



Ecological economics & sustainability

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Abstract:

Natural ecosystems provide network models for human waste disposal where detritivores & other decomposers keep the habitat clean & provide much needed nutrients to photosynthetic organisms. In return the decomposer receives the energy & nutrients sequestered in dung, carcasses or phytal debris. This is done by accessing a range of biosynthetic pathways that can utilise biological waste as a primary feedstock. These pathways may involve oxidation or fermentation. Different decomposers have different specializations. Examples might be brown rot fungi eating wood cellulose & white rot fungi eating the lignins also from wood. Photosynthesis, respiration & decomposition can be observed in the model environment of a small glass ecosphere, containing shrimps, algae & bacteria rich sediment, which when set by a window, can be (with some difficulty) maintained to be indefinitely sustainable. In the ecosphere the Calvin (photosynthetic), Krebs (respiratory), & the fermentation cycles can be inferred to be in balance - if the shrimps live, & their tiny, holistic, microenvironment has enough light. ATP is the common currency that links all 3 major biosynthetic pathways. Even marine animals that contain chloroplasts operate similarly. The idea of an alternative energy currency can be transferred to human economic systems. The pairing of urban & rural municipalities using an alternative energy currency or Joule - based credit card system is proposed here. Electrical energy from solar panels, wind turbines & particularly, waste to energy, is directed to microgrids linking homes & businesses with agricultural areas generating food, to create a sustainable economic system in effect a "superorganism" that feeds off the waste of the current system to create a parallel economy, using an alternative energy dollar that can be used for the goods & services created from waste recovery, recycling, remanufacturing etc. This alternative energy dollar would need strict regulation to prevent it impairing the present



economic system which appears to lack specie, though originally linked to petroleum; the "petrodollar". By using an alternative energy dollar (or linking the existing dollar to progressive amounts of alternative energy), the fossil carbon emissions problem might be solved. However, I believe new, local, currencies would be more effective in solving the waste problem, though the dichotomy between a parallel & a circular economy & their impact on one another is not fully resolved. Computer modelling is required as well as practical "real world experiments".

Publication of speakers:

1. Gilles Bernot, Jean-Paul Comet, Adrien Richarda, et al: Application of formal methods to biological regulatory networks: extending Thomas' asynchronous logical approach with temporal logic. August 2004. 10.1016/j.jtbi.2004.04.003
2. Adrien Richard, Jean-Paul Comet, (2007): Necessary conditions for multistationarity in discrete dynamical systems. 10.1016/j.dam.2007.04.019
3. J.P Comet, J. C Aude, E Glémet, et al: Significance of Z-value statistics of Smith-Waterman scores for protein alignments. June 1999 : 10.1016/S0097-8485(99)00008-X
4. Ahmad J., Bernot G, Comet J.-P, et al: Hybrid Modelling and Dynamical Analysis of Gene Regulatory Networks with Delays. 10.1159/000110010

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