

Do single season frequency changes predict multi-season outcome for a mixed species *Candida* community?

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Microbes rarely live in single species populations, rather they are usually found in multi-species communities whose composition and evolution are dependent on environmental conditions such as nutrient levels, antimicrobials and disturbances. Predicting ecological and evolutionary outcome due to environmental alterations is important for controlling microbes, for example it is crucial in the success of disease treatment protocols. Experimentally, changes in the frequency of a species in a mixed population over a single season are commonly used to infer whether it will outcompete, be outcompeted or will coexist with another species in the long-term. To test the feasibility of this approach we consider a human pathogenic community of two *Candida* species competing for a single limiting resource in the presence of an antifungal drug. We compare single season competition outcomes to those of a multi- season experiment and find that, in the absence of an antifungal, they agree. However, when an antifungal drug is added into the environment, our single season outcomes are critically dependent on the degree of organism acclimatisation to the test conditions. Additionally, the multi-season dynamics are influenced by a microbial stress response not seen over a single season in the antifungal. These features have an impact on the predictive power of the single-season experiments to infer long-term competition outcomes.