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# PHOTO GALLERY

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## FRUGIVORES STRONGLY AGGREGATE DISPERSED SEEDS

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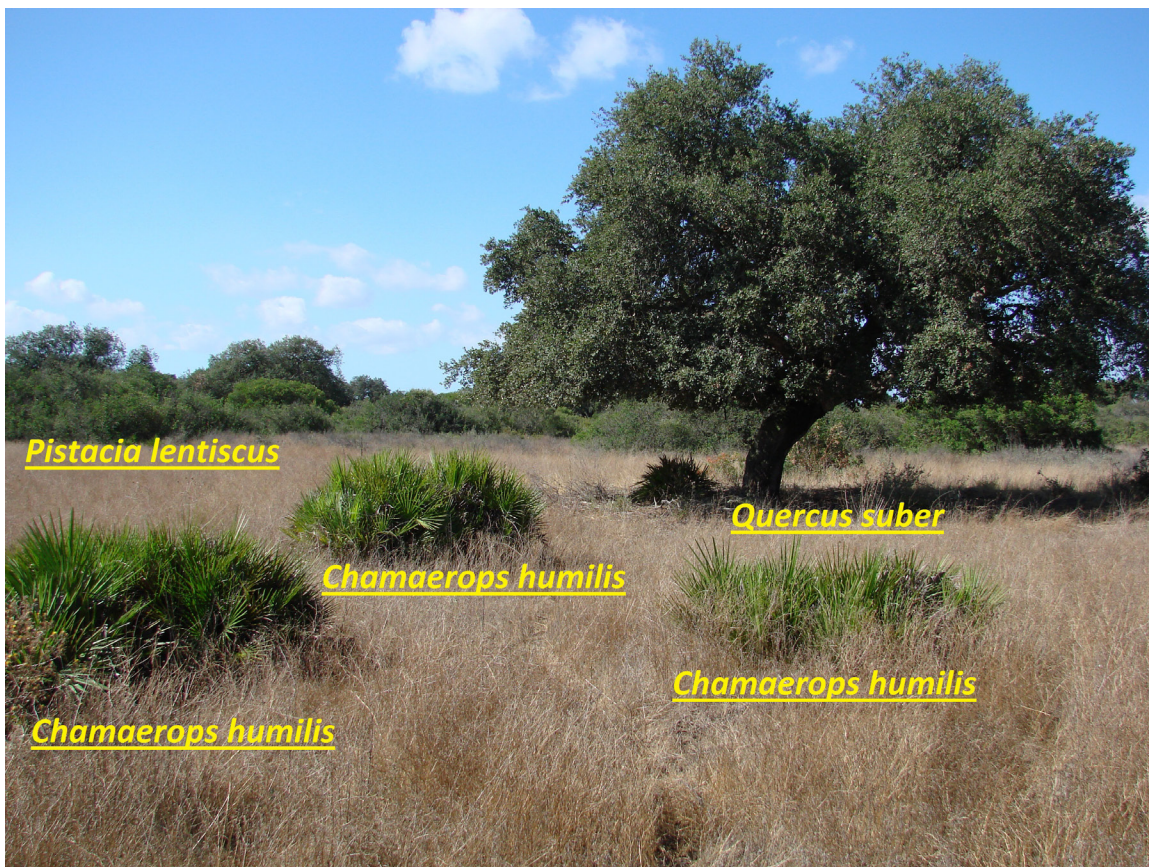


Photo 1. In the *Pistacia*-dominated shrubland, dwarf palms *Chamaerops humilis* and cork oaks *Quercus suber* are abundant. Note also the *Pistacia lentiscus* shrubs in the second line.



Photo 2. Iberian pear *Pyrus bourgaeana* flowering individuals in the *Pistacia*-dominated shrubland. This small tree relies locally on badgers *Meles meles* and foxes *Vulpes vulpes* for seed dispersal. Wild boars *Sus scrofa* also disperse some seeds.

We investigated mechanisms of seed aggregation in complex seed-disperser networks using techniques of spatial point pattern analysis. Our approach revealed three hierarchical mechanisms of seed aggregation acting at different levels (mammal fecal samples, seeds, pairs of seed species) and spatial scales. Despite the fact that seeds were always clustered, some attributes of the zoochorous seed rains (intensity, aggregation scale) were variable among study sites due to changes in the ecological context in which seeds and dispersers interacted. Our novel approach does not require the identification of seed disperser species, an advantage that makes it applicable in a myriad of systems and logistic circumstances.



Photo 3. Sabines *Juniperus phoenicea* subsp. *turbinata* of different sizes in the *Juniperus*-dominated shrubland. It is thought that sabinos aggregate along gravel roadsides because dispersers (e.g., red foxes *Vulpes vulpes*) use them intensively for movements and fecal marking.



Photo 4. The Portuguese crowberry *Corema album* and stone pines *Pinus pinea* are common in the dunes adjacent to the *Juniperus*-dominated shrubland. Seeds of the Portuguese crowberry are frequently dispersed by carnivores, rabbit *Oryctolagus cuniculus*, deer *Cervus elaphus* and *Dama dama*, and wild boars.



Photo 5. View of our headquarters from a fire lookout tower in the Doñana Biological Reserve (southwest Spain), next to the *Halimium*-dominated shrubland.

These photographs illustrate the article “Hierarchical mechanisms of spatially contagious seed dispersal in complex seed-disperser networks,” by José M. Fedriani and Thorsten Wiegand, tentatively scheduled to appear in *Ecology* 95(1), January 2014. doi: <http://dx.doi.org/10.1890/13-0718.1>