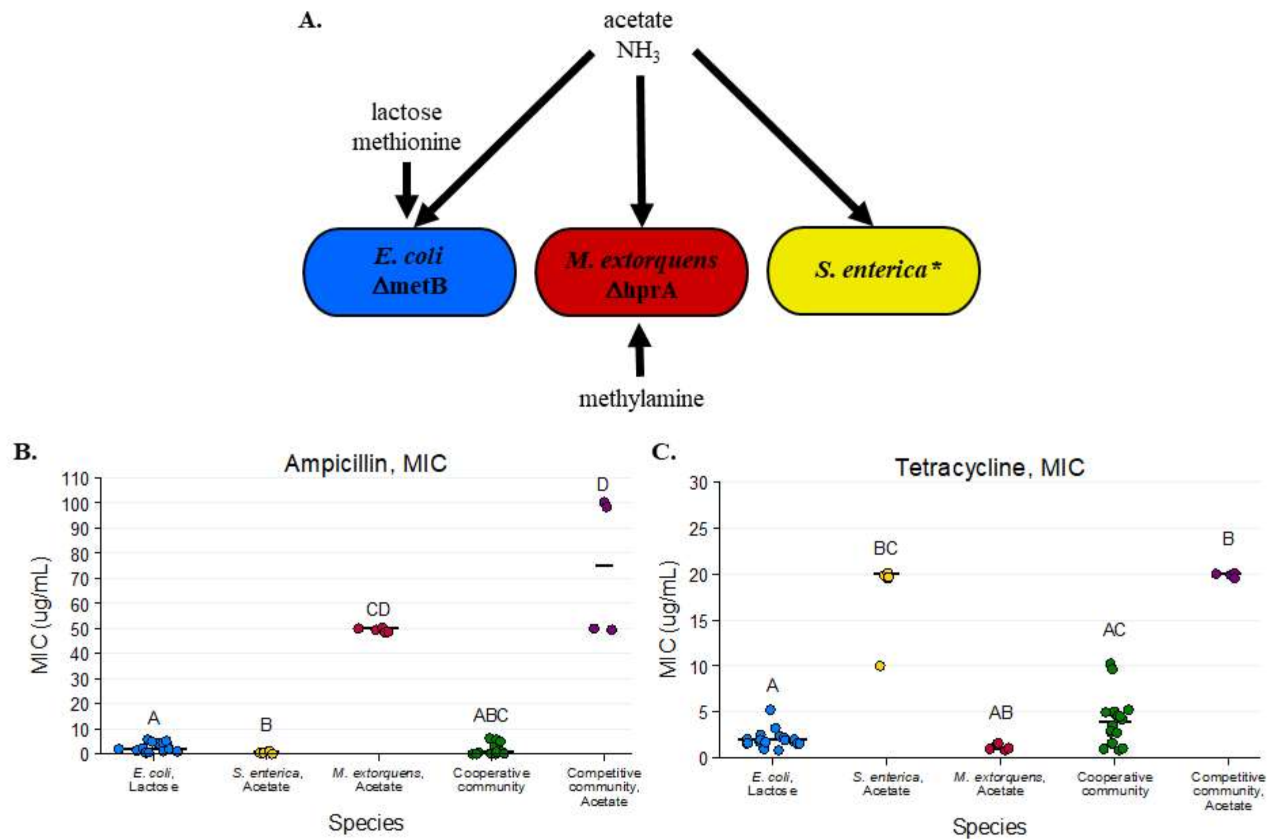
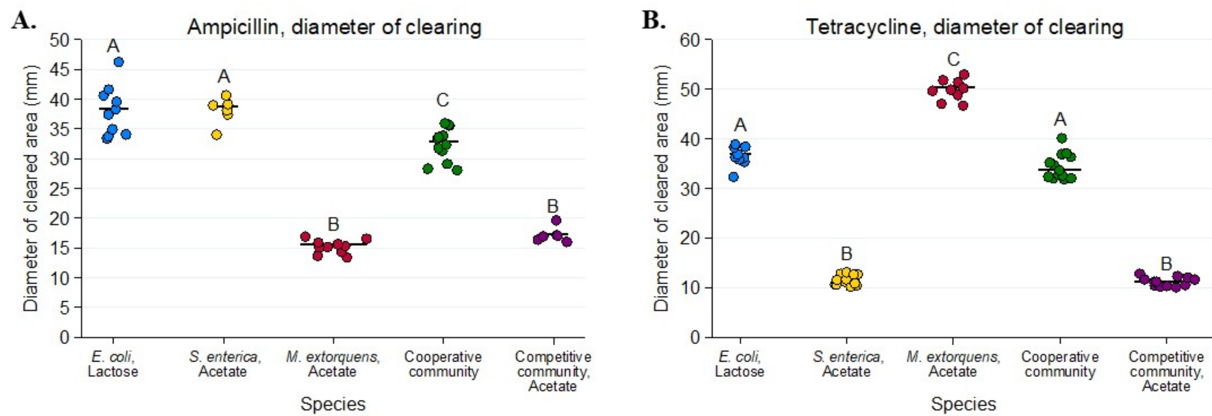
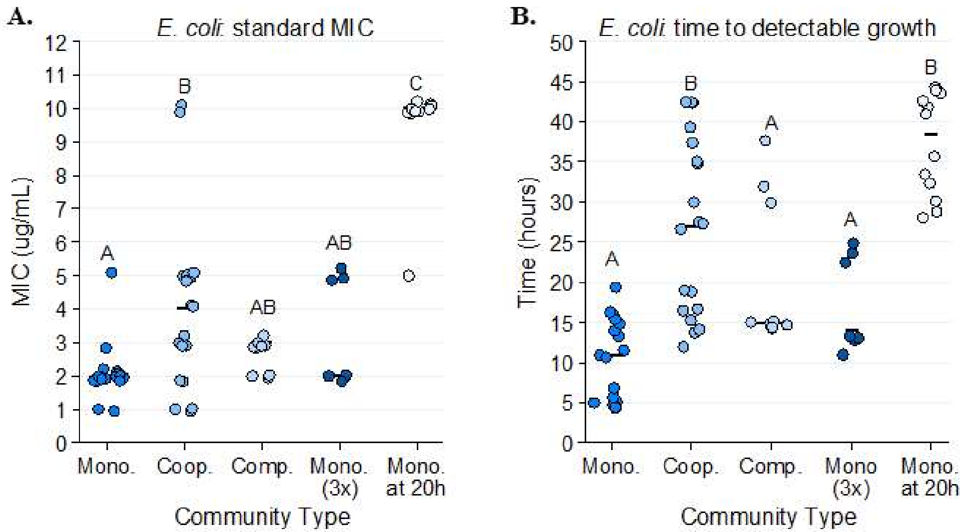


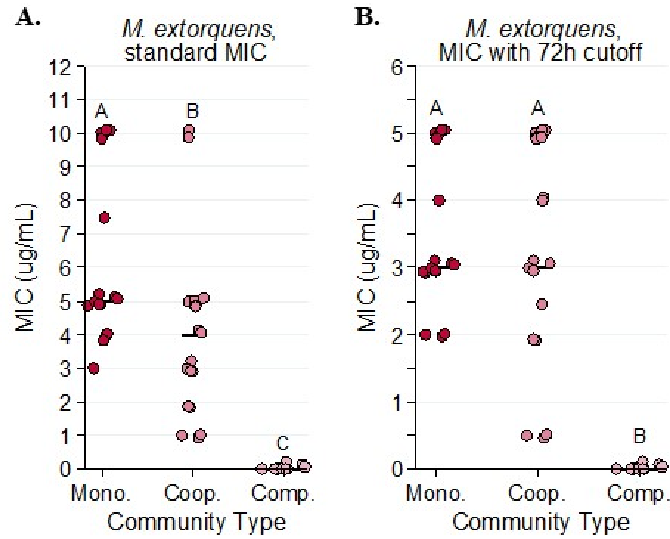
Supplementary figure 1. Acetate as the sole carbon source for *M. extorquens* and *S. enterica* in monoculture and competitive community. **A.** Competitively grown three-species community. Growth medium contains all metabolites necessary for the growth of each individual species, with the carbon sources provided matching that of the carbon sources available to each species in cooperative community via cross-feeding. Minimum inhibitory concentrations (MICs) in for ampicillin (**B.**) and tetracycline (**C.**) were calculated as previously described. At least four replicates were performed for each community type. Matching letters represent statistical non-significance in medians between groups.



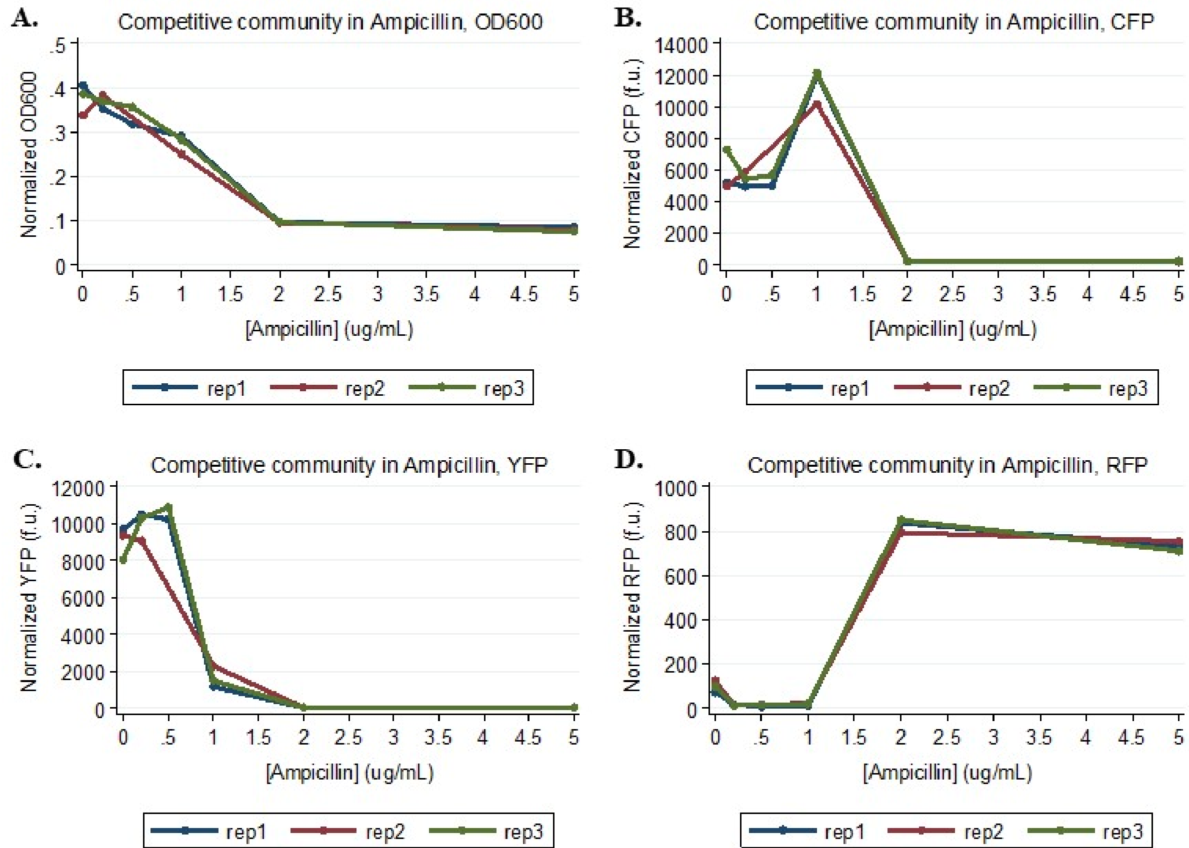
Supplementary figure 2. Acetate as the sole carbon source for *M. extorquens* and *S. enterica* in monoculture and competitive community on solid medium. Disc diffusion experiments using ampicillin (**A.**) and tetracycline (**B.**) were performed and analyzed as previously described. At least six replicates were performed for each community type. Matching letters represent statistical non-significance in medians between groups.



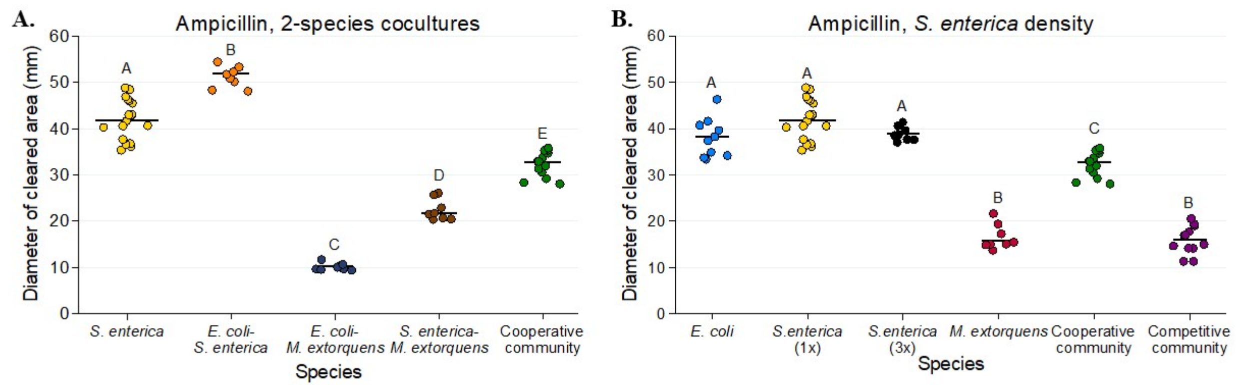
Supplementary figure 3. **A.** Minimum inhibitory concentrations (MICs) of tetracycline for *E. coli* in different growth conditions. MIC was calculated as previously described. 3x mono is monoculture *E. coli* at three times the starting density of conventional monocultures. Mono. at 20h is monoculture *E. coli* added to plate 20 hours post-experiment start. **B.** Time to detectable growth of *E. coli* in monoculture, cooperative community, and competitive community. Cyan fluorescent protein (CFP) was used to monitor the growth of *E. coli.* Time to detectable growth was recorded as the first time point in which CFP above background levels was detected. Pairwise MIC comparisons were performed using a Mann-Whitney U test with Bonferroni adjustment for ten multiple comparisons. Shared letters represent nonsignificant differences between groups.



Supplementary figure 4. Minimum inhibitory concentration of *M. extorquens* in tetracycline. Red fluorescent protein (RFP) was used to monitor the growth of *M. extorquens* in monoculture, cooperative community, and competitive community in a Tecan plate reader. **A.** MIC is defined as the lowest concentration of tetracycline which inhibits *M. extorquens* growth within three times the lag time of the antibiotic-free control. **B.** MIC is defined as the lowest concentration of tetracycline with inhibits growth within three times the lag time of the antibiotic-free control, or by 72 hours of growth, whichever comes first. Pairwise MIC comparisons were performed using a Mann-Whitney U test with Bonferroni adjustment for three multiple comparisons. Shared letters represent nonsignificant differences between groups.

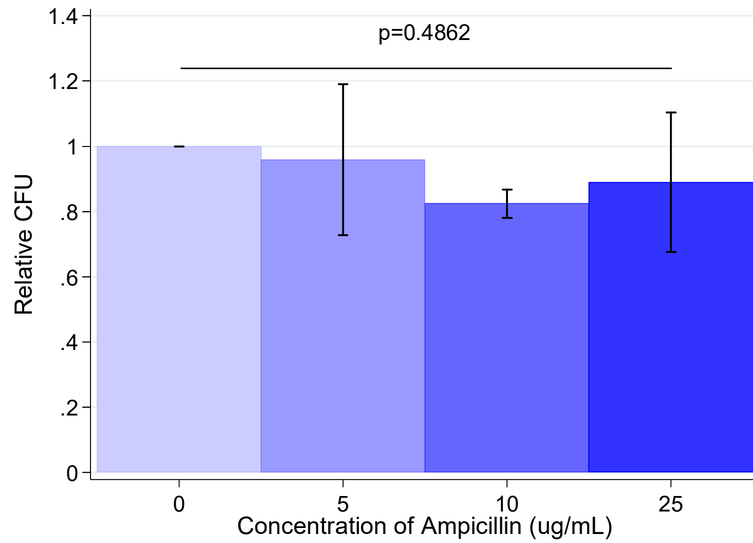


Supplementary figure 5. Competitive release of *M. extorquens* at high ampicillin concentrations in competitively grown community. Species were grown in competitive medium at a range of antibiotic concentrations for 72 hours. A plate reader was then used to measure OD600 of the entire community and fluorescent markers corresponding to individual species. Normalized OD600 (**A**), cyan fluorescent protein to detect *E. coli* (**B**), yellow fluorescent protein to detect *S. enterica* (**C**), and red fluorescent protein to detect *M. extorquens* (**D**) were calculated by subtracting blank values from cell-free medium for each.



Supplementary figure 6. Mechanism of *S. enterica* and *E.* coli protection in cooperative community. **A.** Increasing the density of *S. enterica* to match the total cell in the cooperative and competitive communities (3x *S. enterica*) does not decrease the diameter of the zone of clearing, indicating that some other factor than density is protecting *S. enterica* in community. **B.** Cooperative co-cultures demonstrate that the presence of *M. extorquens* decreases the diameter of the zone of clearing in co-cultures with *E. coli* and *S. enterica*.

Supplementary figure 7. Nitrocefin disc assay for *M. extorquens*. Nitrocefin discs were used to determine if *M. extorquens* was producing a β-lactamase (indicated by a color change from yellow to red/pink). *E. coli* containing the plasmid pBR322 was used as a control; pBR322 contains a *bla* selectable marker encoding a β-lactamase. **A.** *M. extorquens* grown in liquid medium **B.** *M. extorquens* grown on solid medium **C.** *E. coli* with pBR322 on solid medium **D.** *E. coli* with pBR322 in liquid medium. For liquid cultures, 15uL of liquid medium containing cells was pipetted onto the disc and left at room temperature for 15 minutes. For solid cultures, colonies were scraped off plates and dissolved in liquid medium, and 15uL was pipetted onto the discs. All cells were grown in the presence of 50ug/mL ampicillin.



Supplementary Figure 8. *Pseudomonas aeruginosa* PA14 growth alone on mucin across a range of ampicillin concentrations. Colony-forming units (CFU) of PA14 grown alone on glucose verses in co-culture with fermenter community on mucin. Normalized CFP values were calculated by dividing CFU obtained by plating each concertation of ampicillin on Luria Broth agar by the CFU at 0ug/mL ampicillin. Each point represents the mean and standard deviation of triplicate samples. P-values were calculated using a Kruskal-Wallis test across ampicillin concentrations.