

References

- Adami, C., Taylor C., and Belew, R. (eds.) 1998. *Artificial Life VI : Proceedings of the Sixth International Conference on Artificial Life*. Complex Adaptive Systems, No. 6. Bradford Books.
- Adler, F.R. and Mosquera, J. 2000. Is space necessary? Interference competition and limits to biodiversity. *Ecology* 81: 3226-3232.
- Barbour, M.G., Burk, J.H., Pitts, W.D. and Shwartz, M.W. 1999. *Terrestrial Plant Ecology*. 3rd Edition. Benjamin Cummings.
- Barricelli, N.A. 1962. Numerical testing of evolution theories. Part I. Theroetical introduction and basic tests. *Acta Biotheoretica* XVI: 69-98.
- Barricelli, N.A. 1963. Numerical testing of evolution theories. Part II. Preliminary tests of performance. Symbiogenesis and terrestrial life. *Acta Biotheoretica* XVI: 99-126.
- Bausenwein, U., Millard, P., Thornton, B. and Raven, J.A. 2001. Seasonal nitrogen storage in the forb *Rumex acetosa*. *Functional Ecology* 15: 370-377.
- Bedau, M.A., Snyder, E. and Packard, N.H. 1998. A classification of long-term evolutionary dynamics. In: Adami, C., Belew, R., Kitano, H., and Taylor, C. (eds.), *Proceedings of Artificial Life VI*, pp. 228-237, MIT press.
- Botsford, L.W. 1992. Individual state structure in population models. In: DeAngelis, D.L. and Gross, L. J. (eds.), *Individual-Based Models and Approaches in Ecology*, pp. 213-236, Chapman and Hall.
- Bown, J.L. 2000. *Issues of scale in individual-based models: applications in fungal and plant communities*. PhD thesis, University of Abertay Dundee.
- Braun, M. 1993. *Differential Equations and Their Applications: An Introduction to Applied Mathematics*, 4th ed. Flushing.
- Briggs, D. and Walters, S.M. 1997. *Plant Variation and Evolution*. Cambridge University Press.
- Bronstein, J.L. 1994. Our current understanding of mutualism. *Quarterly Reviews of Biology* 69: 31-51.
- Cardinale, B.J., Nelson, K. and Palmer, M.A. 2000. Linking species diversity to the functioning of ecosystems: on the importance of environmental context. *Oikos* 91: 175-183.

- Caswell, H. 1989. *Matrix Population Models: Construction, Analysis, and Interpretation*. Sinauer Associates.
- Chapin III, F.S., Zavaleta, E.S., Eviner, V.T., Naylor, R.L., Vitousek, P.M. *et al.* 2000. Consequences of changing biodiversity. *Nature* 405: 234-242.
- Chesson, P. 1994. Multispecies competition in variable environments. *Theoretical Population Biology* 45: 227-276.
- Conrad, M. and Pattee, H. 1970. Evolution experiments with an artificial ecosystem. *Journal of Theoretical Biology* 28:393-409.
- Crawley, M.J. 1990. The population dynamics of plants. *Philosophical Transaction of the Royal Society of London B* 330: 125-140.
- Crawley, M.J. 1997. *Plant Ecology*. Blackwell.
- Crawley, M.J. and May, R.M. 1987. Population dynamics and plant community structure: competition between annuals and perennials. *Journal of Theoretical Biology* 125: 475-489.
- Crawley, M.J. and Harral, J.E. 2001. Scale dependence in plant biodiversity. *Science* 291: 864-868.
- D'Agostino, R.B. and Stephens, M.A. 1986. *Goodness-of-fit Techniques*. Marcel Dekker.
- Draper, N.R. and Smith, H. 1981. *Applied Regression Analysis*. John Wiley & Sons.
- Dunning, J.B., Stewart, D.J., Danielson, B.J., Noon, B.R., Root, T.L. *et al.* 1995. Spatially explicit population models: Current forms and future cases. *Ecological Modelling* 5: 3-11.
- Fahse, L., Wissel, C. and Grimm, V. 1998. Reconciling classical and individual-based approaches in theoretical population ecology: a protocol for extracting population parameters from individual-based models. *The American Naturalist* 152: 838-852.
- Geritz, S.A.H., van der Meijden, E. and Metz, J.A.J. 1999. Evolutionary dynamics of seed size and seedling competitive ability. *Theoretical Population Biology* 55: 324-343.
- Gleeson, S.K. and Tilman, D. 1990. Allocation and the transient dynamics of succession on poor soils. *Ecology* 71: 1144-1155.
- Gordon, C.E. 2000. The coexistence of species. *Revista Chilena de Historia Natural* 73: 175-198.
- Green, D. 1989. Simulated effects of fire, dispersal and spatial pattern on competition within forest mosaics. *Vegetatio* 82: 139-153.
- Grime, J.P., Hodgson, J.G. and Hunt, R. 1988. *Comparative Plant Ecology: A Functional Approach to Common British Species*. Unwin Hyman.

- Grimm, V. 1999. Ten years of individual-based modelling in ecology: what have we learned and what could we learn in the future? *Ecological Modelling* 115: 129-148.
- Gross, L.J., Rose, K.A., Rykiel, E., Van Winkle, W. and Werner, E.E. 1992. Individual-based modelling: summary of a workshop. In: DeAngelis, D.L. and Gross, L.J. (eds.), *Individual-Based Models and Approaches in Ecology*, pp. 511-522, Chapman and Hall.
- Guo, Q., Brown, J.H., Valone, T.J. and Kachman, S.D. 2000. Constraints of seed size on plant distribution and abundance. *Ecology* 81: 2149-2155.
- Hairer, E., Norsett, S.P. and Wanner, G. 1993. *Solving Ordinary Differential Equations. Nonstiff Problems*. 2nd edition. Springer Series in Computational Mathematics, vol. 8, Springer.
- Harper, John L. 1977. *Population Biology of Plants*. Academic Press.
- Hassel, M.P., Comins, H.N. and May, R.M. 1994. Species coexistence and self-organizing spatial dynamics. *Nature* 370: 290-292.
- Hastings, A. 1990. Spatial heterogeneity and ecological models. *Ecology* 71: 426-428.
- Hastings, A. 1997. *Population Biology: Concepts and Models*. Springer.
- Hector, A., Schmid, B., Beierkuhnlein, C., Caldeira, M.C., Diemer, M. *et al.* 1999. Plant diversity and productivity experiments in European grasslands. *Science* 286: 1123-1127.
- Helfield, J.M. and Naiman, R.J. 2001. Effects of salmon-derived nitrogen on riparian forest growth and implications for stream productivity. *Ecology* 82: 2403 – 2409.
- Hogeweg, P. and Hesper, B. 1990. Individual-oriented modelling in ecology. *Mathematical and Computer Modelling* 13: 83-90.
- Holland, J.H. 1995. *Hidden Order: How Adaptation Builds Complexity*. Addison Wesley/Helix Books.
- Hooper, D.U. and Vitousek, P.M. 1997. The effects of plant composition and diversity on ecosystem processes. *Science* 277: 1302-1305.
- Hraber, P.T., Jones, T. and Forrest, S. 1997. The ecology of Echo. *Artificial Life* 3(3), 165-190.
- Hubbell, S.P. 2001. *The Unified Neutral Theory of Biodiversity and Biogeography*, Monographs in Population Biology 32. Princeton University Press.
- Huisman, J. and Weissing, F.J. 1999. Biodiversity of plankton by species oscillations and chaos. *Nature* 402:407-410.
- Humphries, H.C., Coffin, D.P. and Lauenroth, W.K. 1996. An individual-based model of alpine plant distributions. *Ecological Modelling* 84: 99-126.

- Huston, M. 1994. *Biological Diversity: The coexistence of species in changing landscapes*. Cambridge University Press.
- Huston, M., DeAngelis, D.L. and Post, W.M. 1988. New computer models unify ecological theory. *Bioscience* 38: 682-691.
- Hutchinson, G.E. 1951. Copepodology for the ornithologist. *Ecology* 32: 571-577.
- Kaitala, V., Alaja, S. and Ranta, E. 2001. Temporal self-similarity created by spatial individual-based population dynamics. *Oikos* 94: 273-278.
- Kiers, E.T., Lovelock, C.E., Krueger, E.L. and Herre, E.A. 2000. Differential effects of tropical arbuscular mycorrhizal fungal inocula on root colonization and tree seedling growth: implications for tropical forest diversity. *Ecology Letters* 3:106-113.
- Kleidon, A. and Mooney, H. 2000. A global distribution of biodiversity inferred from climatic constraints: results from a process-based modelling study. *Global Change Biology* 6: 507-523.
- Köhler, P. and Huth, A. 1998. The effects of tree species grouping in tropical rainforest modelling: Simulations with the individual-based model Formind. *Ecological Modelling* 109: 301-321.
- Kubo, T. and Ida, H. 1998. Sustainability of an isolated beech-dwarf bamboo stand: analysis of forest dynamics with individual based model. *Ecological Modelling* 111: 223-235.
- Lavorel, S. and Chesson, P. 1995. How species with different regeneration niches coexist in patchy habitats with local disturbances. *Oikos* 74: 103-114.
- Lawton, J.H. 1999. Are there general laws in ecology? *Oikos* 83: 177-192.
- Leishman, M.R. and Murray, B.R. 2001. The relationship between seed size and abundance in plant communities: model predictions and observed patterns. *Oikos* 94: 151-161.
- Levin, S.A. 1970. Community equilibria and stability, and an extension of the competitive exclusion principle. *The American Naturalist* 104: 413-423.
- Levin, S.A. 1974. Dispersion and population interactions. *The American Naturalist* 108: 207-228.
- Levin, S.A. 1992. The problem of pattern and scale in ecology. *Ecology* 73: 1943-1967.
- Levins, R. 1969. Some demographic and genetic consequences of environmental heterogeneity for biological control. *Bulleting of the Entomological Society of America* 15: 237-240.
- Levins, R. and Culver, D. 1971. Regional coexistence of species and competition between rare species. *Proceedings of the National Academy of Sciences USA* 68: 1246-1248.

- Mladenoff, D. and Baker, W. (eds.) 1999. *Spatial Modeling of Forest Landscape Change*. Cambridge University Press.
- Lomnicki, A. 1988. *Population ecology of individuals*. Princeton University Press.
- Lomnicki, A. 1999. Individual-based models and the individual-based approach to population ecology. *Ecological Modelling* 115: 191-198.
- Loreau, M. 1992. Species abundance patterns and the structure of ground-beetle communities. *Annales Zoologici Fennici* 28: 49-56.
- Loreau, M. 2000. Biodiversity and ecosystem functioning: recent theoretical advances. *Oikos* 91: 3-17.
- MacArthur, R.H. 1957. On the relative abundance of bird species. *Proceedings of the National Academy of Sciences USA* 43: 293-295.
- MacArthur, R.H. and Wilson, E.O. 1963. An equilibrium theory of insular zoogeography. *Evolution* 17: 373-87.
- MacArthur, R.H. and Wilson, E.O. 1967. *The Theory of Island Biogeography*, Princeton University Press.
- May, R.M. 1976. *Theoretical Ecology*. Blackwell Scientific Publications.
- Mayr, E. 1942. *Systematics and the Origin of Species*. Columbia University Press.
- Metz, J.A.J and Diekmann, O. (eds.) 1986. *The Dynamics of Physiological Structured Population*. Lecture Notes in Biomathematics 68. Springer-Verlag.
- Metz, J.A.J., de Roos, A.M. and van den Bosch, F. 1988. Population models incorporating physiological structure: a quick survey of the basic concepts and an application to size-structured population dynamics in waterfleas. In: Ebenman, B. and Persson, L. (eds.) *Size-structured populations*, pp. 106-126, Springer-Verlag.
- Metz, J.A.J. and de Roos, A.M. 1992. The role of physiologically structured population models within a general individual-based modeling perspective. In: DeAngelis, D.L. and Gross, L.J. (eds.) *Individual-based models and approaches in ecology*, pp. 88-111, Chapman and Hall.
- Murray, J. D. 1989. *Mathematical Biology*. Springer-Verlag.
- Naeem, S., Thompson, L.J., Lawler, S.P., Lawton, J.H. and Woodfin, R.M. 1994. Declining biodiversity can alter the performance of ecosystems. *Nature* 368: 734-737.
- Naeem, S., Knops, J., Tilman, D., Howe, K.H., Kennedy, T. and Gale, S. 2000. Plant diversity increases resistance to invasion in the absence of covarying extrinsic factors. *Oikos* 91: 97-108.

- Nijs, I. and Roy, J. 2000. How important are species richness, species evenness and interspecific differences to productivity? A mathematical model. *Oikos* 88: 57-66.
- Pacala, S.W. 1986. Neighborhood models of plant population dynamics. 2. Multi-species models of annuals. *Theoretical Population Biology* 29, 262-292.
- Pacala, S.W. 1987. Neighborhood models of plant population dynamics. 3. Models with spatial heterogeneity in the physical environment. *Theoretical Population Biology* 31, 359-392.
- Pacala, S.W. and Silander, J.A. Jr. 1985. Neighborhood models of plant population dynamics. I. Single-species models of annuals. *The American Naturalist* 125: 385-411.
- Pachepsky, E., Crawford, J.W., Bown, J.L., Squire, G. 2001. Towards a general theory of biodiversity. *Nature* 410: 923-926.
- Pachepsky, E., Taylor, T., Jones, S. 2002. Mutualism promotes diversity and stability in a simple artificial ecosystem. *Journal of Artificial Life* 8: 5-24.
- Pearson, T.H., Gray, J.S. and Johannessen, P.J. 1982. Objective selection of sensitive species indicative of pollution-induced change in benthic communities. 2. Data analyses. *Marine Ecology-Progress Series* 12: 237-255.
- Pepper, J.W. and Smuts, B.B. 2000. The evolution of cooperation in an ecological context: An agent-based model. In: Kohler, T.A. and Gumerman, G.J. (eds.) *Dynamics in Human and Primate Societies: Agent-Based Modeling of Social and Spatial Processes*. Oxford University Press.
- Pielou, E.C. 1977. *Mathematical Ecology*. Wiley.
- Preston, F.W. 1948. The commonness, and rarity, of species. *Ecology* 29: 254-283.
- Pugnaire, F.I. and Luque, M.T. 2001. Changes in plant interactions along a gradient of environmental stress. *Oikos* 93: 42-49.
- Putman, R.J. 1994. *Community Ecology*. Chapman and Hall.
- Ray, T.S. 1991. An approach to the synthesis of life. In: Langton, C.G., Taylor, C., Farmer, J.D. and Rasmussen, S. (eds.), *Artificial Life II*, pp. 371-408, Addison-Wesley.
- Ratkowsky, D.A. 1983. *Nonlinear Regression Modelling. A Unified Practical Approach*. Marcel Dekker.
- Read, D.J. 1996. *Mycorrhizal Symbiosis*. Harcourt Brace & Co.
- Rees, M. and Westoby, M. 1997. Game-theoretical evolution of seed mass in multi-species ecological models. *Oikos* 78: 116-126.
- Ricklefs, R.E. and Schluter, D. 1993. *Species diversity in ecological communities*. The University of Chicago Press.

- Ricklefs, R.E. and Miller, G.L. 1999. *Ecology*. W. H. Freeman.
- Rodwell, J.S. (ed.) 1992. *British Plant Communities, Volume 3. Grassland and montane communities*. Cambridge University Press.
- Rosenzweig, M. 1995. *Species Diversity in Space and Time*. Cambridge University Press.
- Schmitz, O.J. 2000. Combining field experiments and individual-based modeling to identify the dynamically relevant organizational scale in a field system. *Oikos* 89: 471-484.
- Schulze, E.-D. and Mooney, H.A. 1994. *Biodiversity and Ecosystem Function*. Springer.
- Schwartz, M.W., Brigham, C.A., Hoeksema, J.D., Lyons, K.G., Mills, M.H. *et al.* 2000. Linking biodiversity to ecosystem function: implications for conservation ecology. *Oekologia* 122: 297-305.
- Shimatani, K. 2001. On the measurement of species diversity incorporating species differences. *Oikos* 93: 135-147.
- Shmida, A. and Ellner, S. 1984. Coexistence of plant species with similar niches. *Vegetatio* 58: 29-55.
- Shugart, H.H. 1984. *A Theory of Forest Dynamics*. Springer-Verlag.
- Silvertown, J., Holtier, S., Johnson, J. and Dale, P. 1992. Cellular automaton models of interspecific competition for space - the effect of pattern on process. *Journal of Ecology* 80: 527-534.
- Skellam, J.G. 1951. Random dispersal in theoretical populations. *Biometrika* 38: 196-218.
- Slatkin, M. 1974. Competition and regional coexistence. *Ecology* 55: 128-134.
- Stachnowicz, J.J. 2001. Mutualism, facilitation, and the structure of ecological communities. *Bioscience* 51: 235-246.
- Sugihara, G. 1980. Minimal community structure: an explanation of species abundance patterns. *The American Naturalist* 116: 770-787.
- Sumpter, D.J.T. and Broomhead, D.S. 2001. Relating individual behaviour to population dynamics. *Proceedings of the Royal Society B* 286: 925-932.
- Symstad, A.J. and Tilman, D. 2001. Diversity loss, recruitment limitation, and ecosystem functioning lessons learned from a removal experiment. *Oikos* 92: 424-435.
- Tanton, J.H. 1995. End of the migration epoch. *The Social Contract* IV: 162 – 173.
- Taylor, T. 1999. *From Artificial Evolution to Artificial Life*. PhD thesis, University of Edinburgh.

- Tilman, D. 1994. Competition and biodiversity in spatially structured habitats. *Ecology* 75: 2-16.
- Tilman, D. 1999. The ecological consequences of changes in biodiversity: a search for general principles. *Ecology* 80: 1455-1474.
- Tilman, D. and Downing, J.A. 1994. Biodiversity and stability in grasslands. *Nature* 367: 363-365.
- Tilman, D. and Kareiva, P. 1997. *Spatial Ecology*. Princeton University Press.
- Tilman, D., Knops, J., Wedin, D., Reich, P., Ritchie, M.E. *et al.* 1997. The influence of functional diversity and composition on ecosystem processes. *Science* 277: 1300-1302.
- Turing, A.M. with 1952. The chemical basis of morphogenesis. *Philosophical Transactions of the Royal Society of London B* 237: 37-72.
- Uchmanski, J. and Grimm, V. 1996. Individual-based modelling in ecology: what makes the difference? *Trends in Ecology and Evolution* 11: 437-441.
- Vitousek, P.M., Mooney, H.A., Lubchenco, J. and Melillo, J.M. 1997. Human domination of Earth's ecosystems. *Science* 277: 494- 499.
- Walker, B., Kinzig, A.P. and Langridge, J. 1999. Plant attribute diversity, resilience and ecosystem function: the nature and significance of dominant and minor species. *Ecosystems* 2: 95-113.
- Warren, J.M. and Topping, C.J. 1999. A space occupancy model for the vegetation succession that occurs on set-aside. *Agriculture, Ecosystems and Environment* 72:119-129.
- Weber, G.E., Jeltsch, F., vanRooyen, N. and Milton, S. 1998. Simulated long-term vegetation response to grazing heterogeneity in semi-arid rangelands. *Journal of Applied Ecology* 35: 687-699.
- Weiner, J. and Conte, P.T. 1981. Dispersal and neighborhood effects in a annual plant competition model. *Ecological Modelling* 13: 131-147.
- Whittaker, R.H. 1965. Dominance and diversity in land plant communities. *Science* 147: 250-260.
- Whittaker, R.H. 1967. Gradient analysis of vegetation. *Biological Review of Cambridge Philosophical Society* 42: 207-264.
- Whittaker, R.H. 1970. Evolution and measurement of species diversity. *Taxon* 21: 213-251.
- Whittaker, R.H. 1999. Ecology: Scaling, energetics and diversity. *Nature* 401: 865-866.

- Wilkinson, H.H. and Parker, M.A. 1996. Symbiotic specialization and the potential for genotypic coexistence in a plant-bacterial mutualism. *Oecologia* 108: 361-367.
- Winkler, E., Fischer, M. and Schmid, B. 1999. Modelling the competitiveness of clonal plants by complementary analytical and simulation approaches. *Oikos* 85: 217-233.
- Yachi, S. and Loreau, M. 1999. Biodiversity and ecosystem productivity in a fluctuating environment: The insurance hypothesis. *Proceedings of the National Academy of Sciences of the USA* 96: 1463-1468.
- Young, I.M. and Crawford, J.W. 1991. The fractal structure of soil aggregates: its measurement and interpretation. *The Journal of Soil Science*, 42: 187 – 192.