



## Dynamic Mutation Selection Balance as an Evolutionary Attractor



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### ABSTRACT:

The vast majority of mutations are deleterious, and are eliminated by purifying selection. Yet in finite asexual populations, purifying selection cannot completely prevent the accumulation of deleterious mutations due to Muller's ratchet and can lead to a rapid degradation of population fitness. Evidently, the long term stability of an asexual population requires an in flux of beneficial mutations and any stable evolutionary state of a population in a static environment must involve a dynamic mutation-selection balance, where accumulation of deleterious mutations is on average offset by the in flux of beneficial mutations. We find that a surprisingly low fraction of beneficial mutations suffices to achieve stability, even in small populations in the face of high mutation rates and weak selection.

This may explain the maintenance of mitochondria and other asexual genomes.

Host: Tom Chou, Ph.D.

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