1-15 Poster

NEW PARADIGMS FOR MODELING LONG TERM EVOLUTION AND ADAPTATIONS IN VARYING SELECTION REGIMES: THE ELUSIVE CONCEPTS OF EQUIBLIBRIUM AND OPTIMALITY

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A genetic model of varying selection regimes:

1. Selection during a sequence of different conditions in different generations changes the frequency or expression of the selected alleles according to the geometric mean of their weighted mean fitness in each generation.
2. The realized sequence of conditions during any particular period defines therefore a retrospective conditionally optimal set of alleles or traits which would have maximized the geometric mean fitness only during this particular period.
3. A consistent definition of genetic equilibrium, optimality, or optimal strategies, cannot be defined therefore for evolution in all naturally varying selection conditions.
4. Genetic adaptations for rare extreme events cannot be maintained therefore during the long intervening intervals because of degradation by mutations and by negatively correlated selection on other traits.
5. The concepts of equilibrium, optimality, optimal strategies, or strategy equilibrium, as used in population genetics models, can only be applied therefore for specific particular sequences, and cannot be used for defining and modeling dynamic evolutionary processes in varying selection regimes.
6. Existing species or lineages represent therefore the combined long term cumulative effects of retrospective multi level selection within populations, of differential extinction and reproduction of groups within populations, of competing species, and of higher level lineages, during the previous long term sequences of conditions.
7. New paradigms are suggested for modeling the long term evolutionary and ecological dynamics of interacting multi genes and multi traits, in multi species ecological communities.