Table S1. Dispersal and fecundity models used for inverse modeling of *Attalea butyracea* seed shadows on Barro Colorado Island, Panama. Dispersal kernels are given in the two-dimensional form (m^2), assuming isotropy. *a* is the scale parameter, *b* is the shape parameter.

Model	Formula	Pars	Notes
Dispersal kernels			
Erlang[a,b]	$f(r) = \frac{a^2}{2\pi}\exp(-ar)$	1	Two dimensional form of the exponential distribution
2Dt [*†‡§¶]	$f(r) = \frac{b}{\pi a}\left(1+\left[\frac{r^2}{a}\right]^{-b+1}\right)$	2	Fat-tailed kernel. Modus can be away from source.
Weibull [*†‡]	$f(r) = \frac{1}{2\pi}\frac{br^{b-2}}{a^b}\exp\left(-\left[\frac{r}{a}\right]^b\right)$	2	Includes Gaussian when b = 2. Modus can be away from source.
Lognormal [†§]	$f(r) = \frac{1}{2b\pi r^2\sqrt{2\pi}}\left(-\frac{[\log(r)-a]^2}{2b^2}\right)$	2	Fat-tailed kernel. Modus can be away from source.
Fecundity (s) models			
Mean	$s(x) = b_0$	1	Seed production is constant
Linear	$s(x) = b_0 + b_1 x$	2	Linear increase with tree size *x*
Michaelis-Menten	$s(x) = \frac{b_0 x}{b_1 + x}$	2	Asymptotic increase with tree size *x*. b_0 is the maximum seed production.
Scale parameter (a) models			
Constant	$a(d) = \mu$	1	Shape parameter is a constant
Linear	$a(d) = c_0 + c_1 x$	2	Linear increase with tree density *d*
Exponential	$a(d) = e^{(c_0 + c_1 x)}$	2	Exponential increase with tree density *d*

* Klein *et al* 2006 (2-parameter version); † Muller-Landau *et al* 2008; ‡ Clark *et al* 1999; § Stoyan and Wagner 2001; ¶ Dalling *et al* 2002

Figure S1. Location of the two sets of plots on Barro Colorado Island, Panama, in which the measurements were done. The density of adult *Attalea butyracea* varied widely across the plots. The six 1-ha plots established in 2005 were succeeded by ten 4-ha plots in 2009.

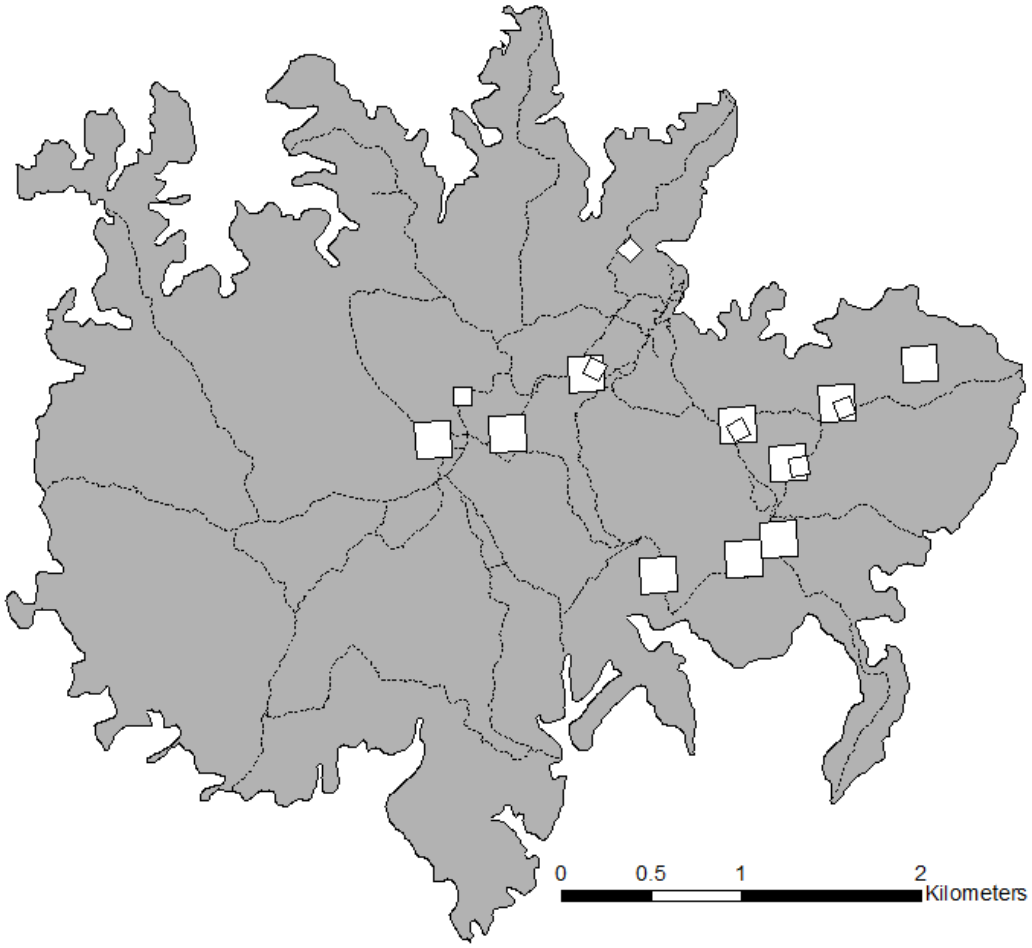

Figure S2. Cumulative probability distribution of seed dispersal distance in the palm *Attalea butyracea* on Barro Colorado Island, Panama, estimated for ten populations that varied widely in adult density, from 1-23 ha^{-1}. The functions were fitted by hierarchical inverse modelling based on the distribution of reproductive adult trees and dispersed seeds on and in the top soil.

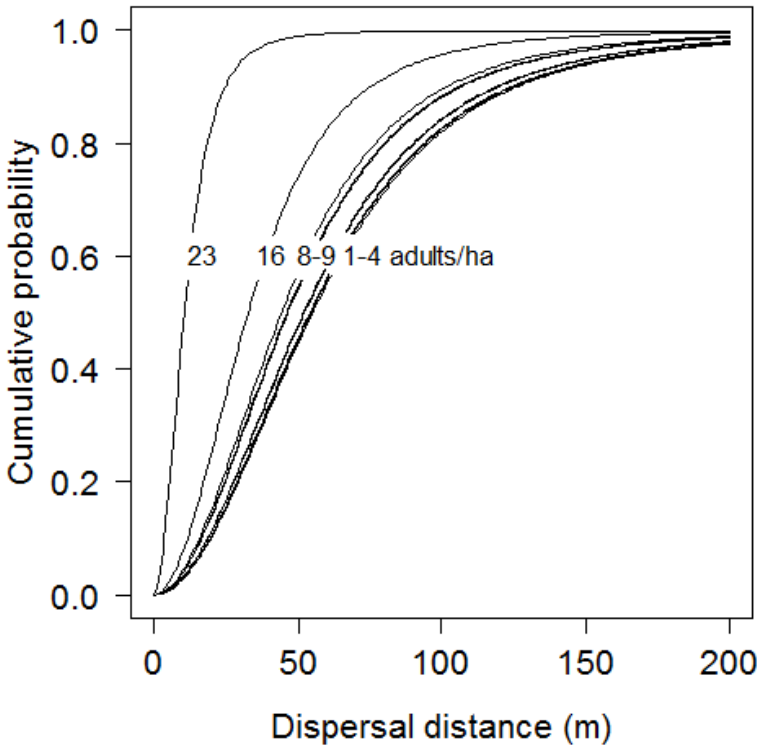

Figure S3. Seed limitation in the palm *Attalea butyracea* on Barro Colorado Island, Panama, for ten populations that varied widely in adult density. Plotted values are observed proportions of sample quadrats reached by at least 1, 2, 4, 8, 16 and 32 seeds, each set with different symbols. Lines are logistic regression fits.