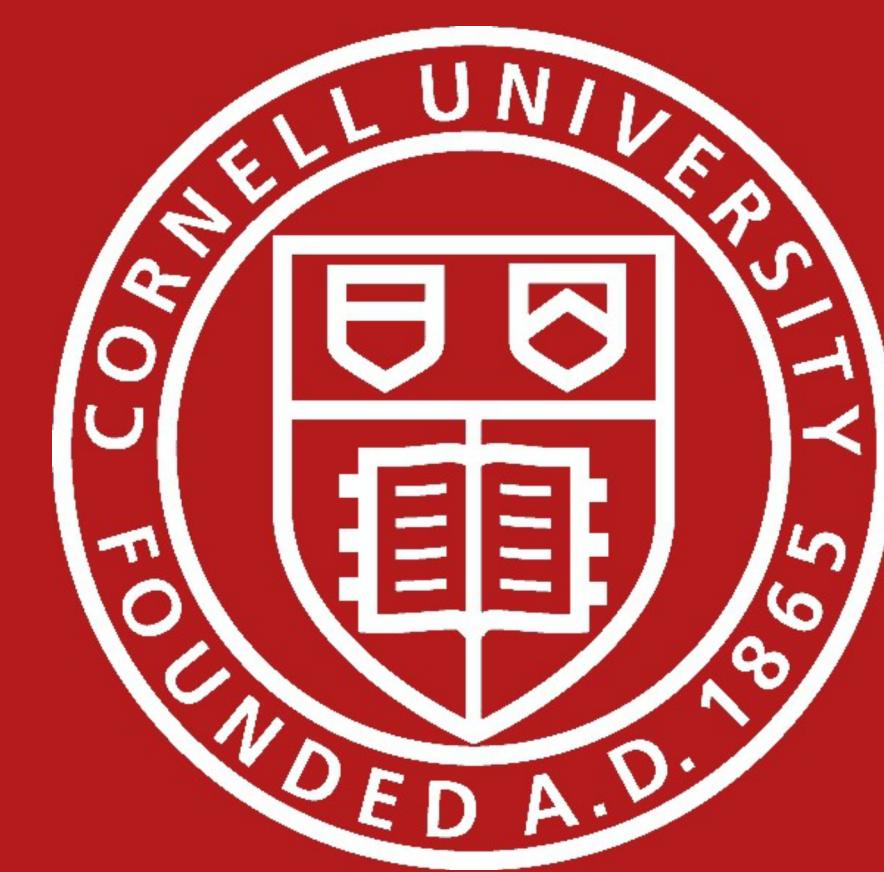


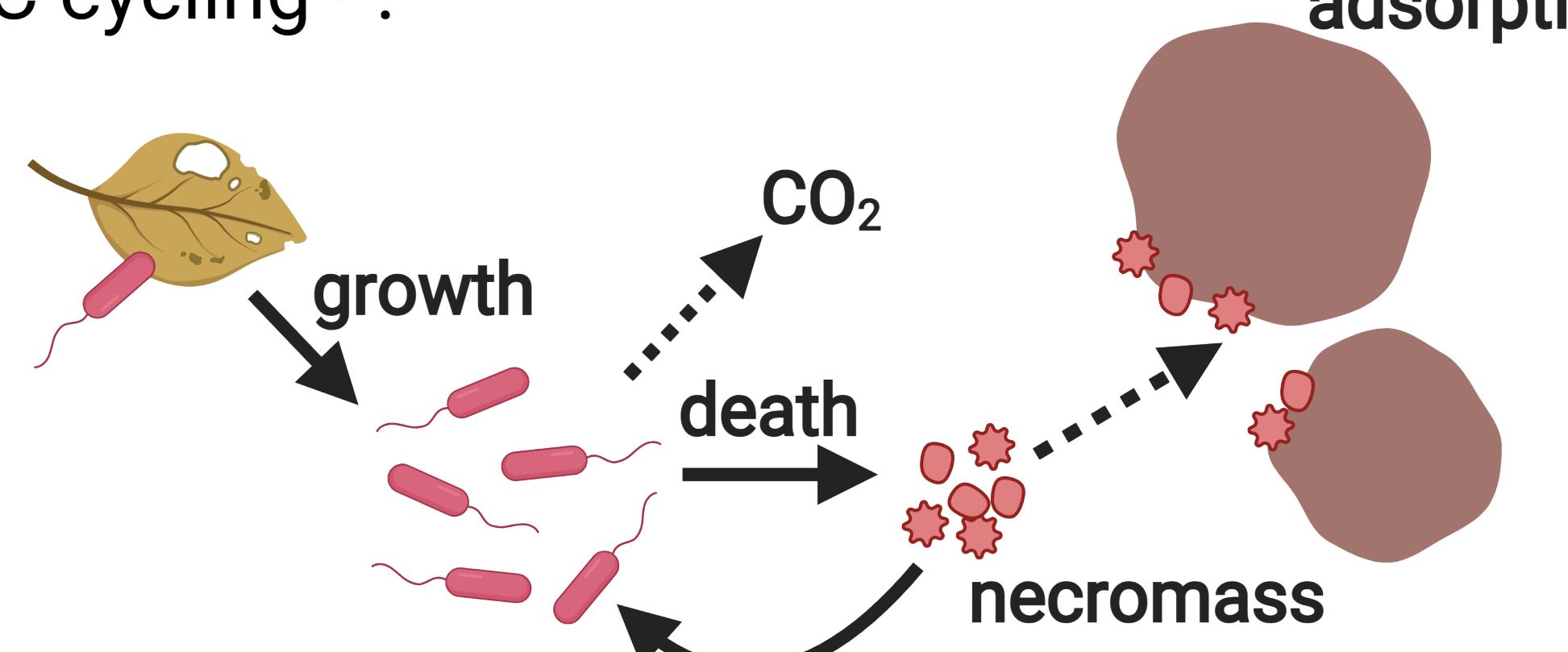
Population dynamics of soil bacterial communities during litter decomposition



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INTRODUCTION

Microbial growth and death are critical to soil C cycling^{1,2}.



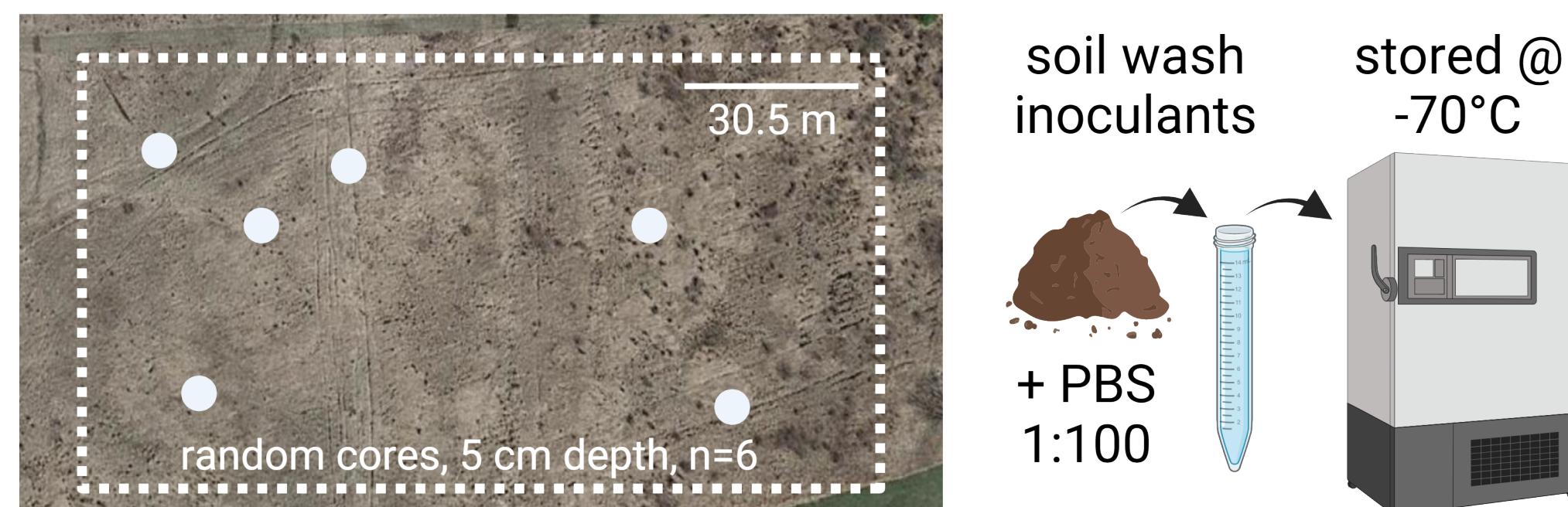
Understanding microbial growth and death dynamics can help us predict soil carbon cycling³.

Predictions:

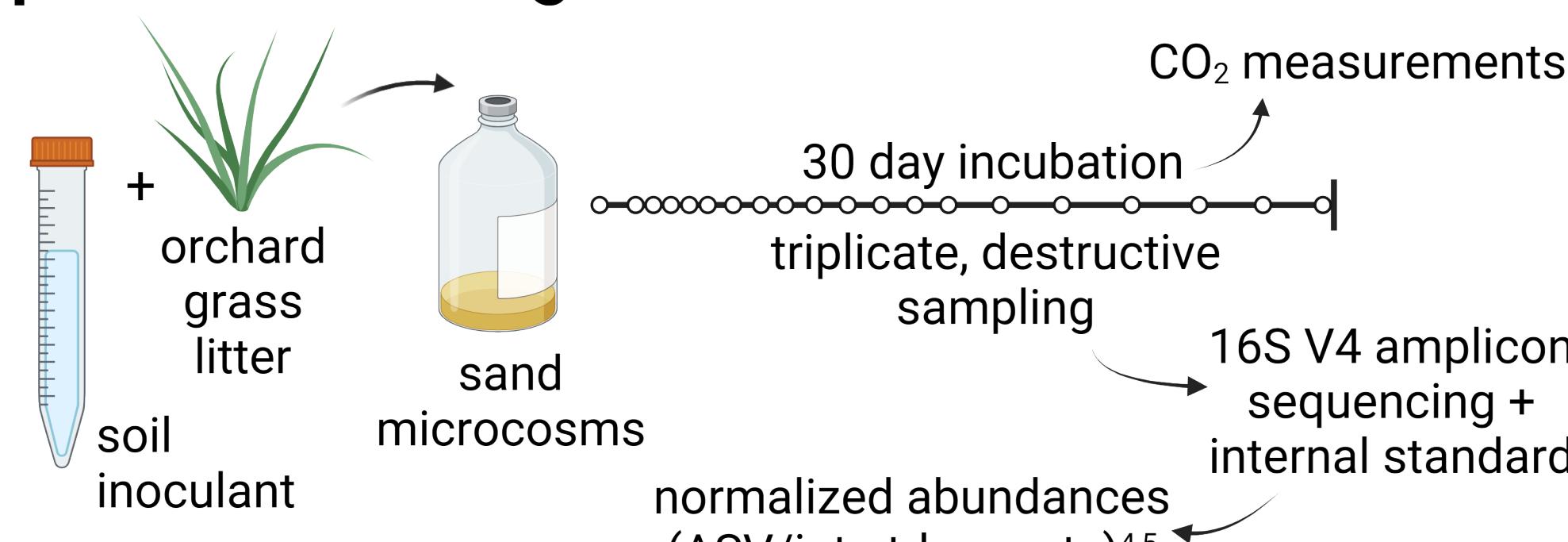
- Litter input will stimulate bacterial growth.
- Rates of growth and death and abundance changes will vary among taxa and between stages of community assembly.

METHODS

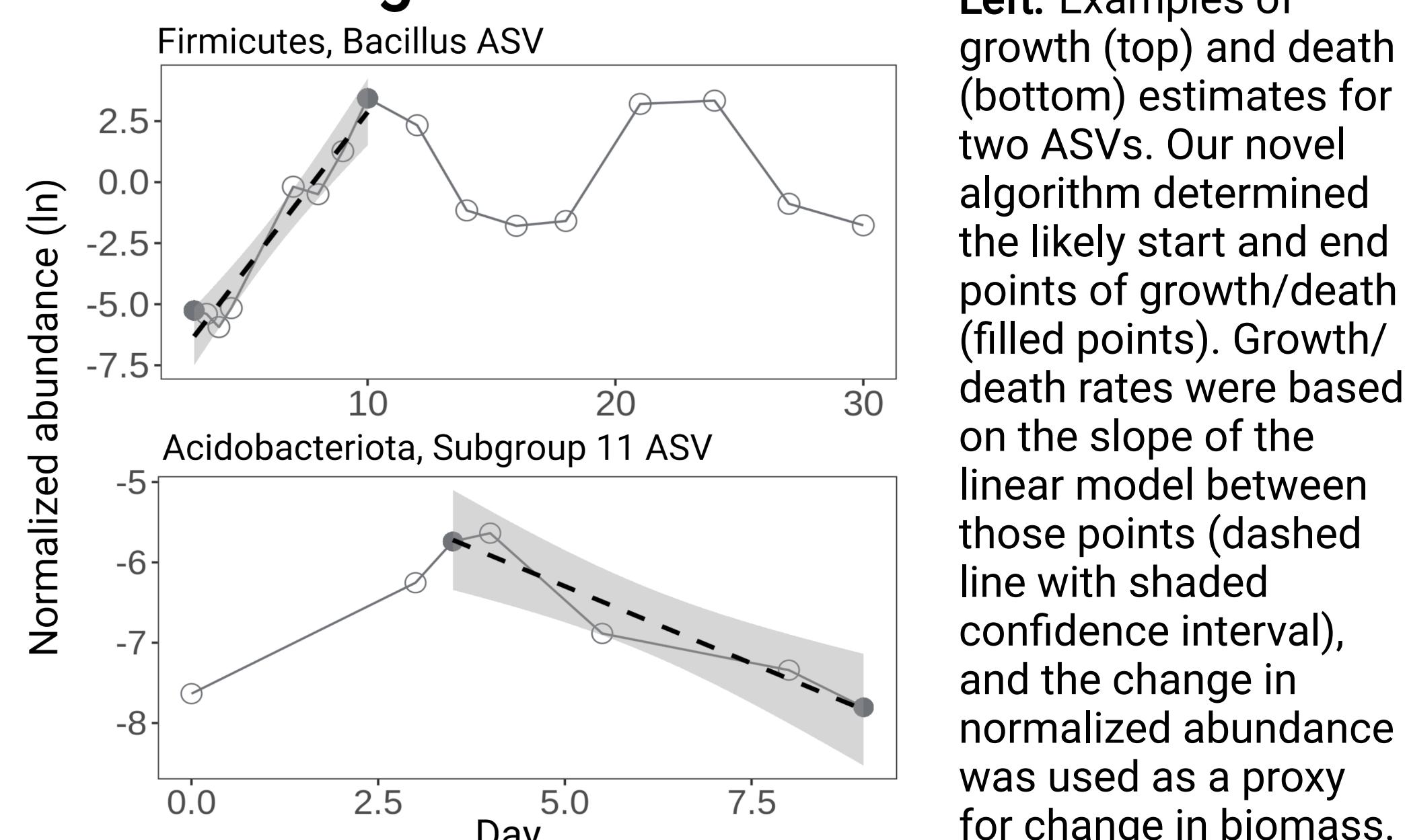
Soil sampling - meadow, Ithaca, NY



Experimental design - microcosms



Estimation - growth and death



CONCLUSIONS

Rates and abundance changes of individual ASVs during growth and death were affected by the stage of assembly during litter decomposition, indicating diverse responses to changing environmental and ecological conditions.

CO₂ respiration rates did not entirely coincide with whole community growth, indicating that individual taxon dynamics may be important drivers.

Future work: Determine if/how particular patterns of growth and death influence carbon flux during litter decomposition.

RESULTS

Figure 1. Summed normalized abundances of growing ASVs during incubation. Each point represents the average across all 6 inoculants. Day 9 (dashed line) marked a shift from exponential to stationary phase and was used as a threshold to bin ASVs based on duration of growth/death (colored bars). ASVs were categorized based on if the start/end of growth/death occurred in exponential or stationary phase. Numbers to the right indicate the average with standard deviation.

Figure 2. Example growth estimates of ASVs from each bin. Filled points indicate start and end of growth and bold dashed lines growth rate with shaded confidence interval. The vertical dashed line marks the shift from exponential to stationary phase of the whole community.

Fig. 1 - ASVs were binned based on stage of whole community assembly

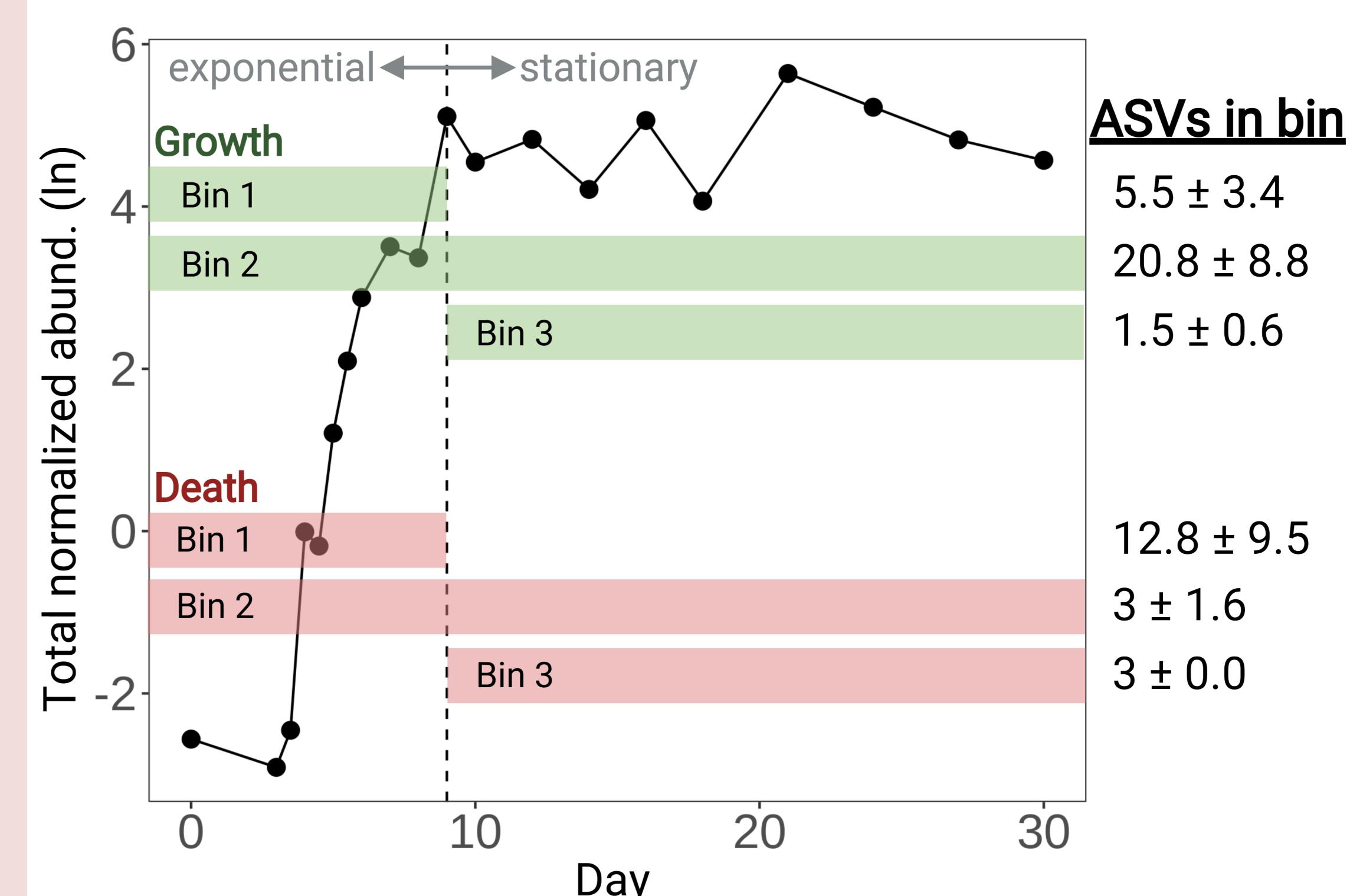


Fig. 2 - Examples of ASV growth estimates from each assembly stage bin

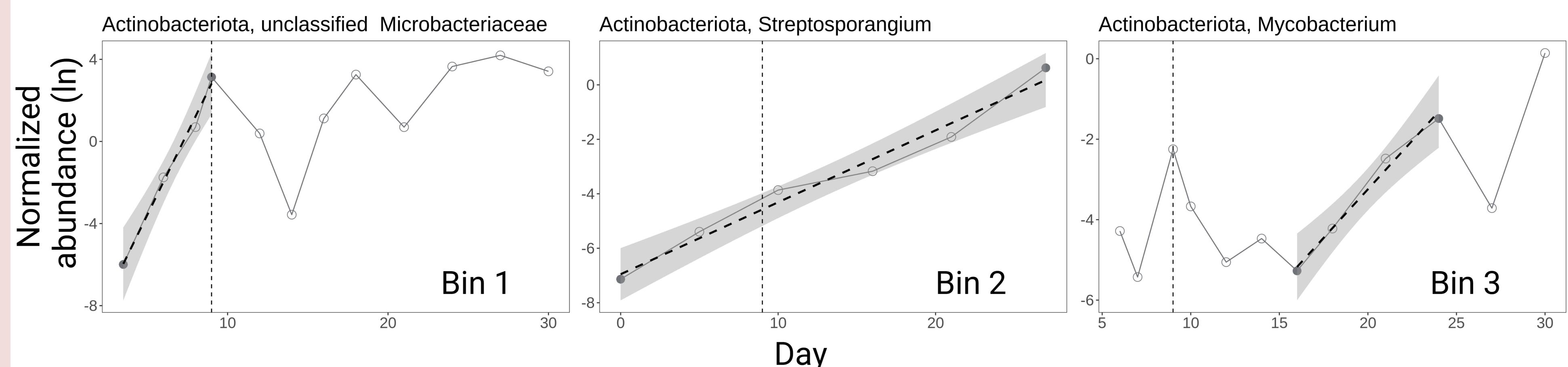


Fig. 3 - ASV growth/death rates and normalized abundance changes were affected by the assembly stages during which growth/death occurred

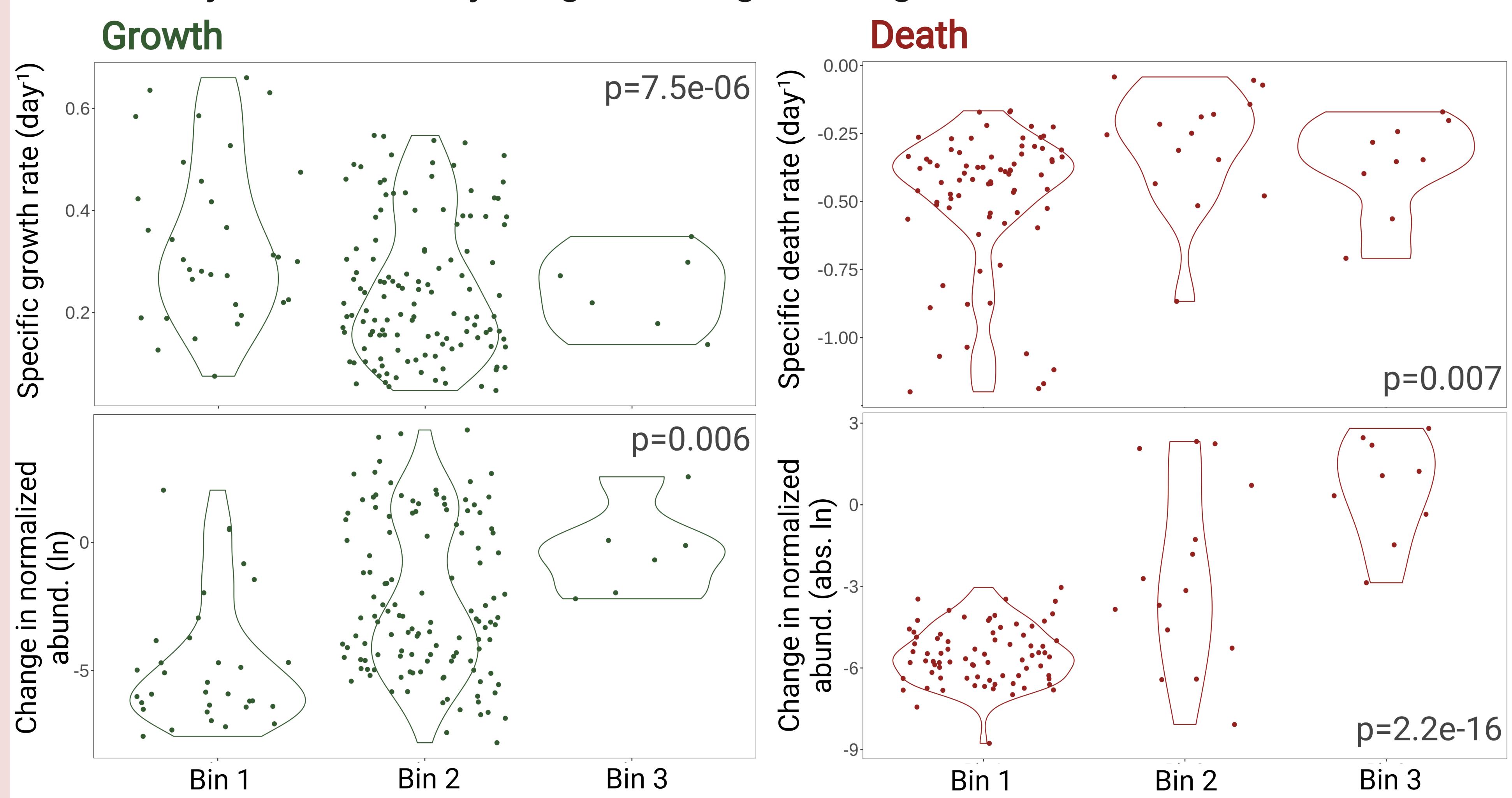


Fig. 4 - CO₂ respiration rates peaked before total community abundance peaked

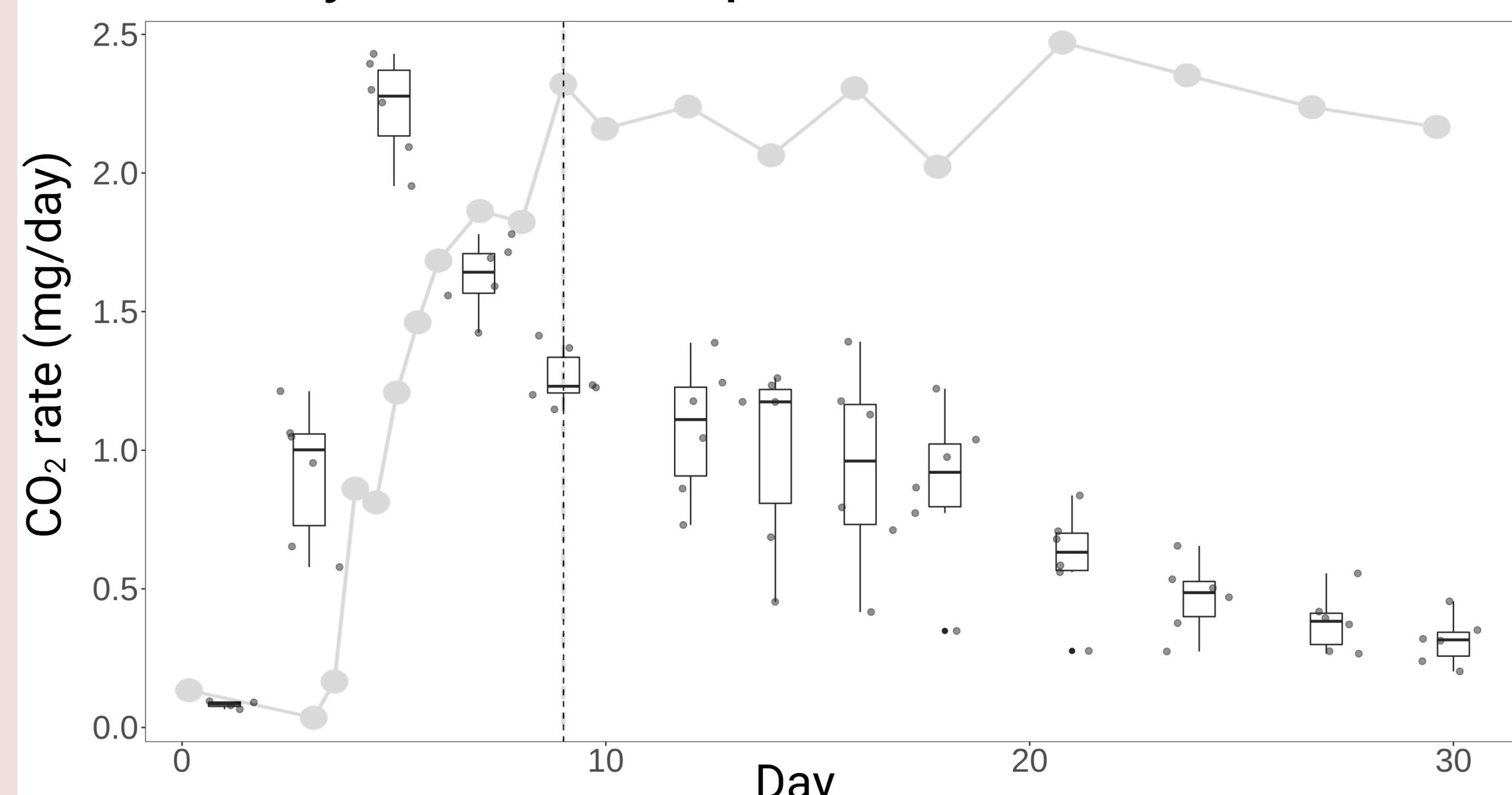


Figure 3. Violin plots showing growth and death metrics of individual ASVs (points) based on bin (see Fig. 1). P-values were generated via linear mixed effects models.

Figure 4. Boxplots showing CO₂ respiration rates for each inoculant. Each point represents the averaged rate of respiration for a soil inoculant (n=3). Faded and overlaid on top of this is the averaged total normalized abundances at each time point from Fig. 1, with the dashed vertical line indicating the shift from exponential to stationary community growth.