NOT ALL WHO WANDER ARE LOST: DETECTING MIGRATION PATTERNS OF WILD RATS IN NEW ZEALAND USING GENETIC DISTANCE MEASURES

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Rats are among the most invasive pest species in the world. They are a particular threat for native species in New Zealand that have evolved in an environment devoid of mammalian predators. New Zealand's island sanctuaries are vulnerable to invasion from rats, which are known to be capable of reaching islands several hundred metres offshore without assistance. In order for an enduringly rat-free island sanctuary to be established, it is necessary for any eradication campaign to consider the concomitant migration pathways to that island. This is necessary to avoid reinvasion from untreated islands following the eradication. Direct observation of migration along these routes is infeasible. Instead we detect migration through heritable genetic signals observed in rats found on island chains. We investigate various methods of assessing the relatedness of populations of rats over different spatial scales within New Zealand, and introduce a novel measure for describing population structure between and within islands. We consider how this measure might be used to separate the degree of similarity between populations due to a common ancestry from that due to a regular flow of genetic material between those populations.