

Demographic stochasticity example:



Welcome to
New Zealand!

Famous for unique endemic species, flightlessly reveling in an archipelago devoid of terrestrial predators.

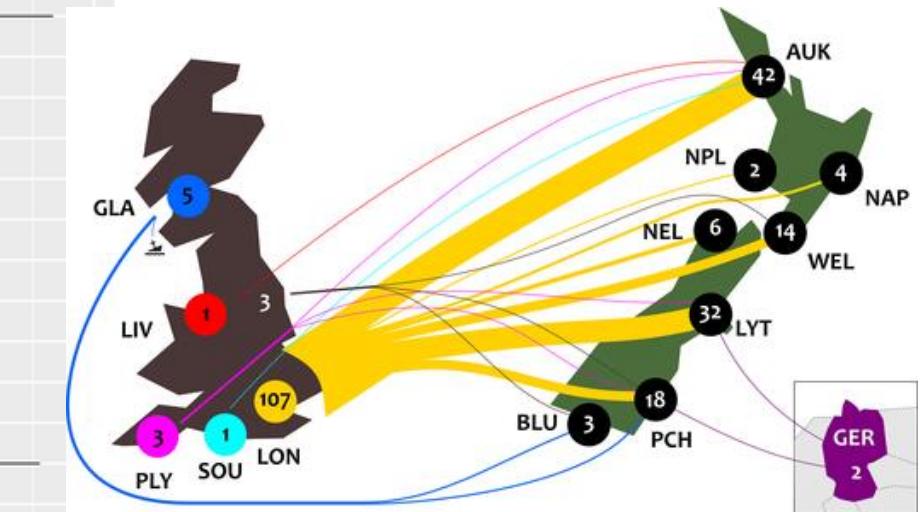
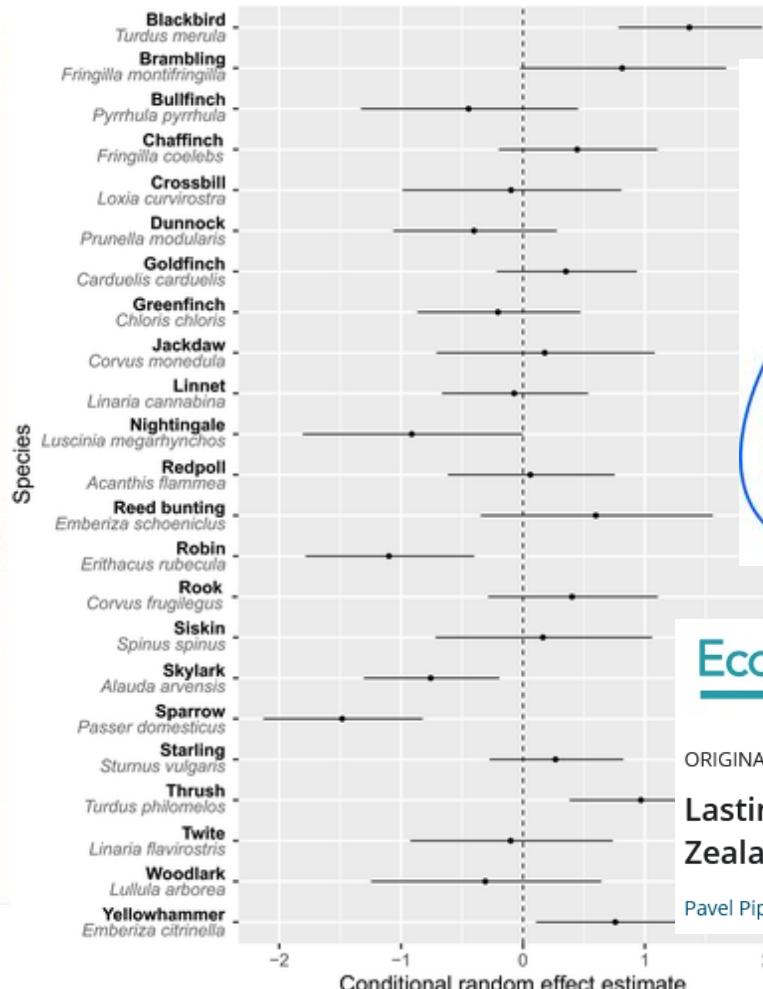


New Zealand ... also home to Acclimatisation societies!

Fastidiously delivering exotic species to New Zealand for over 200 years.



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Presented to Mr. J. M. PATERSON
as an appreciation of his long service to the Society.



Ecology and Evolution

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Lasting the distance: The survival of alien birds shipped to New Zealand in the 19th century

Pavel Pipek, Tim M. Blackburn, Steven Delean, Phillip Cassey, Çağan H. Şekercioğlu, Petr Pyšek

Introduction / Extinction of passerine birds ...

... as a function of
introduction size!

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Demographic Stochasticity and Social Mating System in the
Process of Extinction of Small Populations: The Case
of Passerines Introduced to New Zealand

Stéphane Legendre,^{1,*} Jean Clobert,² Anders P. Møller,² and Gabriele Sorci²

Table 2: Data for passerines introduced to New Zealand 100 yr ago

Released species	Introduction success	Release sites	Initial population size	Mean $n(0)$	p_e	Released species	Introduction success	Release sites	Initial population size	Mean $n(0)$	p_e						
Initial size, 2–9:																	
<i>Carduelis flammea</i>	1	W	2 (1)	<i>P. domesticus</i>	1	A	49 (2)						
<i>Carduelis spinus</i>	0	W	2 (1)	<i>P. modularis</i>	1	W	50 (3)						
<i>Manorina melanophrys</i>	0	W	2 (1)	<i>C. chloris</i>	1	A	51 (3)						
<i>Passer montanus</i>	0	O	2 (1)	<i>C. spinus</i>	0	C	52 (2)						
<i>Piranga rubra</i>	0	A	2 (1)	<i>Carduelis carduelis</i>	1	A	55 (2)						
<i>Pyrrhula pyrrhula</i>	0	C	2 (1)	<i>E. rubecula</i>	0	O	62 (3)	63	.42						
<i>Stagonopleura bella</i>	0	A	2 (1)	<i>C. frugilegus</i>	0	A	66 (2)						
<i>Fringilla montifringilla</i>	0	W	3 (1)	<i>A. tristis</i>	0	W	70 (2)						
<i>Emberiza cirlus</i>	1	W	4 (1)	<i>Manorina melanocephala</i>	0	O	80 (1)						
<i>Emberiza schoeniclus</i>	0	O	4 (1)	<i>C. flammula</i>	1	O	81 (2)						
<i>Neochmia temporalis</i>	0	O	4 (1)	5	.78	<i>G. tibicen</i>	1	O	81 (5)						
<i>Corvus monedula</i>	0	C	5 (1)	Initial size, 98–126:											
<i>Sylvia atricapilla</i>	0	A	5 (1)	<i>P. modularis</i>	1	O	98 (2)						
<i>Lullula arborea</i>	0	A	5 (1)	<i>F. coelebs</i>	1	O	99 (3)						
<i>Emberiza hortulana</i>	0	W	6 (1)	<i>A. arvensis</i>	1	O	100 (3)						
<i>Padula oryzivora</i>	0	A	6 (1)	<i>A. arvensis</i>	1	W	108 (2)						
<i>E. cirlus</i>	1	O	7 (1)	<i>Sturnus vulgaris</i>	1	A	109 (3)						
<i>E. schoeniclus</i>	0	C	7 (2)	<i>F. coelebs</i>	1	A	113 (4)	113	.17						
<i>Carduelis chloris</i>	1	O	8 (1)	<i>E. montifringilla</i>	0	C	117 (4)						
<i>Lonchura punctulata</i>	0	A	8 (1)	<i>C. carduelis</i>	1	O	118 (4)						
<i>S. bella</i>	0	W	8 (1)	<i>C. cannabina</i>	0	C	119 (4)						
<i>Turdus philomelos</i>	1	W	8 (1)	<i>T. philomelos</i>	1	A	125 (2)						
<i>Eriothacus rubecula</i>	0	A	9 (3)	<i>S. vulgaris</i>	1	C	125 (4)						
Initial size, 10–22:																	
<i>E. rubecula</i>	0	W	10 (1)	<i>F. coelebs</i>	1	W	126 (4)						
<i>Gymnorhina tibicen</i>	1	A	10 (2)	Initial size, 138–236:											
<i>Lonchura castaneothorax</i>	0	C	12 (1)	<i>Turdus merula</i>	1	O	138 (5)						
<i>Malurus cyaneus</i>	0	A	12 (1)	<i>T. philomelos</i>	1	O	145 (5)						
<i>Poephila guttata</i>	0	W	12 (1)	<i>S. vulgaris</i>	1	O	169 (3)						
<i>Stagonopleura guttata</i>	0	W	12 (1)	<i>T. merula</i>	1	A	170 (4)						
<i>N. temporalis</i>	0	A	12 (2)	15	.79	<i>C. carduelis</i>	1	W	177 (3)						
<i>P. montanus</i>	0	A	12 (2)	<i>M. melanocephala</i>	0	C	200 (1)	189	.18						
<i>Passer domesticus</i>	1	O	14 (2)	<i>P. domesticus</i>	1	W	200 (1)						
<i>Fringilla coelebs</i>	1	C	16 (4)	<i>C. flammula</i>	1	A	209 (1)						
<i>Acridotheres tristis</i>	0	C	18 (1)	<i>P. modularis</i>	1	C	210 (6)						
<i>Carduelis cannabina</i>	0	O	20 (2)	<i>M. melanocephala</i>	0	W	224 (4)						
<i>Carduelis flavirostris</i>	0	C	21 (1)	<i>E. citrinella</i>	1	C	236 (3)						
<i>C. cannabina</i>	0	W	22 (2)	Initial size, 260–345:											
Initial size, 27–46:																	
<i>L. castaneothorax</i>	0	A	27 (2)	<i>G. tibicen</i>	1	W	260 (1)						
<i>C. chloris</i>	1	C	32 (2)	<i>C. carduelis</i>	1	C	265 (4)						
<i>Corvus frugilegus</i>	1	C	36 (4)	<i>S. vulgaris</i>	1	W	298 (5)						
<i>C. flavirostris</i>	0	O	38 (1)	<i>T. philomelos</i>	1	C	299 (7)	301	.0						
<i>Emberiza citrinella</i>	1	O	39 (2)	44	.38	<i>G. tibicen</i>	1	C	313 (9)						
<i>C. cannabina</i>	0	A	42 (4)	<i>C. flammula</i>	1	C	326 (5)						
<i>P. domesticus</i>	1	C	44 (1)	<i>E. citrinella</i>	1	A	345 (6)						
<i>Prunella modularis</i>	1	A	46 (4)	Initial size, 434–477:											
Initial size, 49–81:																	
<i>P. domesticus</i>	1	A	49 (2)	<i>A. arvensis</i>	1	C	434 (5)						
<i>P. modularis</i>	1	W	50 (3)	<i>T. merula</i>	1	C	477 (7)	455	.0						
<i>C. chloris</i>	1	A	51 (3)												
<i>C. spinus</i>	0	C	52 (2)												
<i>Carduelis carduelis</i>	1	A	55 (2)												
<i>E. rubecula</i>	0	O	62 (3)	63	.42												
<i>C. frugilegus</i>	0	A	66 (2)												
<i>A. tristis</i>	0	W	70 (2)												
<i>Manorina melanocephala</i>	0	O	80 (1)												
<i>C. flammula</i>	1	O	81 (2)												
<i>G. tibicen</i>	1	O	81 (5)												

Common redpoll (*Carduelis flammea*)

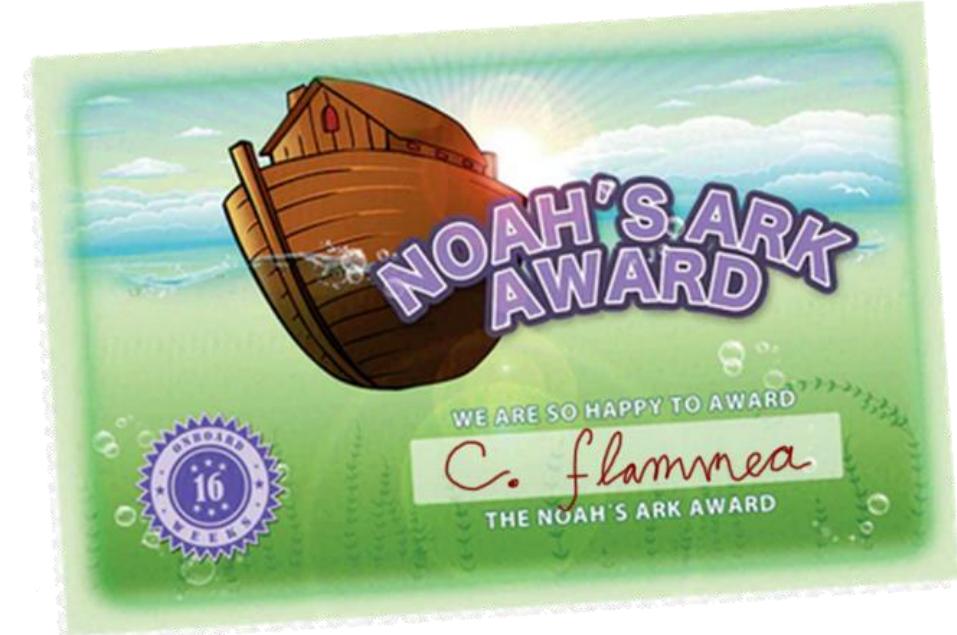


Table 2: Data for passerines introduced to New Zealand 100 yr ago

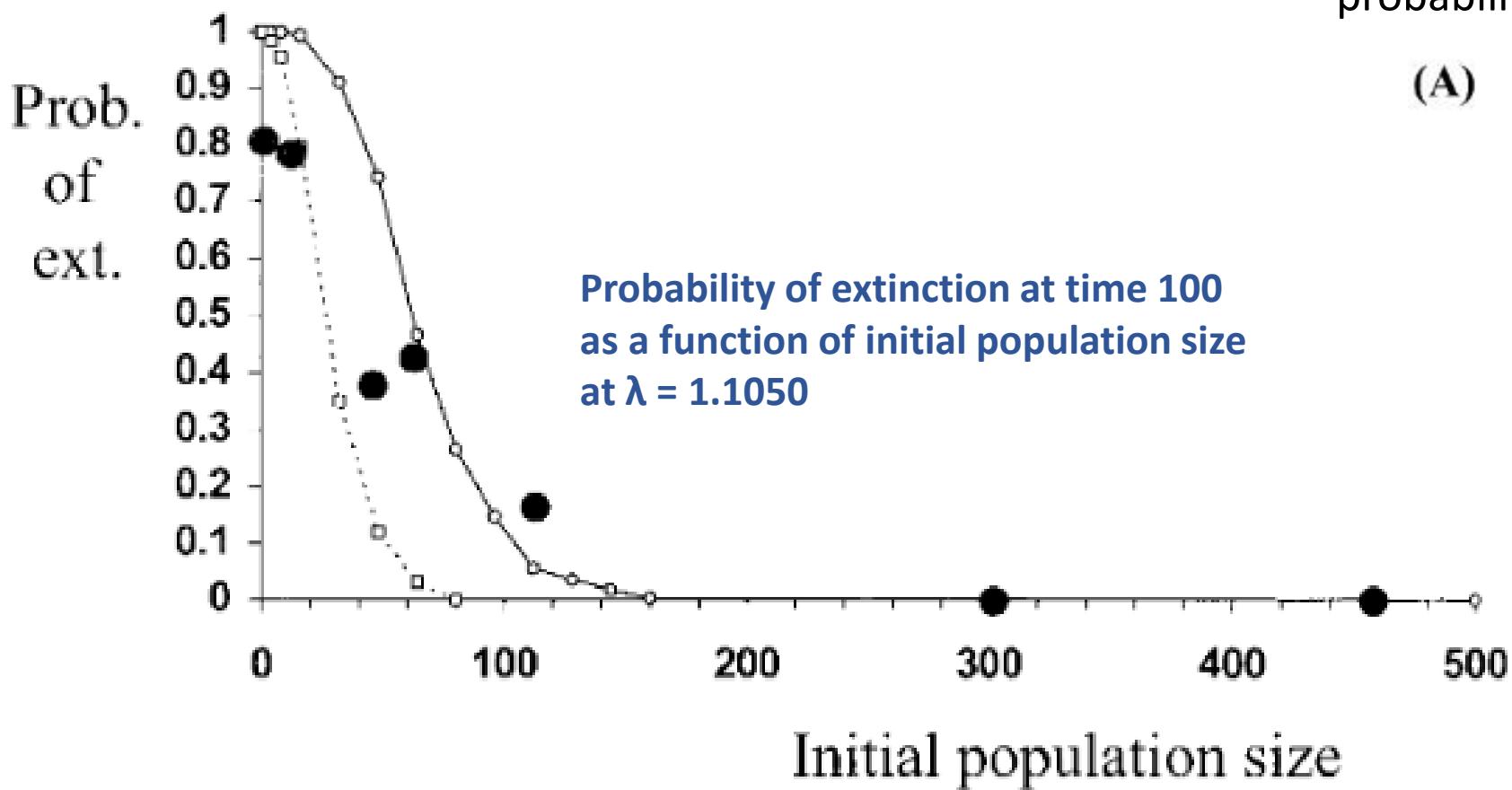
Released species	Introduction success	Release sites	Initial population size	Mean $n(0)$	p_e
Initial size, 2–9:					
<i>Carduelis flammea</i>	1	W	2 (1)
<i>Carduelis spinus</i>	0	W	2 (1)
<i>Manorina melanophrys</i>	0	W	2 (1)
<i>Passer montanus</i>	0	O	2 (1)
<i>Piranga rubra</i>	0	A	2 (1)
<i>Pyrrhula pyrrhula</i>	0	C	2 (1)
<i>Stagonopleura bella</i>	0	A	2 (1)

Distinguished recipient of the:

**Noah's Ark Award for Successful
Colonization at $N_0 = 2$**

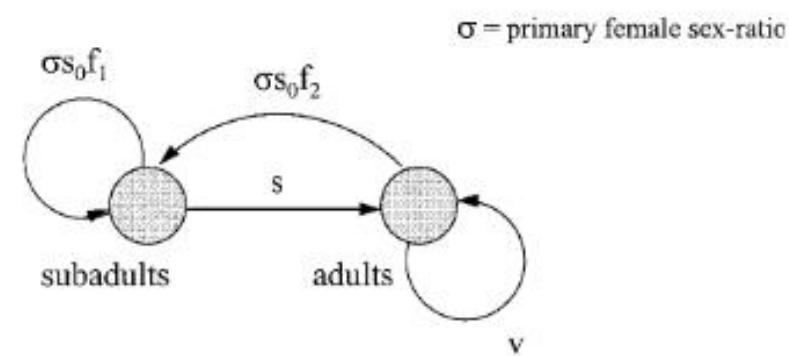


Extinction of passerine birds ...



Model 1: Demographic stochasticity in proportion female / male. Some probability of survival s and v .

(A)

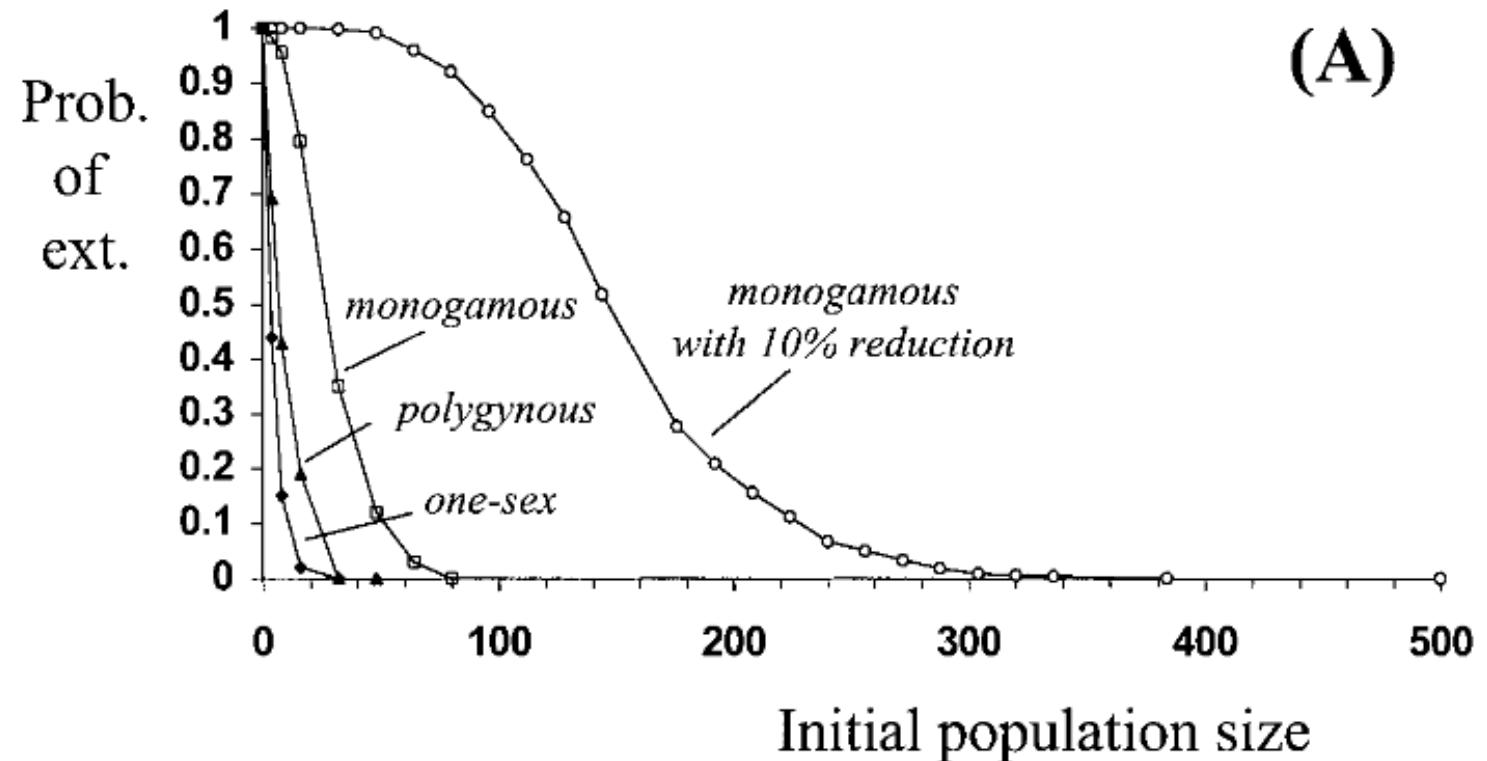
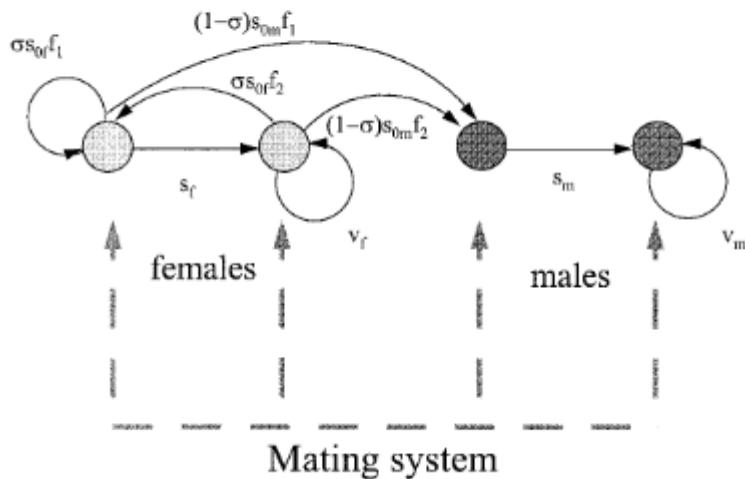


Extinction of passerine birds ...

... as a function of introduction size AND mating system!

Model 2: Also include mating system!
Monogamous vs. polygynous.

(B)



Extinction of passerine birds ...

... as a function of introduction size AND mating system!

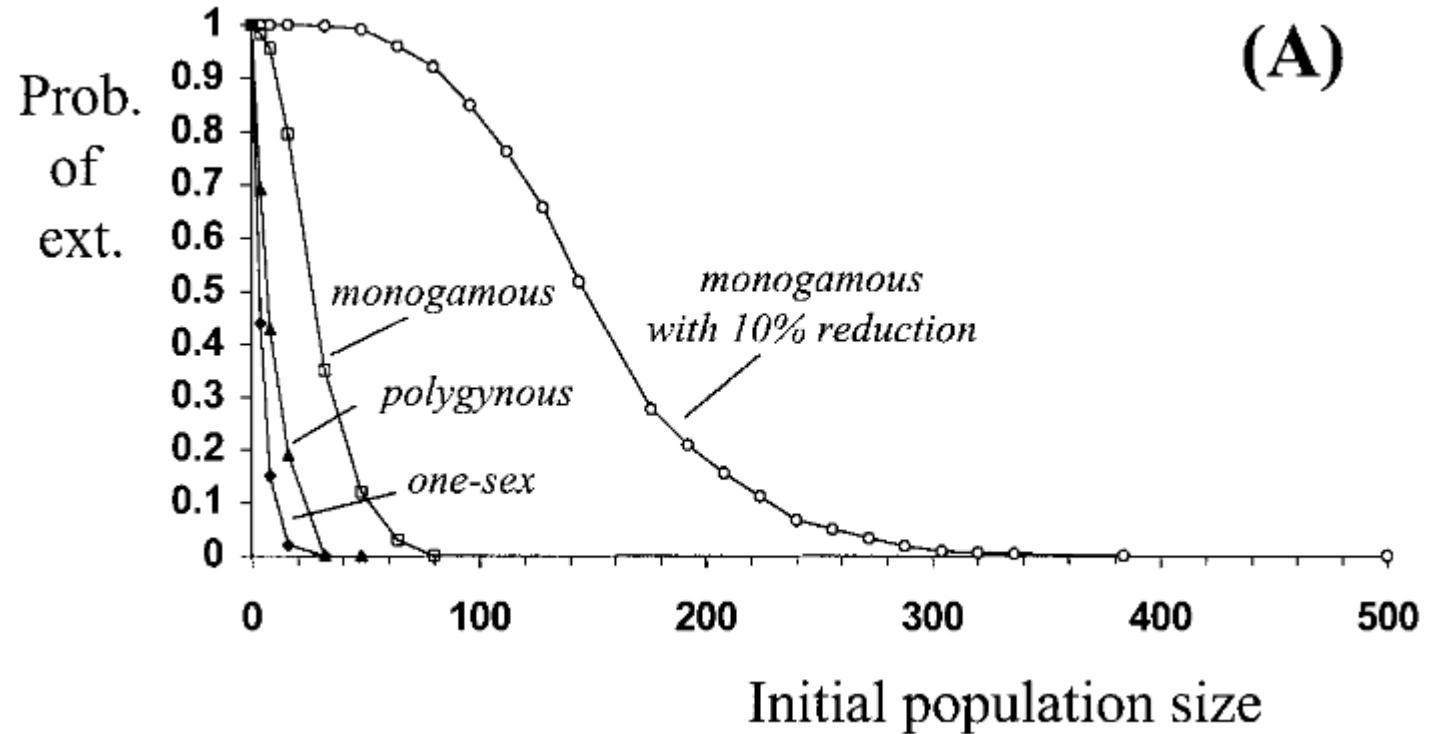
Conclusion

Long-lived & polygynous species have the lowest risk of extinction.

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Historical Ecology, Population Modeling,
Behavioral Ecology, Conservation Biology,
Statistical Model Fitting