

Demographic stochasticity example:



Welcome to New Zealand!

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



New Zealand's Native "K" Birds

Kiwis, Kakas, Kokako, & More



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New Zealand ... also home to Acclimitisation societies!

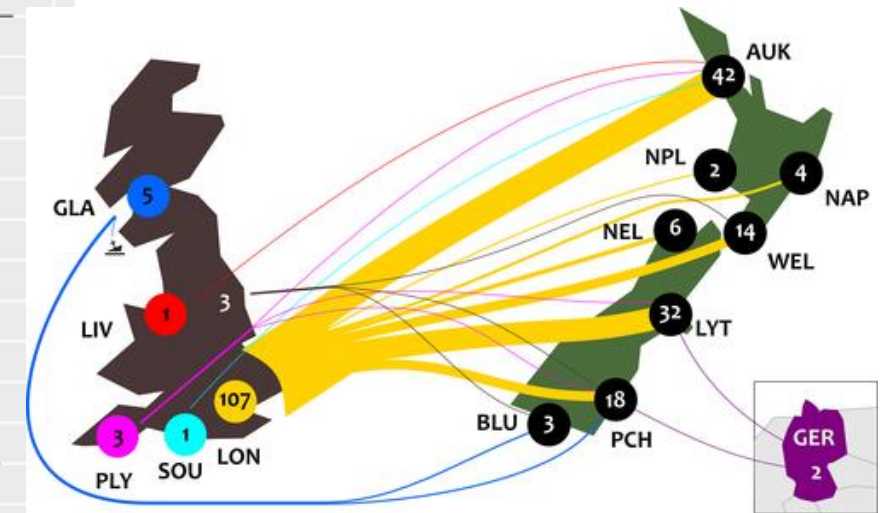
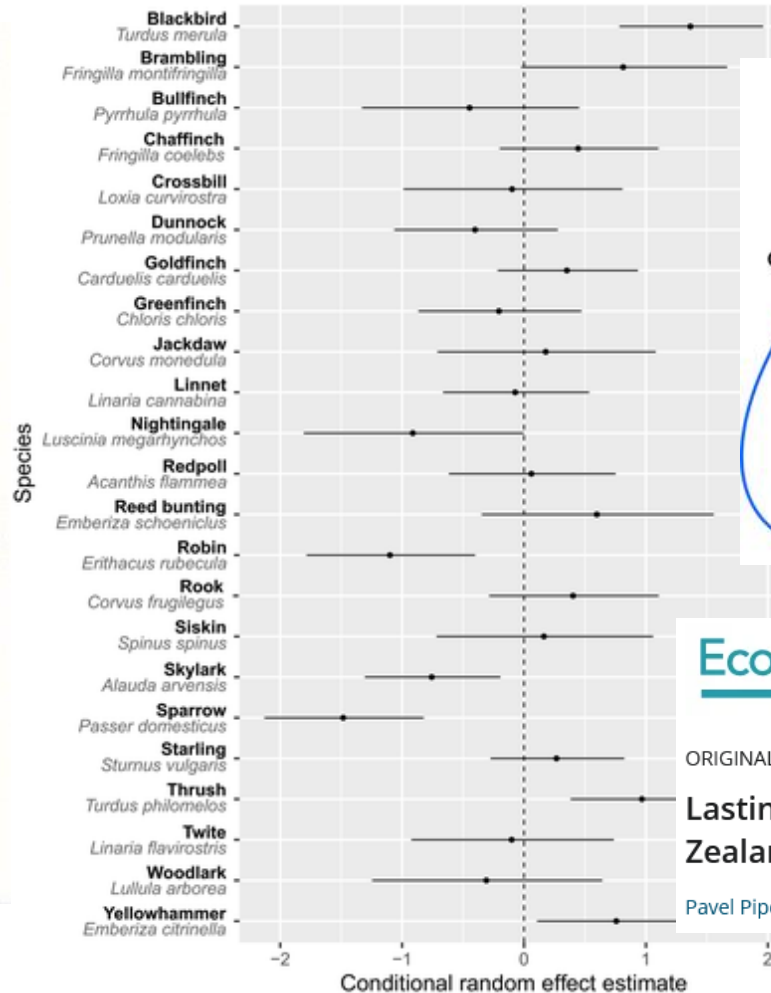
Fastidiously delivering exotic species to New Zealand for over 200 years.

OTAGO ACCLIMATISATION SOCIETY
COUNCIL - 1960



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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!

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)	...	...
<i>Fringilla montifringilla</i>	0	W	3 (1)	...	...
<i>Emberiza cirrus</i>	1	W	4 (1)	...	...
<i>Emberiza schoeniclus</i>	0	O	4 (1)	...	...
<i>Neochmia temporalis</i>	0	O	4 (1)	5	.78
<i>Corvus monedula</i>	0	C	5 (1)	...	...
<i>Sylvia atricapilla</i>	0	A	5 (1)	...	...
<i>Lullula arborea</i>	0	A	5 (1)	...	...
<i>Emberiza hortulana</i>	0	W	6 (1)	...	...
<i>Padda oryzivora</i>	0	A	6 (1)	...	...
<i>E. cirrus</i>	1	O	7 (1)	...	...
<i>E. schoeniclus</i>	0	C	7 (2)	...	...
<i>Carduelis chloris</i>	1	O	8 (1)	...	...
<i>Lonchura punctulata</i>	0	A	8 (1)	...	...
<i>S. bella</i>	0	W	8 (1)	...	...
<i>Turdus philomelos</i>	1	W	8 (1)	...	...
<i>Erithacus rubecula</i>	0	A	9 (3)	...	...
Initial size, 10–22:					
<i>E. rubecula</i>	0	W	10 (1)	...	...
<i>Gymnorhina tibicen</i>	1	A	10 (2)	...	...
<i>Lonchura castaneothorax</i>	0	C	12 (1)	...	...
<i>Malurus cyaneus</i>	0	A	12 (1)	...	...
<i>Poephila guttata</i>	0	W	12 (1)	...	...
<i>Stagonopleura guttata</i>	0	W	12 (1)	...	...
<i>N. temporalis</i>	0	A	12 (2)	15	.79
<i>P. montanus</i>	0	A	12 (2)	...	...
<i>Passer domesticus</i>	1	O	14 (2)	...	...
<i>Fringilla coelebs</i>	1	C	16 (4)	...	...
<i>Acridotheres tristis</i>	0	C	18 (1)	...	...
<i>Carduelis cannabina</i>	0	O	20 (2)	...	...
<i>Carduelis flavirostris</i>	0	C	21 (1)	...	...
<i>C. cannabina</i>	0	W	22 (2)	...	...
Initial size, 27–46:					
<i>L. castaneothorax</i>	0	A	27 (2)	...	...
<i>C. chloris</i>	1	C	32 (2)	...	...
<i>Corvus frugilegus</i>	1	C	36 (4)	...	...
<i>C. flavirostris</i>	0	O	38 (1)	...	...
<i>Emberiza citrinella</i>	1	O	39 (2)	44	.38
<i>C. cannabina</i>	0	A	42 (4)	...	...
<i>P. domesticus</i>	1	C	44 (1)	...	...
<i>Prunella modularis</i>	1	A	46 (4)	...	...

Released species	Introduction success	Release sites	Initial population size	Mean $n(0)$	p_e
Initial size, 49–81:					
<i>P. domesticus</i>	1	A	49 (2)	...	...
<i>P. modularis</i>	1	W	50 (3)	...	...
<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. flammea</i>	1	O	81 (2)	...	...
<i>G. tibicen</i>	1	O	81 (5)	...	...
Initial size, 98–126:					
<i>P. modularis</i>	1	O	98 (2)	...	...
<i>F. coelebs</i>	1	O	99 (3)	...	...
<i>A. arvensis</i>	1	O	100 (3)	...	...
<i>A. arvensis</i>	1	W	108 (2)	...	...
<i>Sturnus vulgaris</i>	1	A	109 (3)	...	...
<i>F. coelebs</i>	1	A	113 (4)	113	.17
<i>F. montifringilla</i>	0	C	117 (4)	...	...
<i>C. carduelis</i>	1	O	118 (4)	...	...
<i>C. cannabina</i>	0	C	119 (4)	...	...
<i>T. philomelos</i>	1	A	125 (2)	...	...
<i>S. vulgaris</i>	1	C	125 (4)	...	...
<i>F. coelebs</i>	1	W	126 (4)	...	...
Initial size, 138–236:					
<i>Turdus merula</i>	1	O	138 (5)	...	...
<i>T. philomelos</i>	1	O	145 (5)	...	...
<i>S. vulgaris</i>	1	O	169 (3)	...	...
<i>T. merula</i>	1	A	170 (4)	...	...
<i>C. carduelis</i>	1	W	177 (3)	...	...
<i>M. melanocephala</i>	0	C	200 (1)	189	.18
<i>P. domesticus</i>	1	W	200 (1)	...	...
<i>C. flammea</i>	1	A	209 (1)	...	...
<i>P. modularis</i>	1	C	210 (6)	...	...
<i>M. melanocephala</i>	0	W	224 (4)	...	...
<i>E. citrinella</i>	1	C	236 (3)	...	...
Initial size, 260–345:					
<i>G. tibicen</i>	1	W	260 (1)	...	...
<i>C. carduelis</i>	1	C	265 (4)	...	...
<i>S. vulgaris</i>	1	W	298 (5)	...	...
<i>T. philomelos</i>	1	C	299 (7)	301	.0
<i>G. tibicen</i>	1	C	313 (9)	...	...
<i>C. flammea</i>	1	C	326 (5)	...	...
<i>E. citrinella</i>	1	A	345 (6)	...	...
Initial size, 434–477:					
<i>A. arvensis</i>	1	C	434 (5)	...	...
<i>T. merula</i>	1	C	477 (7)	455	.0

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

Common redpoll (*Carduelis flammea*)

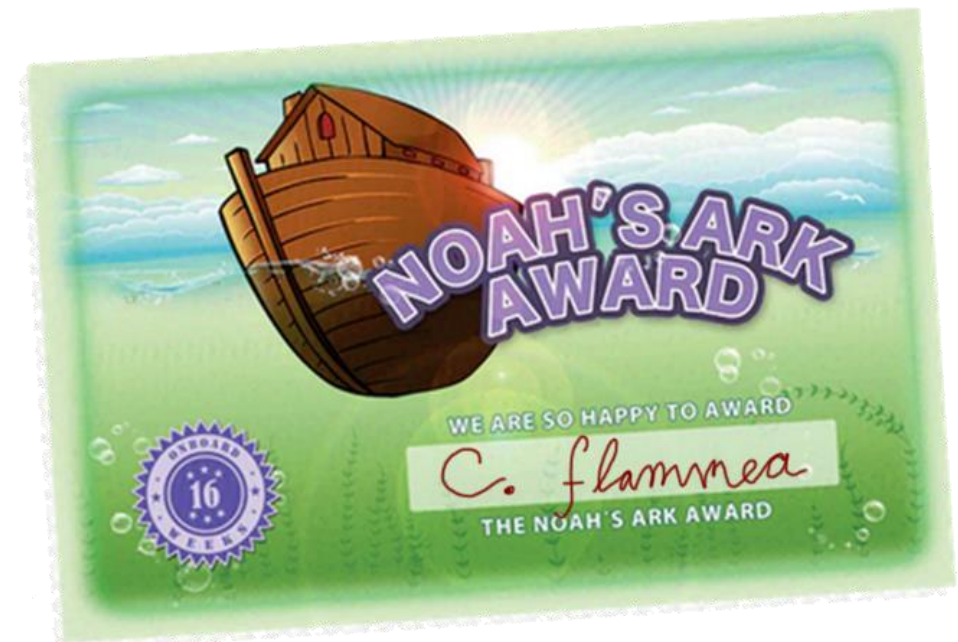


Table 2: Data for passerines introduced to New Zealand 100 yr ago

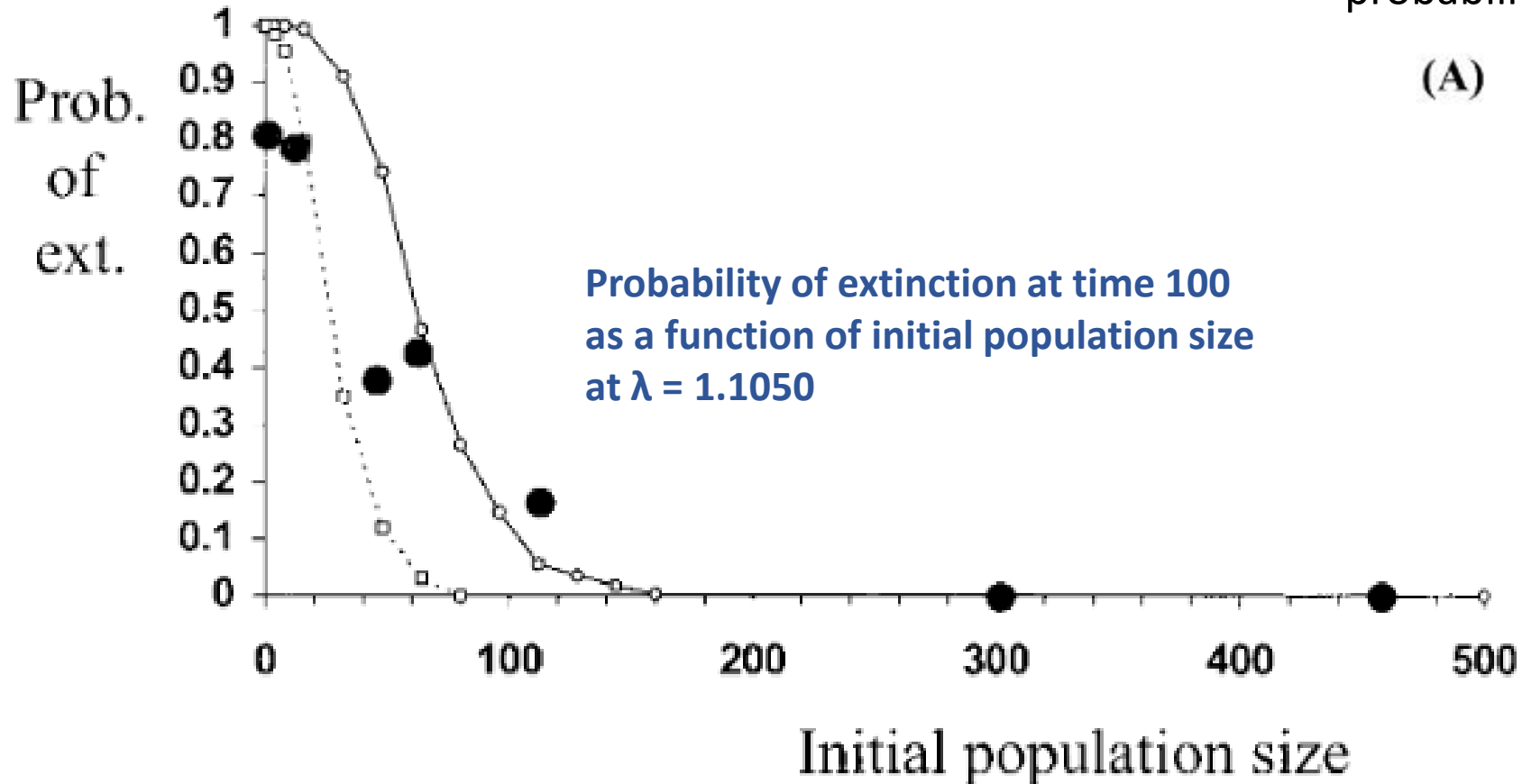
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<i>Carduelis flammea</i>	1	W	2 (1)
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<i>Passer montanus</i>	0	O	2 (1)
<i>Piranga rubra</i>	0	A	2 (1)
<i>Pyrrhula pyrrhula</i>	0	C	2 (1)
<i>Stagonopleura bella</i>	0	A	2 (1)

Distinguished recipient of the:

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

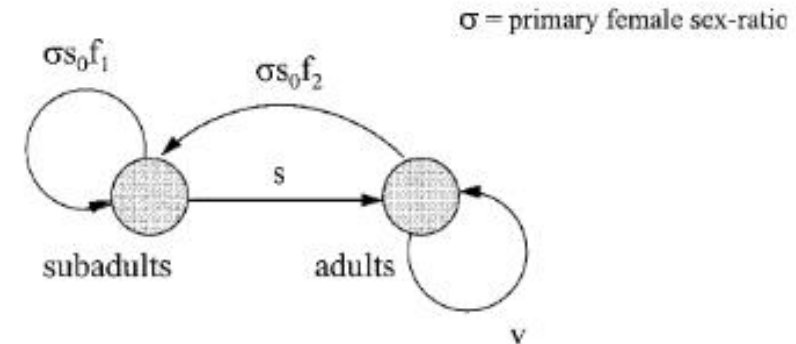


Extinction of passerine birds ...



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

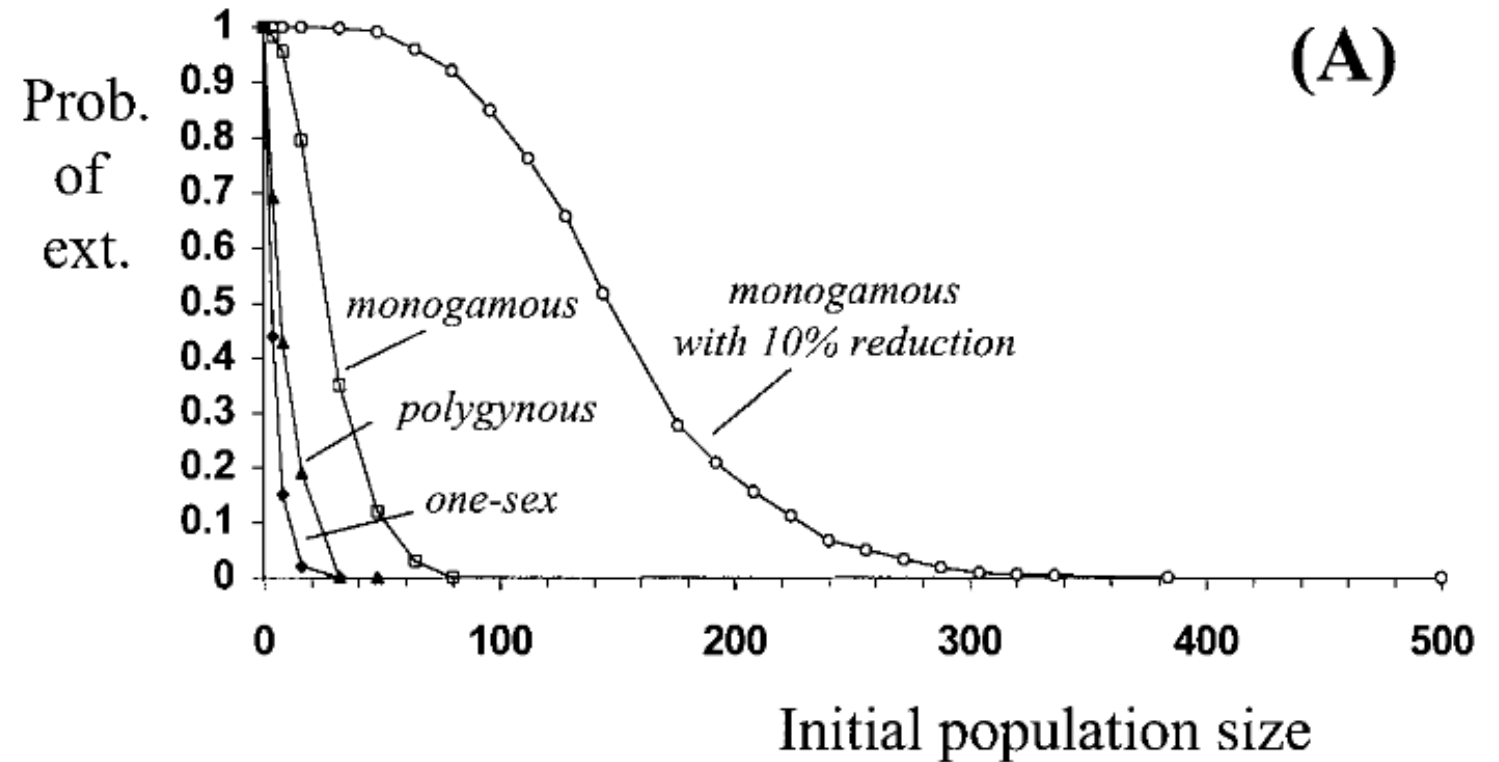
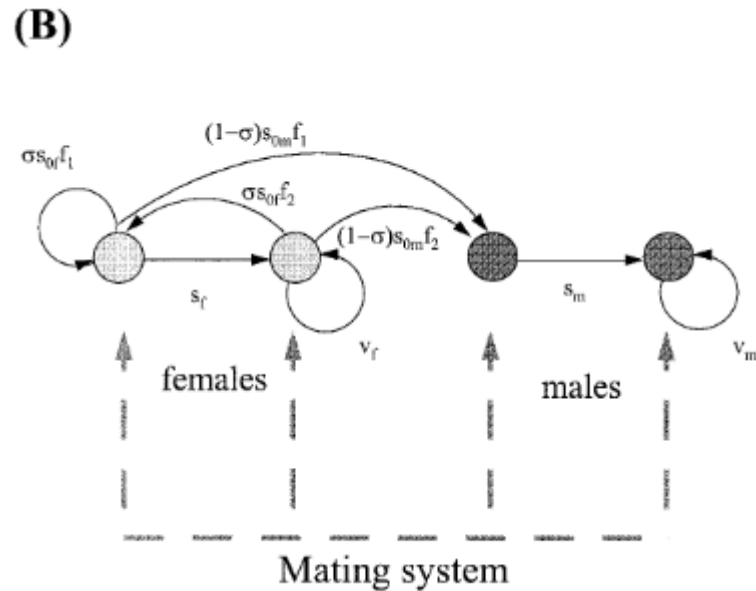
(A)



Extinction of passerine birds ...

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

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

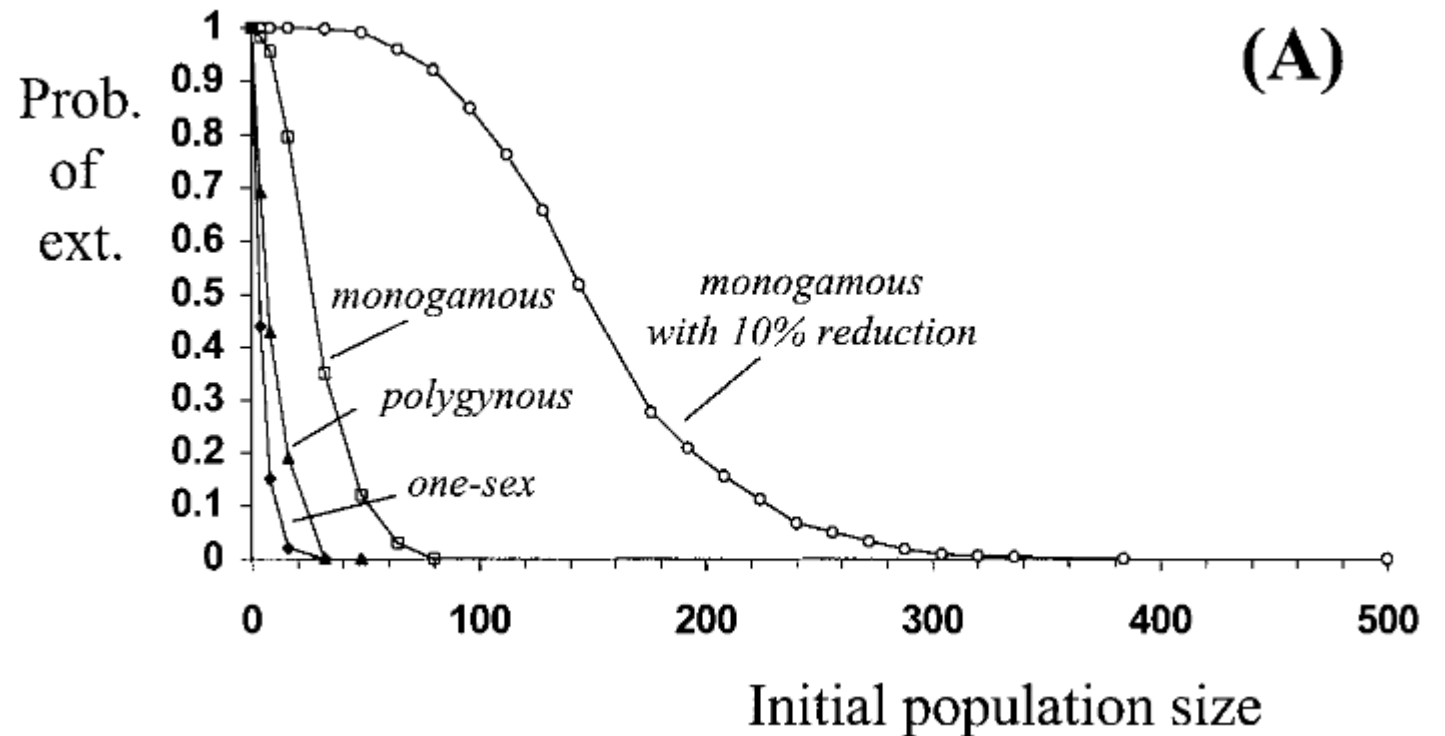


Extinction of passerine birds ...

... 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