FITNESS TRADEOFFS BETWEEN SPORES AND NON-AGGREGATING CELLS CAN EXPLAIN THE COEXISTENCE OF DIVERSE GENOTYPES IN CELLULAR SLIME MOLDS

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The emergence of multicellularity was one of the major transitions in the early evolution of life on earth. Particularly intriguing are those cases where genetically heterogeneous complexes may be formed, among which cellular slime molds are a paradigmatic example. In the absence of food, single cells aggregate into a non-necessarily clonal multicellular fruiting body, where they differentiate into dead stalk cells and reproductive spores. Such division of labor promotes a strong selection to be represented in the reproductive spores and should lead to a reduction in the genotypic diversity, which is inconsistent with the great diversity found in nature. However, not all cells aggregate into the fruiting body and we suggest that these non-aggregating cells provide an additional fitness component that can resolve this inconsistency in two ways. First, apparent reproductive skew in the spores of chimeric (heterogeneous) fruiting bodies could simply be the result of different investments into spores versus non-aggregators induced by different environmental conditions; and second, in an ecosystem with multiple local environments coupled via weak-to-moderate dispersal, coexistence of multiple genotypes can occur.

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