

Ant communities on small tropical islands: effects of island size and isolation are obscured by habitat disturbance and 'tramp' ant species

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KEYWORDS

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Abstract

Aim Comparisons among islands offer an opportunity to study the effects of biotic and abiotic factors on small, replicated biological communities. Smaller population sizes on islands accelerate some ecological processes, which may decrease the time needed for perturbations to affect community composition. We surveyed ants on 18 small tropical islands to determine the effects of island size, isolation from the mainland, and habitat disturbance on ant community composition.

Location Thousand Islands Archipelago (Indonesian name: Kepulauan Seribu) off Jakarta, West Java, Indonesia.

Methods Ants were sampled from the soil surface, leaf litter and vegetation in all habitat types on each island. Island size, isolation from the mainland, and land-use patterns were quantified using GIS software. The presence of settlements and of boat docks were used as indicators of anthropogenic disturbance. The richness of ant communities and non-tramp ant species on each island were analysed in relation to the islands' physical characteristics and indicators of human disturbance.

Results Forty-eight ant species from 5 subfamilies and 28 genera were recorded from the archipelago, and approximately 20% of the ant species were well-known human-commensal 'tramp' species. Islands with boat docks or human settlements had significantly more tramp species than did islands lacking these indicators of anthropogenic disturbance, and the diversity of non-tramp species decreased with habitat disturbance.

Main conclusions Human disturbance on islands in the Thousand Islands Archipelago promotes the introduction and/or establishment of tramp species. Tramp species affect the composition of insular ant communities, and expected biogeographical patterns of ant richness are masked. The island with the greatest estimated species richness and the greatest number of unique ant species, Rambut Island, is a forested bird sanctuary, highlighting the importance of protected areas in preserving the diversity of species-rich invertebrate faunas.