

- Akçakaya, H.R., Hochkirch, A., Bried, J.T., van Grunsven, R.H., Simaika, J.P., De Knijf, G. & Henriques, S. (2021). Calculating population reductions of invertebrate species for IUCN Red List assessments. *Journal of Insect Conservation*, 25, 377-382.
- Andries, A., Murphy, R.J., Morse, S. & Lynch, J. (2021), Earth observation for monitoring, reporting, and verification within environmental land management policy. *Sustainability*, 13, 9105
- Asher, J., Warren, M., Fox, R., Harding, P., Jeffcoate, G., & Jeffcoate, S. (2001). *The millennium atlas of butterflies in Britain and Ireland*: Oxford University Press.
- Bell, F., Botham, M., Brereton, T.M., Fenton, A. & Hodgson, J. (2021) Grizzled Skippers stuck in the south: Population-level responses of an early-successional specialist butterfly to climate across its UK range over 40 years. *Diversity and Distributions*, 27, 962-972
- Bennie, J., Hodgson, J.A., Lawson, C.R., Holloway, C.T., Roy, D.B., Brereton, T., Thomas, C.D. & Wilson, R.J. (2013). Range expansion through fragmented landscapes under a variable climate. *Ecology Letters*, 16(7), 921-929.
- Bishop, T.R., Botham, M.S., Fox, R., Leather, S.R., Chapman, D.S., & Oliver, T.H. (2013). The utility of distribution data in predicting phenology. *Methods in Ecology and Evolution*, 4(11), 1024-1032. doi:10.1111/2041-210x.12112
- Bladon, A.J., Lewis, M., Bladon, E.K., Buckton, S.J., Corbett, S., Ewing, S.R., Hayes, M.P., Hitchcock, G.E., Knock, R., Lucas, C., McVeigh, A., Menéndez, R., Walker, J.M., Fayle, T.M. & Turner, E.C. (2020). How butterflies keep their cool: Physical and ecological traits influence thermoregulatory ability and population trends. *Journal of Animal Ecology*, 89, 2440-2450.
- Blomfield, A., Menendez, R. & Wilby, A. (2023). Population synchrony indicates functional connectivity in a threatened sedentary butterfly. *Oecologia*, 201, 979-989
- Bonsall, M.B., Dooley, C.A., Kasparson, A., Brereton, T., Roy, D.B., & Thomas, J.A. (2014). Allee effects and the spatial dynamics of a locally endangered butterfly, the high brown fritillary (*Argynnis adippe*). *Ecological Applications*, 24(1), 108-120.
- Botham, M.S., Fernandez-Ploquin, E.C., Brereton, T., Harrower, C.A., Roy, D.B., & Heard, M.S. (2015). Lepidoptera communities across an agricultural gradient: how important are habitat area and habitat diversity in supporting high diversity? *Journal of Insect Conservation*, 19(2), 403-420. doi:10.1007/s10841-015-9760-y
- Bourhis, Y., Bell, J.R., Shortall, C.R., Kunin, W.E. & Milne, A.E. (2023). Explainable neural networks for trait-based multispecies distribution modelling – A case study with butterflies and moths. *Methods in Ecology and Evolution*, 14(6), 1531-1542 <https://doi.org/10.1111/2041-210X.14097>
- Bourhis, Y., Bell, J.R., Shortall, C.R., Kunin, W.E. & Milne, A.E. (2023). Correction to: Explainable neural networks for trait-based multispecies distribution modelling – A case study with butterflies and moths. *Methods in Ecology and Evolution* <https://doi.org/10.1111/2041-210X.14230>
- Brakefield, P.M. (1987). Geographical variability in, and temperature effects on, the phenology of *Maniola jurtina* and *Pyronia tithonus* (Lepidoptera, Satyrinae) in England and Wales. *Ecological entomology*, 12(2), 139-148.
- Brereton, T., Cruickshanks, K., Risely, K., Noble, D., & Roy, D. (2011). Developing and launching a wider countryside butterfly survey across the United Kingdom. *Journal of Insect Conservation*, 15(1-2), 279-290.
- Brereton, T., Roy, D., Middlebrook, I., Botham, M., & Warren, M. (2011). The development of butterfly indicators in the United Kingdom and assessments in 2010. *Journal of Insect Conservation*, 15(1-2), 139-151.
- Brereton, T.M., Warren, M.S., Roy, D.B., & Stewart, K. (2008). The changing status of the Chalkhill Blue butterfly *Polyommatus coridon* in the UK: the impacts of conservation policies and environmental factors. *Journal of Insect Conservation*, 12(6), 629-638.
- Clarke, H.E. & Dennis, E.B. (2020). A new method for calculating butterfly abundance trends for small regional areas. *Journal of Insect Conservation*, 24, 779-790.

- Cowley, M., Thomas, C., Roy, D., Wilson, R., León-Cortés, J., Gutiérrez, D., Bulman, C., Quinn, R., Moss, D. & Gaston, K. (2001). Density–distribution relationships in British butterflies. I. The effect of mobility and spatial scale. *Journal of Animal Ecology*, 70(3), 410-425.
- Curtis, R.J., Botham, M.S., Brereton, T.M., & Isaac, N.J.B. (2015). The Rise and Demise of the Glanville fritillary on the Isle of Wight. *Journal of Insect Conservation*, 19(2), 305-311. doi:10.1007/s10841-014-9737-2
- Curtis, R.J., Brereton, T.M., Dennis, R.L.H., Carbone, C., & Isaac, N.J.B. (2015). Butterfly abundance is determined by food availability and is mediated by species traits. *Journal of Applied Ecology*, 52(6), 1676-1684. doi:10.1111/1365-2664.12523
- Davies, H., Brereton, T.M., Roy, D.B., & Fox, R. (2007). Government targets for protected area management: will threatened butterflies benefit? *Biodiversity and conservation*, 16(13), 3719-3736.
- Davies, Z.G., Wilson, R.J., Brereton, T.M., & Thomas, C.D. (2005). The re-expansion and improving status of the silver-spotted skipper butterfly (*Hesperia comma*) in Britain: a metapopulation success story. *Biological Conservation*, 124(2), 189-198.
- Davis, B.N.K. (1989). Habitat creation for butterflies on a landfill site. *Entomologist*.
- Dennis, E.B., Fagard-Jenkin, C. & Morgan, B.J. (2022). rGAI: An R package for fitting the generalized abundance index to seasonal count data. *Ecology and Evolution*, 12, e9200
- Dennis, E.B., Morgan, B.J., Brereton, T.M., Roy, D.B., & Fox, R. (2017). Using citizen science butterfly counts to predict species population trends. *Conservation Biology*, 31(6), 1350-1361.
- Dennis, E.B., Morgan, B.J., Freeman, S.N., Brereton, T.M., & Roy, D.B. (2016). A generalized abundance index for seasonal invertebrates. *Biometrics*, 72(4), 1305-1314.
- Dennis, E.B., Morgan, B.J., Roy, D.B., & Brereton, T.M. (2017). Urban indicators for UK butterflies. *Ecological indicators*, 76, 184-193.
- Dennis, R.L., Dapporto, L., Sparks, T.H., Williams, S.R., Greatorex-Davies, J.N., Asher, J., & Roy, D.B. (2010). Turnover and trends in butterfly communities on two British tidal islands: stochastic influences and deterministic factors. *Journal of biogeography*, 37(12), 2291-2304.
- Dennis, R.L., Hodgson, J.G., Grenyer, R., Shreeve, T.G., & Roy, D.B. (2004). Host plants and butterfly biology. Do host-plant strategies drive butterfly status? *Ecological Entomology*, 29(1), 12-26.
- Devictor, V., Van Swaay, C., Brereton, T., Brotons, L., Chamberlain, D., Heliölä, J., Herrando, S., Julliard, R., Kuussaari, M. & Lindström, Å. (2012a). Differences in the climatic debts of birds and butterflies at a continental scale. *Nature climate change*, 2(2), 121-124.
- Devictor, V., Van Swaay, C., Brereton, T., Brotons, L., Chamberlain, D., Heliölä, J., Herrando, S., Julliard, R., Kuussaari, M. & Lindström, Å. (2012b). Uncertainty in thermal tolerances and climatic debt. *Nature Climate Change*, 2(9), 638-639.
- Diamond, S.E., Frame, A.M., Martin, R.A., & Buckley, L.B. (2011). Species' traits predict phenological responses to climate change in butterflies. *Ecology*, 92(5), 1005-1012.
- Dooley, C.A., Bonsall, M.B., Brereton, T., & Oliver, T. (2013). Spatial variation in the magnitude and functional form of density-dependent processes on the large skipper butterfly *Ochlodes sylvanus*. *Ecological Entomology*, 38(6), 608-616. doi:10.1111/een.12055
- Dover, J., Sotherton, N., & Gobbett, K. (1990). Reduced pesticide inputs on cereal field margins: the effects on butterfly abundance. *Ecological Entomology*, 15(1), 17-24.
- Dover, J., Sparks, T., & Greatorex-Davies, J. (1997). The importance of shelter for butterflies in open landscapes. *Journal of Insect Conservation*, 1(2), 89-97.
- Eglinton, S.M., Brereton, T.M., Tayleur, C.M., Noble, D., Risely, K., Roy, D.B., & Pearce-Higgins, J.W. (2015). Patterns and causes of covariation in bird and butterfly community structure. *Landscape ecology*, 30(8), 1461-1472.
- Elston, D., Nevison, I., Scott, W., Sier, A., & Morecroft, M. (2011). Power calculations for monitoring studies: a case study with alternative models for random variation. *Environmetrics*, 22(5), 618-625.

- Eyre, M.D. (1996). *Environmental monitoring, surveillance and conservation using invertebrates*: EMS Publications.
- Fox, R., Dennis, E.B., Brown, A.F. & Curson, J. (2022). A revised Red List of British butterflies. *Insect Conservation and Diversity*, 15, 485-495
- Fox, R., Harrower, C.A., Bell, J.R., Shortall, C.R., Middlebrook, I. & Wilson, R.J. (2019). Insect population trends and the IUCN Red List process. *Journal of Insect Conservation*, 23, 269-278.
- Fox, R., Warren, M.S., Brereton, T.M., Roy, D.B., & Robinson, A. (2011). A new Red List of British butterflies. *Insect Conservation and Diversity*, 4(3), 159-172.
- Franco, A.M., Hill, J.K., Kitschke, C., Collingham, Y.C., Roy, D.B., Fox, R., Huntley, B. & Thomas, C.D. (2006). Impacts of climate warming and habitat loss on extinctions at species' low-latitude range boundaries. *Global Change Biology*, 12(8), 1545-1553.
- Franks, S.E., Pearce-Higgins, J.W., Atkinson, S., Bell, J.R., Botham, M.S., Brereton, T.M., Harrington, R. & Leech, D.I. (2018). The sensitivity of breeding songbirds to changes in seasonal timing is linked to population change but cannot be directly attributed to the effects of trophic asynchrony on productivity. *Global Change Biology*, 24(3), 957-971. doi:10.1111/gcb.13960
- Freeman, S.N., Isaac, N.J., Besbeas, P., Dennis, E.B. & Morgan, B.J. (2021). A generic method for estimating and smoothing multispecies biodiversity indicators using intermittent data. *Journal of Agricultural, Biological and Environmental Statistics*, 26, 71-89
- Gilburn, A.S., Bunnefeld, N., Wilson, J.M., Botham, M.S., Brereton, T.M., Fox, R., & Goulson, D. (2015). Are neonicotinoid insecticides driving declines of widespread butterflies? *PeerJ*, 3. doi:10.7717/peerj.1402
- Gillingham, P.K., Alison, J., Roy, D.B., Fox, R., & Thomas, C.D. (2015). High Abundances of Species in Protected Areas in Parts of their Geographic Distributions Colonized during a Recent Period of Climatic Change. *Conservation Letters*, 8(2), 97-106. doi:10.1111/conl.12118
- Greatorex-Davies, J., Sparks, T., Hall, M., & Marss, R. (1993). The influence of shade on butterflies in rides of coniferised lowland woods in southern England and implications for conservation management. *Biological Conservation*, 63(1), 31-41.
- Greenwell, M.P., Botham, M.S., Bruford, M.W., Day, J.C., Evans, L.C., Gibbs, M., Middlebrook, I., Roy, D.B., Watts, K. & Oliver, T.H. (2021). The influence of chalk grasslands on butterfly phenology and ecology. *Ecology and Evolution*, 11, 14521-14539
- Greenwell, M.P., Brereton, T., Day, J.C., Roy, D.B. & Oliver, T.H. (2019). Predicting resilience of ecosystem functioning from co-varying species' responses to environmental change. *Ecology and Evolution*, 9, 11775-11790.
- Gripenberg, S., Hamer, N., Brereton, T., Roy, D.B., & Lewis, O.T. (2011). A novel parasitoid and a declining butterfly: cause or coincidence? *Ecological Entomology*, 36(3), 271-281.
- Harding, P., Asher, J., & Yates, T. (1995). Butterfly monitoring 1—recording the changes *Ecology and conservation of butterflies* (pp. 3-22): Springer.
- Heath, J., Pollard, E., & Thomas, J.A. (1984). *Atlas of butterflies in Britain and Ireland*: Viking.
- Hetherington, M., Sterling, P. & Coulthard, E. (2022). Butterfly colonisation of a new chalkland road cutting. *Insect Conservation and Diversity*, 15, 191-199
- Hodgson, J.A., Thomas, C.D., Oliver, T.H., Anderson, B.J., Brereton, T. & Crone, E. (2011). Predicting insect phenology across space and time. *Global Change Biology*, 17(3), 1289-1300.
- Hordley, L.A., Powney, G.D., Brereton, T., Gillings, S., Petchey, O.L., Roy, D.B., Tobias, J.A., Williams, J. & Oliver, T.H. (2022). Developing a national indicator of functional connectivity. *Ecological Indicators*, 136, 108610
- Hu, G., Stefanescu, C., Oliver, T.H., Roy, D.B., Brereton, T., van Swaay, C., Reynolds, D.R. & Chapman, J.W. (2021). Environmental drivers of annual population fluctuations in a trans-Saharan insect migration. *Proceedings of the National Academy of Sciences*, 118, e2102762118

- Isaac, N.J., Cruickshanks, K.L., Weddle, A.M., Rowcliffe, J.M., Brereton, T. M., Dennis, R. L., Shuker, D.M. & Thomas, C.D. (2011). Distance sampling and the challenge of monitoring butterfly populations. *Methods in Ecology and Evolution*, 2(6), 585-594.
- Kéry, M. & Royle, J.A. (2020) Applied hierarchical modeling in ecology: Analysis of distribution, abundance and species richness in R and BUGS: Volume 2: Dynamic and advanced models. Academic Press.
- Long, O.M., Warren, R., Price, J., Brereton, T.M., Botham, M.S., & Franco, A.M.A. (2017). Sensitivity of UK butterflies to local climatic extremes: which life stages are most at risk? *Journal of Animal Ecology*, 86(1), 108-116. doi:10.1111/1365-2656.12594
- Mair, L., Hill, J.K., Fox, R., Botham, M., Brereton, T., & Thomas, C.D. (2014). Abundance changes and habitat availability drive species' responses to climate change. *Nature Climate Change*, 4(2), 127-131. doi:10.1038/nclimate2086
- Mair, L., Thomas, C.D., Anderson, B.J., Fox, R., Botham, M., & Hill, J.K. (2012). Temporal variation in responses of species to four decades of climate warming. *Global Change Biology*, 18(8), 2439-2447.
- Martay, B., Brewer, M.J., Elston, D.A., Bell, J.R., Harrington, R., Brereton, T.M., Barlow, K., Botham, M. & Pearce-Higgins, J.W. (2017). Impacts of climate change on national biodiversity population trends. *Ecography*, 40(10), 1139-1151. doi:10.1111/ecog.02411
- Martin, E.C., Hansen, B.B., Lee, A.M. & Herfindal, I. (2023). How do life history traits influence the environment's effect on population synchrony? Insights from European birds and insects. *bioRxiv*, 2023.2009.2008.556676
- McLean, I., Fowles, A., Kerr, A., Young, M., & Yates, T. (1995). Butterflies on nature reserves in Britain *Ecology and conservation of butterflies* (pp. 67-83): Springer.
- Menéndez, R., González-Megías, A., Collingham, Y., Fox, R., Roy, D.B., Ohlemüller, R., & Thomas, C.D. (2007). Direct and indirect effects of climate and habitat factors on butterfly diversity. *Ecology*, 88(3), 605-611.
- Menéndez, R., Megías, A.G., Hill, J.K., Braschler, B., Willis, S.G., Collingham, Y., Fox, R., Roy, D.B. & Thomas, C.D. (2006). Species richness changes lag behind climate change. *Proceedings of the Royal Society of London B: Biological Sciences*, 273(1593), 1465-1470.
- Menzel, A., Sparks, T., Estrella, N., & Roy, D. (2006). Altered geographic and temporal variability in phenology in response to climate change. *Global Ecology and Biogeography*, 15(5), 498-504.
- Mills, S.C., Oliver, T.H., Bradbury, R.B., Gregory, R.D., Brereton, T., Kühn, E., Kuussaari, M, Musche, M., Roy, D.B. & Schmucki, R. (2017). European butterfly populations vary in sensitivity to weather across their geographical ranges. *Global ecology and biogeography*, 26(12), 1374-1385.
- Montoya, D. & de Jong, M. (2023). Warming-induced range expansion effects on the diversity and composition of the gut microbiome: a case study with two butterflies. *bioRxiv*, 2023.2001.2011.523549
- Morecroft, M., Bealey, C., Howells, O., Rennie, S., & Woiwod, I. (2002). Effects of drought on contrasting insect and plant species in the UK in the mid-1990s. *Global Ecology and Biogeography*, 11(1), 7-22.
- Morecroft, M.D., Bealey, C.E., Beaumont, D.A., Benham, S., Brooks, D.R., Burt, T.P., ...Watson, H. (2009). The UK Environmental Change Network: Emerging trends in the composition of plant and animal communities and the physical environment. *Biological Conservation*, 142(12), 2814-2832. doi:10.1016/j.biocon.2009.07.004
- Moss, D., & Pollard, E. (1993). Calculation of collated indexes of abundance of butterflies based on monitored sites. *Ecological Entomology*, 18(1), 77-83. doi:10.1111/j.1365-2311.1993.tb01083.x
- Mowbray, S., Bennie, J., Rhodes, M.W., Smith, D.A. & French-Constant, R.H. (2022). Back to the Meadow Brown: eyespot variation and field temperature in a classic butterfly polymorphism. *bioRxiv*, 2022.2007.2008.499313

- Oliver, T., Hill, J.K., Thomas, C.D., Brereton, T., & Roy, D.B. (2009). Changes in habitat specificity of species at their climatic range boundaries. *Ecology Letters*, *12*(10), 1091-1102. doi:10.1111/j.1461-0248.2009.01367.x
- Oliver, T., Roy, D.B., Hill, J.K., Brereton, T., & Thomas, C.D. (2010). Heterogeneous landscapes promote population stability. *Ecology Letters*, *13*(4), 473-484. doi:10.1111/j.1461-0248.2010.01441.x
- Oliver, T.H., Brereton, T., & Roy, D.B. (2013). Population resilience to an extreme drought is influenced by habitat area and fragmentation in the local landscape. *Ecography*, *36*(5), 579-586. doi:10.1111/j.1600-0587.2012.07665.x
- Oliver, T.H., Gillings, S., Pearce-Higgins, J.W., Brereton, T., Crick, H.Q., Duffield, S.J., Morecroft, M.D. & Roy, D.B. (2017). Large extents of intensive land use limit community reorganization during climate warming. *Global change biology*, *23*(6), 2272-2283.
- Oliver, T.H., Heard, M.S., Isaac, N.J., Roy, D.B., Procter, D., Eigenbrod, F., Freckleton, R., Hector, A., Orme, C.D.L & Petchey, O. L. (2015). Biodiversity and resilience of ecosystem functions. *Trends in ecology & evolution*, *30*(11), 673-684.
- Oliver, T.H., Marshall, H.H., Morecroft, M.D., Brereton, T., Prudhomme, C., & Huntingford, C. (2015). Interacting effects of climate change and habitat fragmentation on drought-sensitive butterflies. *Nature Climate Change*, *5*(10), 941-+. doi:10.1038/nclimate2746
- Oliver, T.H., Roy, D.B., Brereton, T., & Thomas, J.A. (2012). Reduced variability in range-edge butterfly populations over three decades of climate warming. *Global Change Biology*, *18*(5), 1531-1539. doi:10.1111/j.1365-2486.2012.02659.x
- Oliver, T.H., Stefanescu, C., Paramo, F., Brereton, T., & Roy, D.B. (2014). Latitudinal gradients in butterfly population variability are influenced by landscape heterogeneity. *Ecography*, *37*(9), 863-871. doi:10.1111/ecog.00608
- Oliver, T.H., Thomas, C.D., Hill, J.K., Brereton, T., & Roy, D.B. (2012). Habitat associations of thermophilous butterflies are reduced despite climatic warming. *Global Change Biology*, *18*(9), 2720-2729. doi:10.1111/j.1365-2486.2012.02737.x
- Pagel, J., Anderson, B.J., O'Hara, R.B., Cramer, W., Fox, R., Jeltsch, F., Roy, D.B., Thomas, C.D. & Schurr, F.M. (2014). Quantifying range-wide variation in population trends from local abundance surveys and widespread opportunistic occurrence records. *Methods in Ecology and Evolution*, *5*(8), 751-760. doi:10.1111/2041-210x.12221
- Palmer, G., Platts, P.J., Brereton, T., Chapman, J.W., Dytham, C., Fox, R., Pearce-Higgins, J.W., Roy, D.B., Hill, J.K. & Thomas, C.D. (2017). Climate change, climatic variation and extreme biological responses. *Phil. Trans. R. Soc. B*, *372*(1723), 20160144.
- Pateman, R.M., Hill, J.K., Roy, D.B., Fox, R., & Thomas, C.D. (2012). Temperature-Dependent Alterations in Host Use Drive Rapid Range Expansion in a Butterfly. *Science*, *336*(6084), 1028-1030. doi:10.1126/science.1216980
- Plummer, K.E., Dadam, D., Brereton, T., Dennis, E.B., Massimino, D., Risely, K., Siriwardena, G.M. & Toms, M.P. (2023). Trends in butterfly populations in UK gardens – New evidence from citizen science monitoring. *Insect Conservation and Diversity*, <https://doi.org/10.1111/icad.12645>
- Pollard, E. (1979). Population ecology and change in range of the white admiral butterfly *Ladoga camilla* L. in England. *Ecological Entomology*, *4*(1), 61-74. doi:10.1111/j.1365-2311.1979.tb00561.x
- Pollard, E. (1982). Monitoring butterfly abundance in relation to the management of a nature reserve. *Biological Conservation*, *24*(4), 317-328. doi:10.1016/0006-3207(82)90018-0
- Pollard, E. (1984). Synoptic studies on butterfly abundance. *The biology of butterflies*.
- Pollard, E. (1991a). Changes in the flight period of the hedge brown butterfly *Pyronia tithonus* during range expansion. *Journal of Animal Ecology*, *60*(3), 737-748. doi:10.2307/5411
- Pollard, E. (1991a). Monitoring butterfly numbers *Monitoring for conservation and ecology* (pp. 87-111): Springer.

- Pollard, E. (1991b). Monitoring Butterfly Numbers in Monitoring for Conservation and Ecology (ed.). FB Goldsmith: London: Chapman and Hall.
- Pollard, E. (1991b). Synchrony of population fluctuations - the dominant influence of widespread factors on local butterfly populations. *Oikos*, *60*(1), 7-10. doi:10.2307/3544985
- Pollard, E. (1993). *Monitoring populations of a butterfly during a period of range expansion*. Paper presented at the ITE symposium.
- Pollard, E., & Cooke, A.S. (1994). Impact of muntjac deer *Muntiacus reevesi* on egg-laying sites of the white admiral butterfly *Ladoga camilla* in a Cambridgeshire wood. *Biological Conservation*, *70*(2), 189-191. doi:10.1016/0006-3207(94)90287-9
- Pollard, E., & Eversham, B. (1995). Butterfly monitoring 2—interpreting the changes *Ecology and conservation of butterflies* (pp. 23-36): Springer.
- Pollard, E., & Greatorex-Davies, J.N. (1998). Increased abundance of the red admiral butterfly *Vanessa atalanta* in Britain: the roles of immigration, overwintering and breeding within the country. *Ecology Letters*, *1*(2), 77-81.
- Pollard, E., Greatorex-Davies, J.N., & Thomas, J.A. (1997). Drought reduces breeding success of the butterfly *Aglais urticae*. *Ecological Entomology*, *22*(3), 315-318. doi:10.1046/j.1365-2311.1997.00064.x
- Pollard, E., Moss, D., & Yates, T.J. (1995). Population trends of common British butterflies at monitoring sites. *Journal of Applied Ecology*, *32*(1), 9-16. doi:10.2307/2404411
- Pollard, E., & Rothery, P. (1994). A simple stochastic model of resource-limited insect populations. *Oikos*, *69*(2), 287-294. doi:10.2307/3546149
- Pollard, E., Rothery, P., & Yates, T.J. (1996). Annual growth rates in newly established populations of the butterfly *Pararge aegeria*. *Ecological Entomology*, *21*(4), 365-369.
- Pollard, E., Woiwod, I.P., Greatorex-Davies, J.N., Yates, T.J., & Welch, R.C. (1998). The spread of coarse grasses and changes in numbers of lepidoptera in a woodland nature reserve. *Biological Conservation*, *84*(1), 17-24. doi:10.1016/s0006-3207(97)00090-6
- Pollard, E., & Yates, T.J. (1992). The extinction and foundation of local butterfly populations in relation to population variability and other factors. *Ecological Entomology*, *17*(3), 249-254. doi:10.1111/j.1365-2311.1992.tb01055.x
- Powney, G.D., Broaders, L.K., & Oliver, T.H. (2012). Towards a measure of functional connectivity: local synchrony matches small scale movements in a woodland edge butterfly. *Landscape Ecology*, *27*(8), 1109-1120. doi:10.1007/s10980-012-9771-y
- Powney, G.D., Roy, D.B., Chapman, D., Brereton, T., & Oliver, T.H. (2011). Measuring functional connectivity using long-term monitoring data. *Methods in Ecology and Evolution*, *2*(5), 527-533. doi:10.1111/j.2041-210X.2011.00098.x
- Powney, G.D., Roy, D.B., Chapman, D., & Oliver, T.H. (2010). Synchrony of butterfly populations across species' geographic ranges. *Oikos*, *119*(10), 1690-1696. doi:10.1111/j.1600-0706.2010.18168.x
- Redhead, J.W., Fox, R., Brereton, T., & Oliver, T.H. (2016). Assessing species' habitat associations from occurrence records, standardised monitoring data and expert opinion: A test with British butterflies. *Ecological Indicators*, *62*, 271-278. doi:10.1016/j.ecolind.2015.11.004
- Rothery, P. (1998). The problems associated with the identification of density dependence in population data *Insect Populations In theory and in practice* (pp. 97-133): Springer.
- Rothery, P., Newton, I., Dale, L., & Wesolowski, T. (1997). Testing for density dependence allowing for weather effects. *Oecologia*, *112*(4), 518-523. doi:10.1007/s004420050340
- Rothery, P., & Roy, D.B. (2001). Application of generalized additive models to butterfly transect count data. *Journal of Applied Statistics*, *28*(7), 897-909. doi:10.1080/02664760120074979
- Roy, D.B., Oliver, T.H., Botham, M.S., Beckmann, B., Brereton, T., Dennis, R.L.H., Harrower, C., Phillimore, A.B. & Thomas, J.A. (2015). Similarities in butterfly emergence dates among populations suggest local adaptation to climate. *Global Change Biology*, *21*(9), 3313-3322. doi:10.1111/gcb.12920

- Roy, D.B., Ploquin, E.F., Randle, Z., Risely, K., Botham, M.S., Middlebrook, I., Noble, D., Cruikshanks, K., Freeman, S. & Brereton, T.M. (2015). Comparison of trends in butterfly populations between monitoring schemes. *Journal of Insect Conservation*, 19(2), 313-324. doi:10.1007/s10841-014-9739-0
- Roy, D.B., Rothery, P., & Brereton, T. (2007). Reduced-effort schemes for monitoring butterfly populations. *Journal of Applied Ecology*, 44(5), 993-1000. doi:10.1111/j.1365-2664.2007.01340.x
- Roy, D.B., Rothery, P., Moss, D., Pollard, E., & Thomas, J.A. (2001). Butterfly numbers and weather: predicting historical trends in abundance and the future effects of climate change. *Journal of Animal Ecology*, 70(2), 201-217. doi:10.1046/j.1365-2656.2001.00480.x
- Roy, D.B. & Thomas, J.A. (2003). Seasonal variation in the niche, habitat availability and population fluctuations of a bivoltine thermophilous insect near its range margin. *Oecologia*, 134(3), 439-444. doi:10.1007/s00442-002-1121-3
- Schmucki, R., Pe'Er, G., Roy, D.B., Stefanescu, C., Van Swaay, C.A., Oliver, T.H., ... Settele, J. (2016). A regionally informed abundance index for supporting integrative analyses across butterfly monitoring schemes. *Journal of Applied Ecology*, 53(2), 501-510.
- Shreeve, T.G., Dennis, R.L.H., Roy, D.B., & Moss, D. (2001). An ecological classification of British butterflies: Ecological attributes and biotope occupancy. *Journal of Insect Conservation*, 5(3), 145-161. doi:10.1023/a:1017556113534
- Smart, S.M., Firbank, L.G., Bunce, R.G.H., & Watkins, J.W. (2000). Quantifying changes in abundance of food plants for butterfly larvae and farmland birds. *Journal of Applied Ecology*, 37(3), 398-414. doi:10.1046/j.1365-2664.2000.00508.x
- Soulsby, R.L., & Thomas, J.A. (2012). Insect population curves: modelling and application to butterfly transect data. *Methods in Ecology and Evolution*, 3(5), 832-841. doi:10.1111/j.2041-210X.2012.00227.x
- Sparks, T., Hann, J., & Greatorex-Davies, J. (1999). The influence of field boundary structure on butterflies. *Aspects of Applied Biology*, 54, 235-240.
- Sparks, T.H., & Yates, T.J. (1997). The effect of spring temperature on the appearance dates of British butterflies 1883-1993. *Ecography*, 20(4), 368-374. doi:10.1111/j.1600-0587.1997.tb00381.x
- Stefanescu, C., Alarcon, M., & Vila, A.A. (2007). Migration of the painted lady butterfly, *Vanessa cardui*, to north-eastern Spain is aided by African wind currents. *Journal of Animal Ecology*, 76(5), 888-898. doi:10.1111/j.1365-2656.2007.01262.x
- Stefanescu, C., Páramo, F., Åkesson, S., Alarcón, M., Ávila, A., Brereton, T., ...Chapman, J.W. (2013). Multi-generational long-distance migration of insects: studying the painted lady butterfly in the Western Palaearctic. *Ecography*, 36(4), 474-486. doi:10.1111/j.1600-0587.2012.07738.x
- Suggitt, A.J., Stefanescu, C., Paramo, F., Oliver, T., Anderson, B.J., Hill, J.K., Roy, D.B., Brereton, T. & Thomas, C. D. (2012). Habitat associations of species show consistent but weak responses to climate. *Biology Letters*, 8(4), 590-593. doi:10.1098/rsbl.2012.0112
- Sullivan, M.J.P., Pearce-Higgins, J.W., Newson, S.E., Scholefield, P., Brereton, T., & Oliver, T.H. (2017). A national-scale model of linear features improves predictions of farmland biodiversity. *Journal of Applied Ecology*, 54(6), 1776-1784. doi:10.1111/1365-2664.12912
- Sutcliffe, O.L., Thomas, C.D., & Moss, D. (1996). Spatial synchrony and asynchrony in butterfly population dynamics. *Journal of Animal Ecology*, 65(1), 85-95. doi:10.2307/5702
- Sutcliffe, O.L., Thomas, C.D., Yates, T.J., & Greatorex-Davies, J.N. (1997). Correlated extinctions, colonizations and population fluctuations in a highly connected ringlet butterfly metapopulation. *Oecologia*, 109(2), 235-241. doi:10.1007/s004420050078
- Taylor, M.E., & Morecroft, M.D. (2009). Effects of agri-environment schemes in a long-term ecological time series. *Agriculture Ecosystems & Environment*, 130(1-2), 9-15. doi:10.1016/j.agee.2008.11.004
- Terry, J.C.D., Langdon, W. & Rossberg, A.G. (2023). Codistribution as an indicator of whole metacommunity response to environmental change. *Ecography*, e06605

- Thackeray, S.J., Henrys, P.A., Hemming, D., Bell, J.R., Botham, M.S., Burthe, S., ... Wanless, S. (2016). Phenological sensitivity to climate across taxa and trophic levels. *Nature*, 535(7611), 241-249. doi:10.1038/nature18608
- Thackeray, S.J., Sparks, T.H., Frederiksen, M., Burthe, S., Bacon, P.J., Bell, J.R., ... Wanless, S. (2010). Trophic level asynchrony in rates of phenological change for marine, freshwater and terrestrial environments. *Global Change Biology*, 16(12), 3304-3313. doi:10.1111/j.1365-2486.2010.02165.x
- Thomas, C.D. (1991). Spatial and temporal variability in a butterfly population. *Oecologia*, 87(4), 577-580. doi:10.1007/bf00320423
- Thomas, J. (1999). *New atlas of Dorset butterflies*: Dorset County Museum.
- Thomas, J.A. (1983). The ecology and status of *Thymelicacteon* (Lepidoptera, Hesperidae) in Britain. *Ecological Entomology*, 8(4), 427-435. doi:10.1111/j.1365-2311.1983.tb00521.x
- Thomas, J.A., Moss, D., & Pollard, E. (1994). Increased fluctuations of butterfly populations towards the northern edges of species ranges. *Ecography*, 17(3), 215-220. doi:10.1111/j.1600-0587.1994.tb00096.x
- Thomas, J.A., Telfer, M.G., Roy, D.B., Preston, C.D., Greenwood, J.J.D., Asher, J., ... Lawton, J.H. (2004). Comparative losses of British butterflies, birds, and plants and the global extinction crisis. *Science*, 303(5665), 1879-1881. doi:10.1126/science.1095046
- VanStrien, A.J., VandePavert, R., Moss, D., Yates, T.J., VanSwaay, C.A.M., & Vos, P. (1997). The statistical power of two butterfly monitoring schemes to detect trends. *Journal of Applied Ecology*, 34(3), 817-828.
- Van Swaay, C.A.M., Dennis, E.B., Schmucki, R., Sevilleja, C.G., Arnberg, H., Åström, S., Balalaikins, M., Barea-Azcón, J.M., Bonelli, S., Botham, M., Cancela, J.P., Collins, S., De Flores, M., Dapporto, L., Dopagne, C., Dziekanska, I., Escobés, R., Faltýnek Fric, Z., Garcia Fernandez, J. M., ... Roy, D.B. (2022). European Grassland Butterfly Indicator 1990-2020: Technical report. Butterfly Conservation Europe & ABLE/eBMS ([www.butterfly-monitoring.net](http://www.butterfly-monitoring.net)).
- Warren, M.S. (1985). The influence of shade on butterfly numbers in woodland rides, with special reference to the Wood White *Leptidea sinapis*. *Biological Conservation*, 33(2), 147-164. doi:10.1016/0006-3207(85)90101-6
- Warren, M.S., Hill, J.K., Thomas, J.A., Asher, J., Fox, R., Huntley, B., ... Thomas, C.D. (2001). Rapid responses of British butterflies to opposing forces of climate and habitat change. *Nature*, 414(6859), 65-69. doi:10.1038/35102054
- Warren, M.S., Maes, D., van Swaay, C.A., Goffart, P., Van Dyck, H., Bourn, N.A., Wynhoff, I., Hoare, D. & Ellis, S. (2021). The decline of butterflies in Europe: Problems, significance, and possible solutions. *Proceedings of the National Academy of Science*, 118, e2002551117
- Warren, M.S., Pollard, E., & Bibby, T.J. (1986). Annual and long-term changes in a population of the Wood White butterfly *Leptidea sinapis*. *Journal of Animal Ecology*, 55(2), 707-719. doi:10.2307/4749
- Woodcock, B.A., Bullock, J.M., Mortimer, S.R., Brereton, T., Redhead, J.W., Thomas, J.A., & Pywell, R.F. (2012). Identifying time lags in the restoration of grassland butterfly communities: A multi-site assessment. *Biological Conservation*, 155, 50-58. doi:10.1016/j.biocon.2012.05.013
- Zonneveld, C. (1991). Estimating death rates from transect counts. *Ecological Entomology*, 16(1), 115-121. doi:10.1111/j.1365-2311.1991.tb00198.x