

Tick Tock: Evolutionary history and dispersal capacity of Little Blue Penguin ticks

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Long-distance dispersal is a driving force in the isolation and subsequent evolution of species on both local and global scales. By their nature these dispersal events are often sporadic and difficult to predict, complicating and in some cases precluding the development of testable hypotheses for investigation. The association of ticks and seabirds is global and ancient, and its investigation offers a rare opportunity to assess the influence of long-distance dispersal on the rapid evolution of a parasitic species. Research on associations with non-flighted seabirds is, however, lacking, despite these systems raising intriguing questions as to how terrestrial parasites can disperse with their largely aquatic hosts.

Molecular methods were used in conjunction with morphological investigations to uncover the genetic associations and connectivity among and between geographically disparate penguin tick populations, and in order to ascertain whether accepted taxonomic characteristics concurred with genetic data on the separation of tick species. The results indicate that trans-Tasman dispersal of Little Blue Penguin hosts may have led to the isolation, divergence and possible speciation of some tick lineages. In addition, these results suggest that the isolation of Australian and New Zealand penguin tick populations may be due to the limitations on long distance tick dispersal as a consequence of the ticks' inability to survive long sea journeys with its host. The results of this thesis do, however, suggest that the ticks are dispersing among Australian populations either via the Little Blue Penguin or a sympatric seabird host species. Genetic divergence between Australian and New Zealand tick clades could indicate that the samples comprise multiple species, possibly including unrecognised taxa. More broadly, this thesis examines the influence of penguin dispersal on the evolution of penguin ticks, and applies this knowledge to identify the influence of limitations to dispersal on the evolution of species on broad spatial scales.