Fluctuations and Food-web Structures in Individual-based Models of Biological Coevolution[1] PER ARNE RIKVOLD, VOLKAN SEVIM, Florida State University — We report very long kinetic Monte Carlo simulations of eco- systems generated by individual-based models of biological co-evolution, emphasizing the temporal fluctuations in community structure, diversity, and population sizes [1-3]. These multispecies coevolution models contain both producers that directly utilize an external resource, and consumers that must consume one or more other species for support. Time series of diversities and population sizes over tens of millions of generations display highly correlated fluctuations that give rise to power spectra of $1/f$ form. These model-intrinsic dynamic features correspond to large, correlated extinction events and similarly correlated bursts of new species, without the need for external catastrophic events. The communities generated by the evolution process take the form of simple food webs, whose species abundance distributions and degree distributions are consistent with data from real food webs.

[1] P. A. Rikvold, *J. Math. Biol* **55**, 653-677 (2007).
[2] P. A. Rikvold and V. Sevim, *Phys. Rev. E* **75**, 051920 (2007) (17 pages).
[3] P. A. Rikvold, arXiv:q-bio.PE/0609013.

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