Trophic network models explain instability of Early Triassic terrestrial communities: Electronic Supplemental Material

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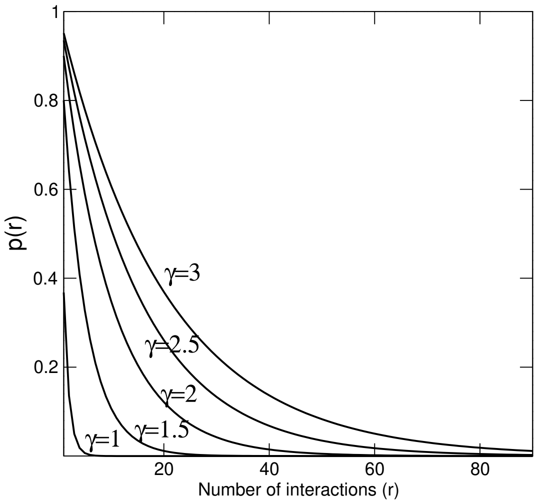
ESM table 1. Guilds used for community reconstruction from each assemblage zone. Richness, number of species in each consumer guild, or the number of units of primary productivity in producer guilds; MVP, fraction of pre-pertubation population size used to determine the point of extinction; Terrestrial production I, primary production available to all insects, myriapods and tetrapods; Terrestrial production II, production available only to insects and myriapods.

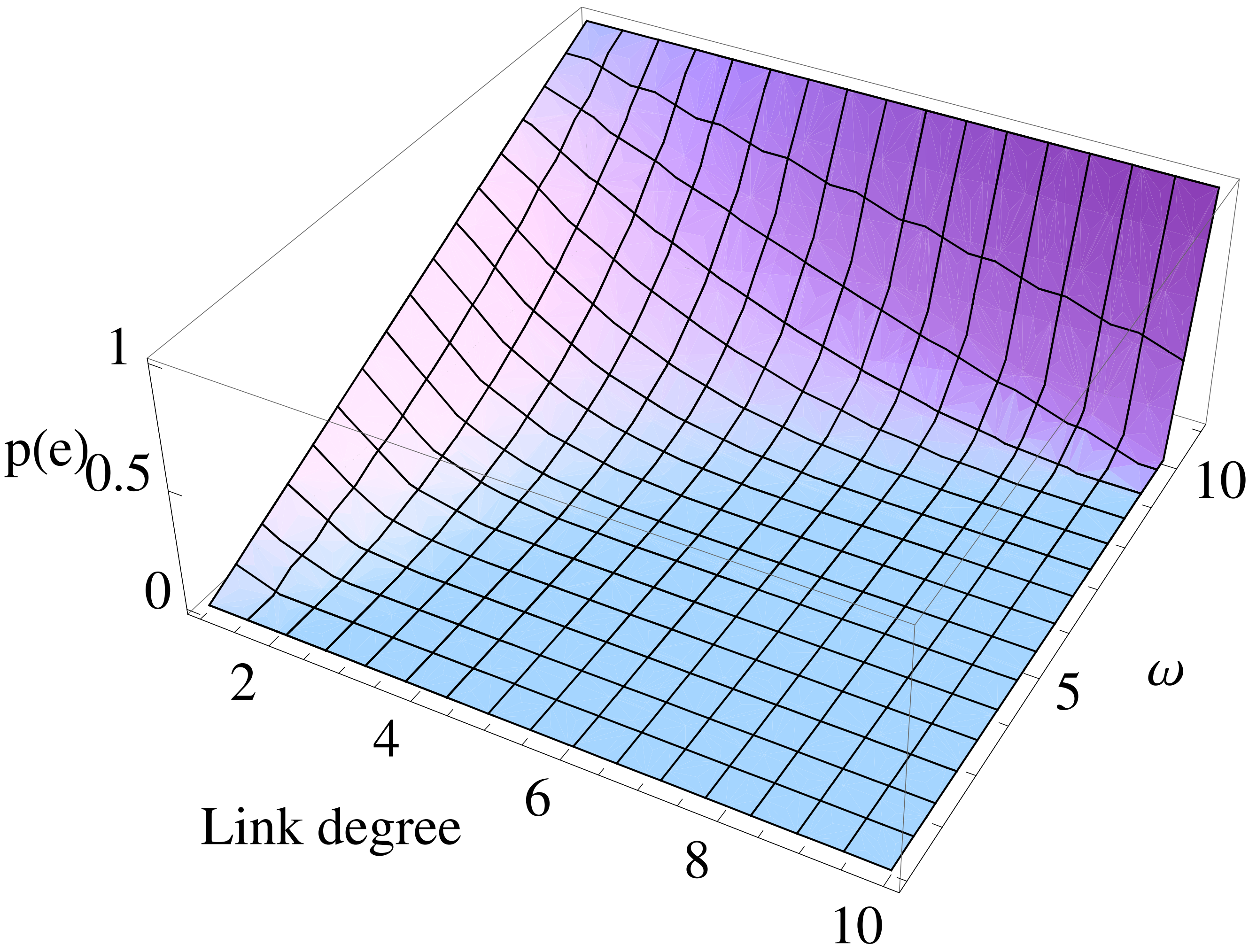
Guild		**Richness**		**MVP**
	Eodicynodon	*Dicynodon*	*Lystrosaurus*	
Aquatic microphytes	205	220	180	0.05
Aquatic macrophytes	205	320	200	0.05
Terrestrial production I	245	460	290	0.05
Terrestrial production II	185	180	190	0.05
Molluscs	2	2	0	0.1
Conchostracans	0	2	0	0.1
Fish	2	14	2	0.2
Myriapods	0	0	2	0.1
Herbivorous insects	40	40	40	0.1
Carnivorous insects	12	12	12	0.1
Omnivorous insects	34	34	34	0.1
Very small amphibians	0	0	4	0.1
Small amphibians	0	0	4	0.2
Medium amphibians	0	2	2	0.3
Large amphibians	0	0	2	0.4
Very large amphibians	0	4	6	0.5
Very small herbivores	2	8	8	0.1
Small herbivores	2	4	0	0.2
Medium herbivores	0	8	2	0.3
Large herbivores	0	4	0	0.4
Very large herbivores	2	4	0	0.5
Very small carnivores/insectivores	0	24	26	0.1
Small carnivores/insectivores	4	22	10	0.2
Medium carnivores	4	12	4	0.3
Large carnivores	0	8	0	0.4
Very large carnivores	0	4	0	0.5

ESM table 2. Link densities of species-level food webs. Mean link densities (plus or minus one standard deviation) of 100 simulated species-level food webs for each stratigraphic zone at γ exponent values of range 1-3.

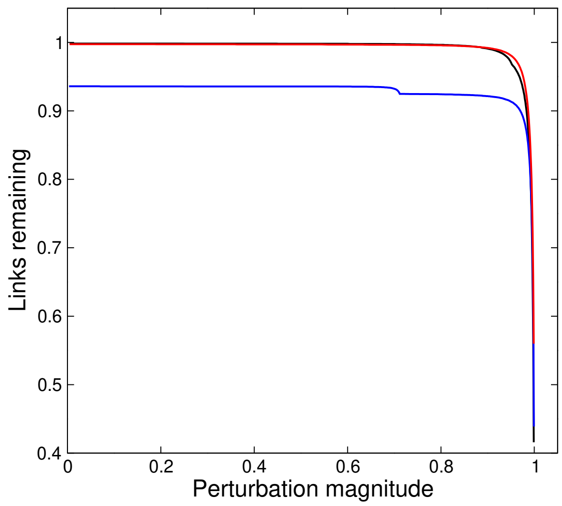
γ	*Eodicynodon*	*Dicynodon*	*Lystrosaurus*
1	0.068 ± 0.011	0.157 ± 0.006	0.089 ± 0.012
1.5	0.838 ± 0.081	0.938 ± 0.073	1.03 ± 0.078
2	2.732 ± 0.281	2.640 ± 0.215	3.052 ± 0.297
2.5	5.100 ± 0.476	5.244 ± 0.409	5.840 ± 0.385
3	7.872 ± 0.944	8.199 ± 0.690	8.896 ± 0.922



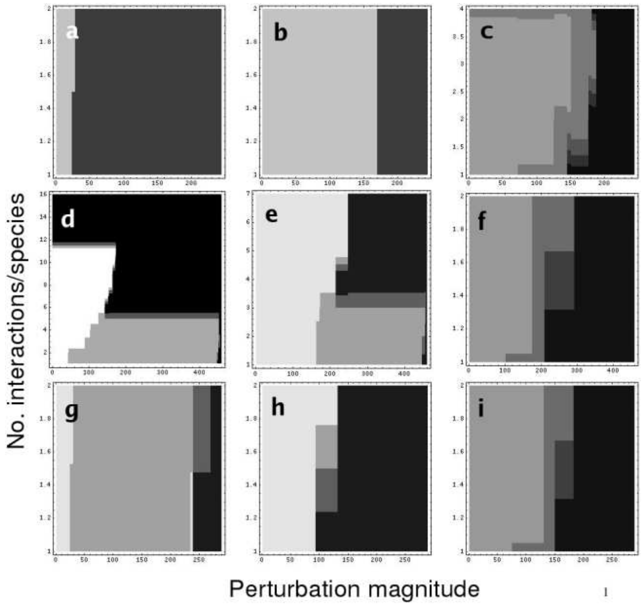
ESM figure 1. Trophic link distribution parameterized with different power law exponents (γ). The total number of prey available to species in this guild is 90, and hence the maximum number of interactions possible for any species is also 90. The tail of the distribution becomes denser as γ increases, and hence the probability of a greater number of interactions ($p(r)$) likewise increases.



ESM figure 2. The probability of topological secondary extinction, illustrated as a surface generated over the number of prey (interactions) of the consumer species ("Link degree") and the magnitude of the perturbation (ω). In this case, the maximum number of prey available to any member of the guild is 10. The probability of extinction is proportional to ω, and inversely proportional to the number of interactions.



ESM figure 3. The number of interactions remaining (y-axis) within the community after a specific level of perturbation. The number of interactions is standardized by the pre-perturbation level. The number of interactions remaining decreases very slowly as the magnitude of perturbation is increased, but declines rapidly and nonlinearly past a certain point. Black - *Eodicynodon* zone communities, blue - *Dicynodon* zone communities, and red - *Lystrosaurus* zone communities.



ESM figure 4. Contour plots of changes in total guild interaction strength with increasing perturbation. Three consumer guilds are represented: left column - small tetrapod carnivores/insectivores, middle column - medium-sized tetrapod carnivores and right column - omnivorous insects. (**a-c**) *Eodicynodon* zone communities, (**d-f**) *Dicynodon* zone communities, and (**g-i**) *Lystrosaurus* zone communities. Shading represents interaction strength standardized to initial interaction strength. Interaction strength increases toward the white (standardized strength of 1) end of the spectrum, and declines toward the black (standardized strength of 0) end. Perturbation magnitude (x-axis) is measured here according to productivity levels unique to each community, and hence differs among zones, while the y-axis shows the number of interactions of species within the guilds. These data are derived from simulations run with guild link distributions of $\gamma = 1.5$ (see text).