

Ecography

ECOG-04039

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Supplementary material

Appendix 1

Table A1: Giving-up and giving-in thresholds of each agent type in CRAFTY. The 'giving-up' threshold determines the minimum return an agent is willing to accept, and below which the agent will abandon their cell. The 'giving-in' threshold determines the maximum competitive deficit an agent is willing to accept before allowing a new agent type to take over.

Agent type	Giving-up threshold	Giving-in threshold
Forestry	0	0.01
High intensity crop farmer	0	0.01
High intensity livestock farmer	0	0.01
Low intensity crop farmer	0	0.001
Low intensity livestock farmer	0	0.001

Table A2: Capital sensitivities and production levels of each agent type in CRAFTY. Higher sensitivity values mean that agent productivity is more reliant on the capitals in their cell.

Agent type	Sensitivity to productivity of:			Service production
	Crop	Livestock	Timber	
Forestry	0	0	1	1 (Timber)
High intensity crop farmer	1	0	0	1 (Crop)
High intensity livestock farmer	0	1	0	1 (Livestock)
Low intensity crop farmer	0.8	0	0	0.5 (Crop)
Low intensity livestock farmer	0	0.5	0	0.5 (Livestock)

Table A3: RangerShifter parameter values for hypothetical pollinator species.

Parameter	Value
Population dynamics	
Model type	Cell-based
Reproduction	Asexual / female only
Stage structure	No
Maximum fecundity (Rmax)	VARIED: 2; 1.5
Competition coefficient (b_c)	1
Habitat dependent carrying capacity (individuals (i.e. colonies) / ha)	

High intensity crop farm	0
Low intensity crop farm	1.1
High intensity livestock farm	0
Low intensity livestock farm	1.1
Forest	2.3
Unmanaged land	1.4
Carrying capacity reduction factor (dK)	VARIED: 0%; 50%
Dispersal – emigration	
Emigration probability	Density-dependent
Max. emigration probability (D_0)	0.7
Slope at inflection point (α)	10
Inflection point (β)	0.5
Dispersal – transfer	
Movement model	Dispersal kernel
Kernel type	VARIED: negative exponential (kernel I only); double negative exponential (kernels I and II)
Mean distance I (metres)	500
Mean distance II (metres)	1500
Probability of kernel II	10%
Dispersal – settlement	
If the arrival cell is unsuitable	Die

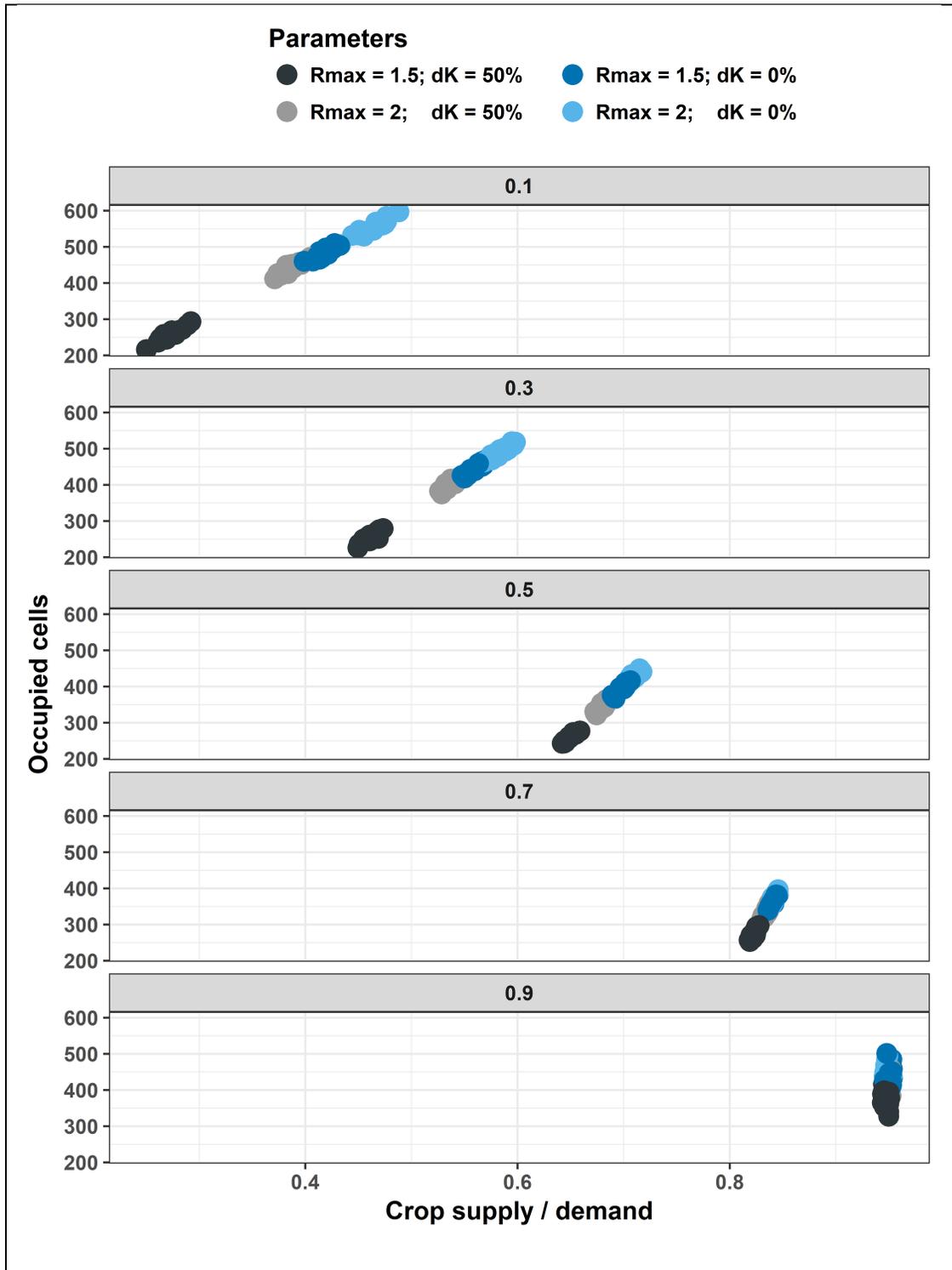


Figure A1: The number of cells occupied by pollinator populations in the final year in relation to crop supply/demand in the final year, crop yield in absence of pollination and ecological parameters (maximum fecundity (R_{max}); carrying capacity reduction factor (dK)).

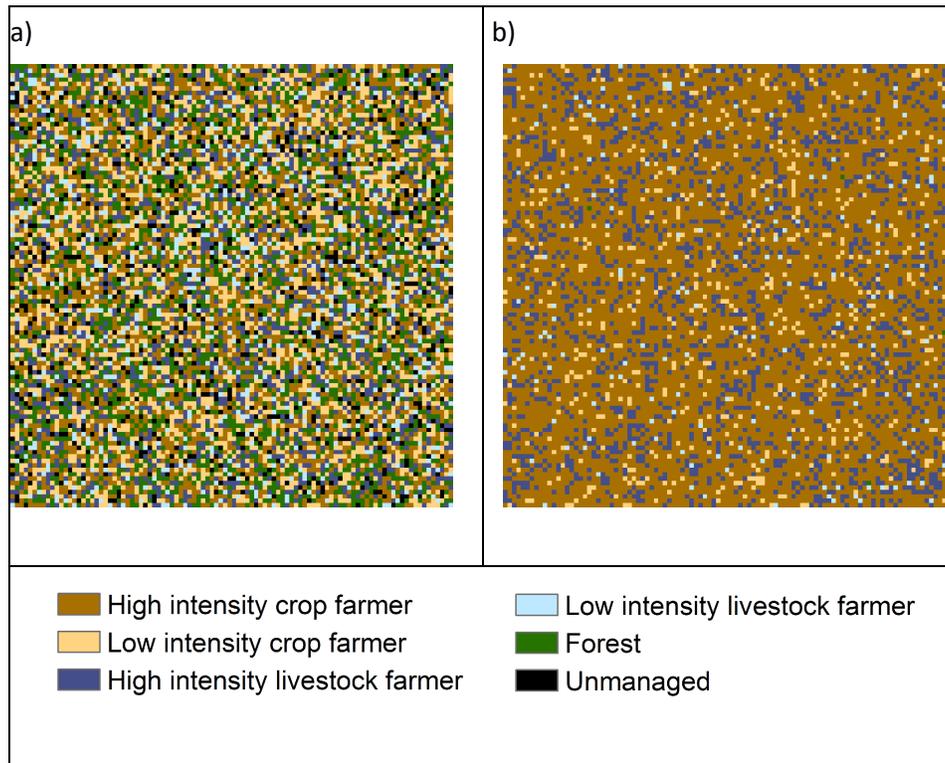


Figure A2: a) The land-use map, resulting from independently randomised capital values, used to initialise each simulation. b) An example final year landscape, illustrating the clustering of high intensity livestock farmers.

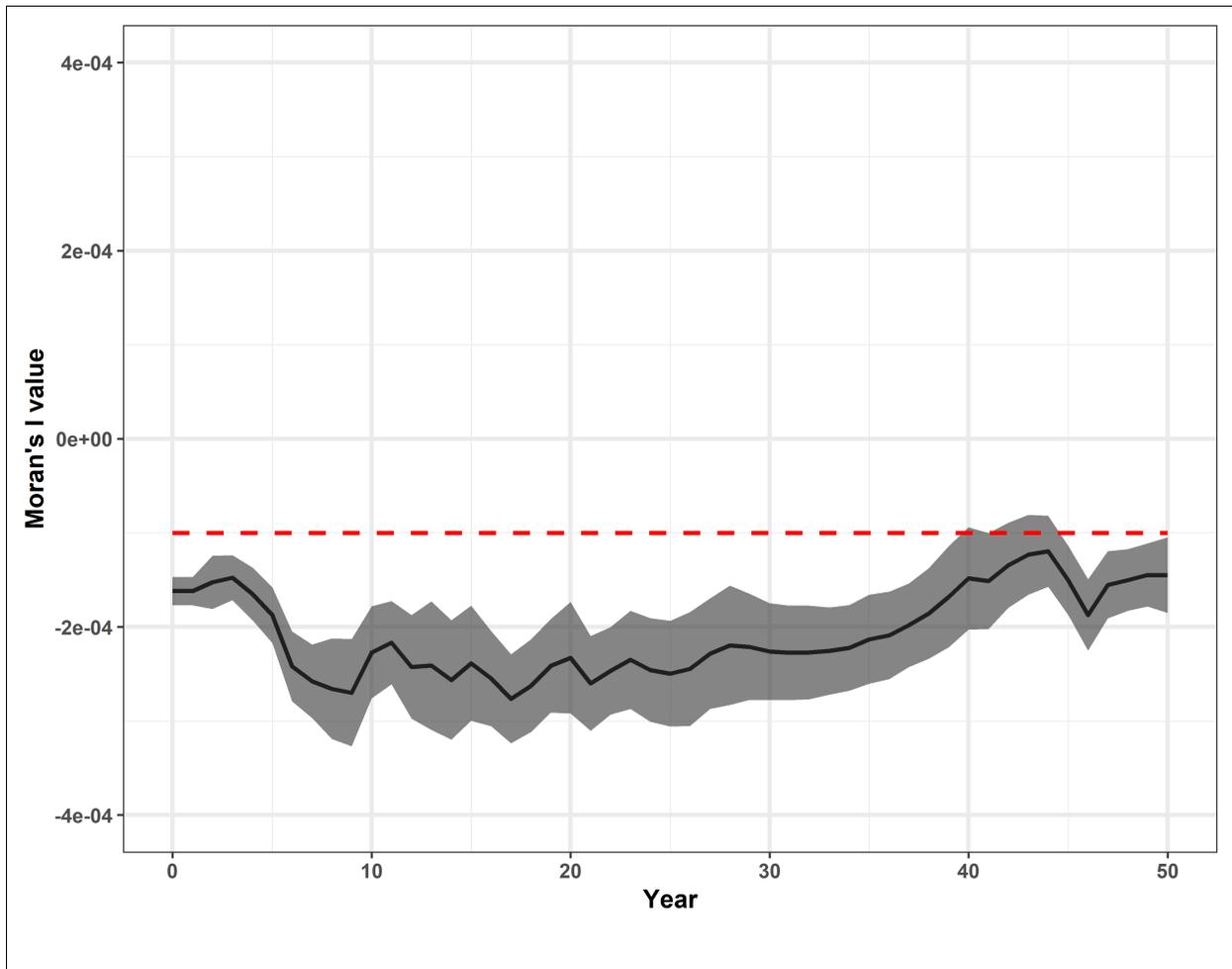


Figure A3: Time-series showing Moran's I values for high intensity livestock farmers for simulations with CRAFTY alone (independent of RangeShifter). Line indicates the mean from 10 replicates; shaded region represents ± 1 standard error. The red dashed line represents the expected Moran's I value if the high intensity livestock farmers were randomly arranged.