* was the only species to exhibit significant substructure with the d-loop (Φ_{ST} = 0.165) which may be the result of female philopatry. *Aegialomys bauri* exhibited

a high number of d-loop haplotypes and a time from most recent expansion of 45,568 years, indicating it is older to than islands than originally thought. *Nesoryzomys fernandinae* had a time from most recent expansion of 116,526 years, older than the youngest age estimate of the island it currently inhabits (Isla Fernandina—60,000 yrs). These results are the first to demonstrate the level of population structure of the 4 endemic Galápagos rodent species. These data could prove useful in making recommendations for possible *ex situ* breeding programs as part of a conservation initiative in the Galápagos Islands. Further, the great temporal differentiation exhibited by *Aegialomys bauri* following an El Niño Southern Oscillation event may be a harbinger of the potential genetic impacts of global climate change.