Seed dispersal by chelonians and the virtually intact Aldabra seed dispersal network

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Abstract

In recent years, it has become clear that frugivory and seed dispersal (FSD) by chelonians (turtles and tortoises) is much more common than previously thought. Yet, a review and synthesis is lacking. We reviewed published and unpublished records of chelonian FSD, and assessed the role of chelonians as seed dispersers, from individual species to the community level. We found that a substantial proportion of the world's aquatic and terrestrial turtles and a major part of testudinid tortoises (70 species in 12 families) include fruits and/or seeds in their diet, and that fruits of at least 588 plant species in 120 families are ingested and/or dispersed by chelonians. For some chelonians, overall or in certain seasons, fruit may even form the largest part of their diet. Contrary to seed dispersal by lizards, the other major reptilian frugivores, chelonian FSD is not an island phenomenon in terms of geographic distribution. Nevertheless, on islands especially tortoises are often among the largest native terrestrial vertebrates-or were, until humans got there. Aldabra Atoll is one of such islands, and harbours the last native population of giant tortoises (*Aldabrachelys gigantea*) in the Western Indian Ocean. We studied the seed dispersal interactions in the plant–frugivore community of Aldabra Atoll, which is composed of ten frugivores and 37 fleshy-fruited plant species. The network was highly generalised, and giant tortoises were the second most important seed dispersers in terms of the number of interactions. In total, *A. gigantea*dispersed the seeds of at least 20 fleshy-fruited plant species, including large-seeded ones such as *Cordia subcordata*(Boraginaceae) and *Guettarda speciosa*(Rubiaceae). Moreover, we found that the network was most vulnerable to the loss of three particular frugivores, one of them being the giant tortoises. This study highlights the importance of tortoises as seed dispersers –especially as megafaunal ones–and suggests that the many recently extinct giant tortoises in numerous islands around the world had a similarly pivotal role in their communities before being exterminated as the Aldabra giant tortoises.

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