

## Correction



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# Correction to 'Adaptation to fragmentation: evolutionary dynamics driven by human influences'

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The reference citations in table 1 are incorrect, and some references that should have been cited in the table were omitted from the published article. The corrected table along with references cited are provided here. The newly inserted references [86–96] do not appear anywhere else in the article.

## References

11. Hanski I. 2012 Dispersal and eco evolutionary dynamics in the Glanville fritillary butterfly. In *Dispersal ecology and evolution* (eds J Clobert, M Baguette, T Benton, JM Bullock), pp. 299–303. Oxford, UK: Oxford University Press.
33. Venable DL, Brown JS. 1988 The selective interactions of dispersal, dormancy, and seed size as adaptations for reducing risk in variable environments. *Am. Nat.* **131**, 360–384. (doi:10.1086/284795)
43. Cody ML, Overton JM. 1996 Short-term evolution of reduced dispersal in island plant populations. *J. Ecol.* **84**, 53–61. (doi:10.2307/2261699)
46. Patten MA, Wolfe DH, Shochat E, Sherrod SK. 2005 Habitat fragmentation, rapid evolution and population persistence. *Evol. Ecol. Res.* **7**, 235–249.
50. De Roissart A, Wang SP, Bonte D. 2015 Spatial and spatiotemporal variation in metapopulation structure affects population dynamics in a passively dispersing arthropod. *J. Anim. Ecol.* **84**, 1565–1574. (doi:10.1111/1365-2656.12400)
56. Cheptou P-O, Carrue O, Rouifed S, Cantarel A. 2008 Rapid evolution of seed dispersal in an urban environment in the weed *Crepis sancta*. *Proc. Natl Acad. Sci. USA* **105**, 3796–3799. (doi:10.1073/pnas.0708446105)
63. Brys R, Jacquemyn H. 2012 Effects of human-mediated pollinator impoverishment on floral traits and mating patterns in a short-lived herb: an experimental approach. *Funct. Ecol.* **26**, 189–197. (doi:10.1111/j.1365-2435.2011.01923.x)
64. Luijten SH, Oostermeijer JGB, Ellis-Adam AC, den Nijs JCM. 1999 Variable herkogamy and autofertility in marginal populations of *Gentianella germanica* in the Netherlands. *Fol. Geobot.* **34**, 483–496. (doi:10.1007/BF02914924)
68. Bonte D, Bossuyt B, Lens L. 2007 Aerial dispersal plasticity under different wind velocities in a salt marsh wolf spider. *Behav. Ecol.* **18**, 438–443. (doi:10.1093/beheco/arl103)
69. Bonte D, Vanden Borre J, Lens L, Maelfait JP. 2006 Geographical variation in wolf spider dispersal behaviour is related to landscape structure. *Anim. Behav.* **72**, 655–662. (doi:10.1016/j.anbehav.2005.11.026)
71. Thomas CD, Hill JK, Lewis OT. 1998 Evolutionary consequences of habitat fragmentation in a localized butterfly. *J. Anim. Ecol.* **67**, 485–497. (doi:10.1046/j.1365-2656.1998.00213.x)
72. Gomez GS MY, Van Dyck H. 2012 Ecotypic differentiation between urban and rural populations of the grasshopper *Chorthippus brunneus* relative to climate and habitat fragmentation. *Oecologia* **169**, 125–133. (doi:10.1007/s00442-011-2189-4)
73. Öckinger E, Van Dyck H. 2012 Landscape structure shapes habitat finding ability in a butterfly. *PLoS ONE* **7**, e41517. (doi:10.1371/journal.pone.0041517)
77. Galetti M et al. 2013 Functional extinction of birds drives rapid evolutionary changes in seed size. *Science* **340**, 1086–1090. (doi:10.1126/science.1233774)
86. Roff DA. 1990 The evolution of flightlessness in insects. *Ecol. Monogr.* **60**, 389–421. (doi:10.2307/1943013)
87. Phllis CC, Moore JW, Buoro M, Hayes SA, Garza JC, Pearse DE. 2016 Shifting Thresholds: Rapid Evolution of Migratory Life Histories in Steelhead/Rainbow Trout, *Oncorhynchus mykiss*. *J. Hered.* **107**, 51–60. (doi:10.1093/jhered/esv085)
88. Duckworth RA. 2012 Evolution of genetically integrated dispersal strategies. In *Dispersal ecology and evolution* (eds J Clobert, M Baguette, T Benton, JM Bullock), pp. 83–94. Oxford, UK: Oxford University Press.

**Table 1.** Overview of empirical studies that have shown evidence for adaptation to natural and anthropogenic fragmentation.

trait	examples	natural fragmentation	anthropogenic fragmentation
mechanism			
patch turnover	decreased dispersal: increased risk of dispersal due to increased extent or harshness of the matrix between patches	fast evolution of reduced dispersal in Asteraceae species on islands after colonization [43]; evolution of reduced dispersal in spiders in salt marshes of different sizes in European estuaries [68]; the evolution of flightlessness in insects (woodlands, deserts, islands, etc.) [86]	reduced dispersal in <i>Crepis sancta</i> in less than 12 generations after colonization of soil patches in urban sidewalks [56]; reduction of dispersal motivation in spiders from dune grassland fragments [69]; reduced migratory behaviour in <i>Oncorhynchus mykiss</i> consecutive to river isolation [87]
	increased dispersal: increased colonization advantage of dispersal	high dispersal in Western bluebirds colonizing disturbed areas and are replaced by phylopatric bluebird along the succession (over a 20–30 years cycle) [88]; sorting of dispersive genotypes in Åland archipelago metapopulations of Granville fritillary butterfly [11];	evolution of flight-related morphology (with putative effect on dispersal) in a butterfly from recently fragmented grassland fragments [71]; evolution of mobility related morphology (with putative effect on dispersal) in a grasshopper [72]; selection for increased perceptual range in fragmented landscapes to reduce dispersal costs [73]
demographic: allelic effects	small populations unable to attract pollinators	none	variable herkogamy and autonomous selfing in small and large populations of <i>Gentianella germanica</i> [64]
physical: edge effects	increased niche breadth	evolution of reduced mobility by relaxed selection from predators on islands [89]	none
community: altered biotic interactions	loss of antagonistic interactions and trait evolution	the absence of specialist bee pollinators leading to reduced herkogamy and higher autogamy in <i>Clarkia</i> [91]	reduced defense in <i>Ambrosia artemisiifolia</i> in free enemy invasive areas [89]; rapid decrease in alewife gill-taker spacing caused by predation [90]
	loss of mutualistic interactions and trait evolution	phytoplankton composition modifies predator-driven life history evolution in <i>Daphnia</i> [93]; the mosaic of coevolution of plant-pollinator–herbivore interactions [94]	evolution of selfing in <i>Centaurium erythraea</i> in absence of pollinators [63]; rapid evolutionary changes in seed size consecutive to bird disperser extinction [77]
altered multitrophic interactions and co-evolutionary dynamics	morphological evolution in naturally clustered plants interacting with both herbivores and pollinators [92];		
eco-evolutionary feedbacks on other traits and correlated responses	joint evolution of dispersal and other traits		matting strategies in prairie chickens: larger clutch size and fewer nests [46]; evolution of stress resistance in <i>Tettigidea urticae</i> [50]
genetic deterioration	fitness loss		herb: plants from smaller fragments had lower reproductive success in transplant experiments [96]

89. Fukano Y, Yahara T. 2012 Changes in Defense of an Alien Plant *Ambrosia artemisiifolia* before and after the invasion of a native specialist enemy *Ophraella communa*. *PLoS ONE* **7**, 8. (doi:10.1371/annotation/868d00f2-375e-421f-8435-0e628c0567bd)
90. Palkovacs EP, Mandeville EG, Post DM. 2014 Contemporary trait change in a classic ecological experiment: rapid decrease in alewife gill-raker spacing following introduction to an inland lake. *Freshwater Biol.* **59**, 1897–1901. (doi:10.1111/fwb.12392)
91. Moeller DA. 2006 Geographic structure of pollinator communities, reproductive assurance, and the evolution of self-pollination. *Ecology* **87**, 1510–1522. (doi:10.1890/0012-9658(2006)87[1510:GSOPCR]2.0.CO;2)
92. Agren J, Oakley CG, McKay JK, Lovell JT, Schemske DW. 2013 Genetic mapping of adaptation reveals fitness tradeoffs in *Arabidopsis thaliana*. *Proc. Natl Acad. Sci. USA* **110**, 21 077–21 082. (doi:10.1073/pnas.1316773110)
93. Walsh MR, La Pierre KJ, Post DM. 2014 Phytoplankton composition modifies predator-driven life history evolution in *Daphnia*. *Evol. Ecol.* **28**, 397–411. (doi:10.1007/s10682-013-9666-7)
94. Thompson JN, Fernandez CC. 2006 Temporal dynamics of antagonism and mutualism in a geographically variable plant-insect interaction. *Ecology* **87**, 103–112. (doi:10.1890/05-0123)
95. Heinen-Kay JL, Noel HG, Layman CA, Langerhans RB. 2014 Human-caused habitat fragmentation can drive rapid divergence of male genitalia. *Evol. Appl.* **7**, 1252–1267. (doi:10.1111/eva.12223)
96. Bowman G, Perret C, Hoehn S, Galeuchet DJ, Fischer M. 2008 Habitat fragmentation and adaptation: a reciprocal replant-transplant experiment among 15 populations of *Lychnis flos-cuculi*. *J. Ecol.* **96**, 1056–1064. (doi:10.1111/j.1365-2745.2008.01417.x)