

Supplementary material

Table S1. Pearson correlation coefficients between environmental predictors of maximum body size (N = 46 islands). All continuous predictors, except isolation index, were log₁₀-transformed before analysis.

Predictor	Species richness	Island area	Island age	Elev.	Precip.	Temp.	Dist. to mainl.
Island area	0.73						
Island age	0.44	0.39					
Island elevation	0.46	0.82	0.09				
Precipitation	0.27	0.00	0.39	-0.09			
Temperature	-0.41	-0.73	-0.19	-0.56	0.26		
Dist. to mainland	-0.70	-0.53	-0.77	-0.23	-0.28	0.24	
Isolation index	-0.30	0.11	-0.64	0.36	-0.51	-0.22	0.65

Table S2. Regression statistics for pairwise predictors of log₁₀ maximum body size (M_{max}) in Pacific island birds. In the two categorical variables Geology and Region, each level was related to the baseline category (Continental and East Polynesia, respectively). All continuous predictors, except isolation, were log₁₀-transformed before analysis.

Predictor	Category	Flightless M _{max}				Volant M _{max}			
		Int.	Slope (SE)	p	AIC	Int.	Slope (SE)	p	AIC
Intercept		3.05	–	–	82.87	3.04	–	–	16.83
Richness null model		-1.31	1.24 (0.17)	***	51.5	-0.77	1.23 (0.26)	***	0.91
Island area		1.21	0.69 (0.09)	***	49.48	2.70	0.14 (0.03)	***	5.69
Island age		2.66	0.48 (0.25)	.	81.15	2.93	0.14 (0.07)	.	15.12
Island elevation		0.11	1.06 (0.21)	***	64.21	2.77	0.10 (0.07)	ns	18.21
Precipitation		6.03	-0.92 (1.23)	ns	84.28	2.00	0.32 (.034)	ns	17.94
Temperature		11.72	-6.34 (1.11)	***	51.03	4.44	-0.99 (0.45)	*	8.24
Distance		8.73	-1.62 (0.72)	*	77.73	5.00	-0.56 (0.18)	**	9.91
Isolation		2.42	0.01 (0.01)	ns	81.8	3.23	0.00 (0.002)	ns	18.31
Geology	Continental	5.00	–	–	53.12	3.33	–	–	17.46
	Coralline	–	-2.72 (0.37)	***	–	–	-0.35 (0.18)	.	–
	Volc. and coral	–	-2.54 (0.38)	***	–	–	-0.36 (0.19)	.	–
	Volcanic	–	-1.84 (0.34)	***	–	–	-0.22 (0.17)	ns	–
Region	E. Polynesia	2.43	–	–	54.06	2.83	–	–	2.08
	Hawaii	–	1.33 (0.30)	***	–	–	0.35 (0.12)	**	–
	Melanesia	–	0.84 (0.33)	*	–	–	0.41 (0.11)	**	–
	Marianas	–	0.11 (0.31)	ns	–	–	-0.10 (0.13)	ns	–
	New Zealand	–	2.77 (0.43)	***	–	–	0.51 (0.17)	**	–
	W. Polynesia	–	0.25 (0.31)	ns	–	–	0.29 (0.10)	**	–

Significance of p-values: ns > 0.10, . < 0.10, * < 0.05, ** < 0.01, *** < 0.001.

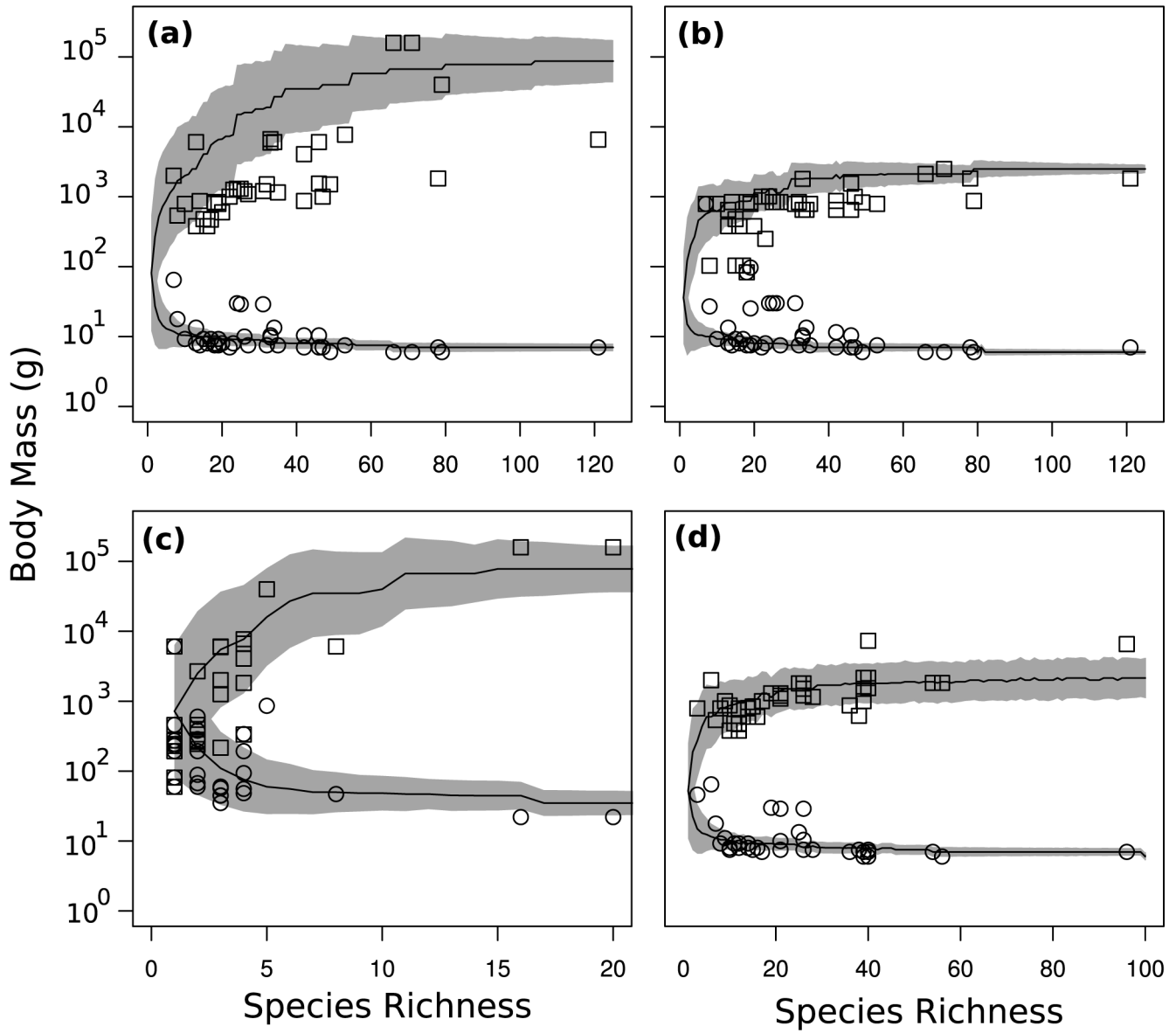


Figure S1. Null model predictions for maximum and minimum body size in Pacific island birds based on species richness for (a) the full prehuman avifauna, (b) extant birds, (c) flightless, and (d) volant species. Black lines represent predicted median size maxima and minima (sampling from an unweighted species pool) over 1000 model runs. Gray areas show 95% confidence bounds. Empirical size maxima for each island are shown with squares and empirical minima in circles.

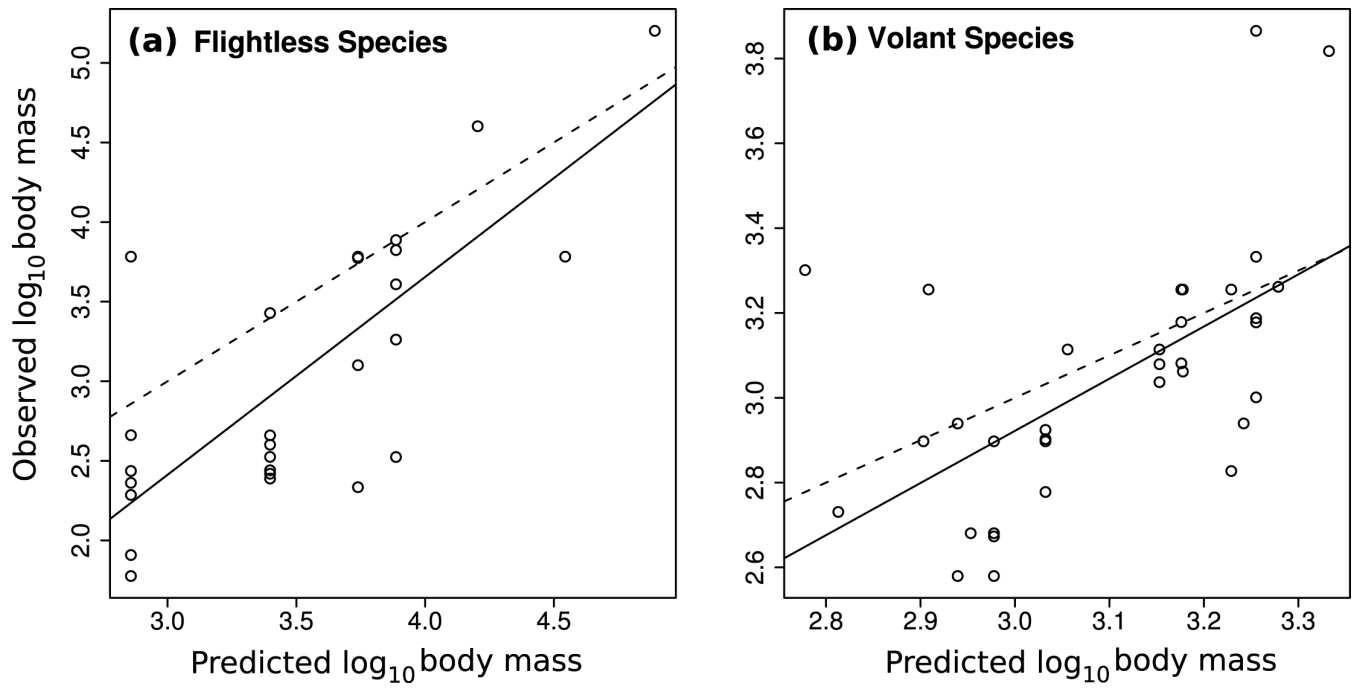


Figure S2. Comparison of null model predictions and observed maximum sizes of Pacific island birds in prehuman (a) flightless and (b) volant species. The dashed line indicates a one-to-one fit, and the solid line shows a least-squares fit of the null model to empirical size maxima (flightless: intercept = -1.31 [SE 0.61], slope = 1.24 [SE 0.17]; volant: intercept = -0.77 [SE 0.81], slope = 1.23 [SE 0.26]).

Appendix S1: data sources

Pacific island bird species list sources

- Birdlife International 2008. World bird database. – <www.birdlife.org/datazone/index.html>, accessed April 2008.
- Boyer, A. G. 2008. Extinction patterns in the avifauna of the Hawaiian islands. – *Divers. Distrib.* 14: 509–517.
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- Steadman, D. W. 2006. Extinction and biogeography of tropical Pacific birds. – Univ. of Chicago Press.
- Worthy, T. H. 2001. A giant flightless pigeon gen. et sp. Nov. and a new species of *Ducula* (Aves: Columbidae), from Quaternary deposits in Fiji. – *J. R. Soc. N. Z.* 31: 763–794.
- Worthy, T. H. and Holdaway, R. N. 2002. The lost world of the Moa. – Indiana Univ. Press.

Pacific island bird mass sources

- Dekker, R. W. R. J. and Brom, T. G. 1990. Maleo eggs and the amount of yolk in relation to different incubation strategies in megapodes. – *Aust. J. Zool.* 38: 19–24.
- Duckworth, W. D. et al. 1997. The scientific bases for preservation of the Mariana crow. – National Academy Press.
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- White, C. M. and Brimm, D. J. 1998. Fiji goshawk (*Accipiter rufitorques*) hunts by grass-probing. – *Notornis* 45: 191–192.
- World parrot trust 2009. Horned parakeet (*Eunymphicus cornutus*). – <www.parrots.org/index.php/encyclopedia/profile/horned_parakeet/>, accessed 31 Aug, 2009.
- Worthy, T. H. 2001. A giant flightless pigeon gen. et sp. Nov. and a new species of *Ducula* (Aves: Columbidae), from Quaternary deposits in Fiji. – *J. R. Soc. N. Z.* 31: 763–794.
- Worthy, T. H. and Holdaway, R. N. 2002. The lost world of the Moa. – Indiana Univ. Press.

Continental and island mammal mass and sources

Landmass	Species	Mass (kg)	Reference
Montserrat	<i>Oryzomys</i> sp.	3	MacFarlane, D. 2009. Extinct mammals of the west indies. – < faculty.jsd.claremont.edu/dmcfarlane/extinctmammals >, accessed 20 July 2009.
Grand Cayman	<i>Capromys</i> sp.	6	same as above
Martinique	<i>Megaloryzomys</i> sp.	3	same as above
Puerto Rico	<i>Acratocnus odontrigonus</i>	45	same as above
Jamaica	<i>Xenothrix mcgregori</i>	4	same as above
Hispaniola	<i>Megalocnus zile</i>	150	Burness, G. P. et al. 2001. Dinosaurs, dragons and dwarfs: the evolution of maximal body size. – <i>Proc. Nat. Acad. Sci. USA</i> 98: 14518–14523.
Cuba	<i>Megalocnus rodens</i>	200	Hansen, D. M. and Galetti, M. 2009. The forgotten megafauna. – <i>Science</i> 324: 42–43.
Madagascar	<i>Hippopotamus laloumena</i>	945	Smith, F. A. et al. 2003. Body mass of late Quaternary mammals. – <i>Ecology</i> 84: 3402.
New Guinea	<i>Kolopsis watuense</i>	300	same as above
Australia	<i>Diprotodon optatum</i>	1500	same as above
South America	<i>Stegomastodon superbus</i>	7580	same as above
North America	<i>Mammuthus imperator</i>	10000	same as above
Africa	<i>Elephas iolensis</i>	6500	same as above
Eurasia	<i>Mammuthus primigenius</i>	5500	same as above