The first thing I want to consider is a comparison of two methods of simulating a GEM. The first is the classic GEM, which chooses an individual at random, uses a Monte Carlo algorithm to determine what happens to it based on the individual's traits, and then advances time a random amount based on the total rate of events for that individual. The second method modifies the algorithm by creating the "wheel of fortune" using the rates for every individual in the population, and then using the Monte Carlo algorithm to choose both an individual and an event from a single "spin" of the wheel. Obviously, time will advance much more slowly in the second model because the timestep is chosen using the code exp(-1/sum(events))/sum(events): since the second method sums across all events (births and deaths) for every individual in the population, the denominator is a very large number in the second method.

Fig. 1 shows the population and trait dynamics for the original GEM method with increasing carrying capacity (the different columns) and initial conditions of $N(0) = 5$, mean trait of 1.8, trait CV of 0.3, and heritability of 0.75.

Fig. 2 shows the same

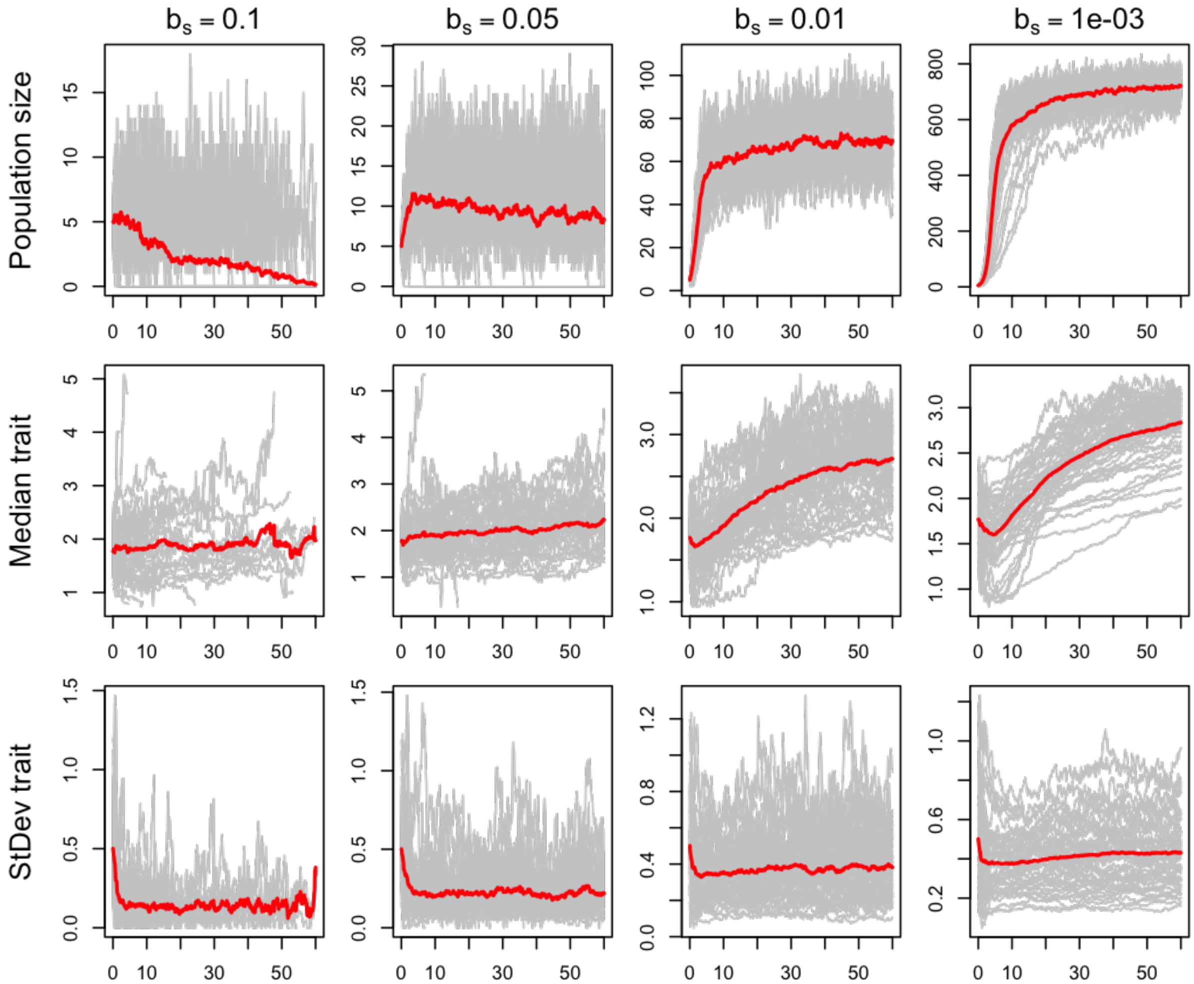

FIGURE 1. Population and trait dynamics for the original GEM.

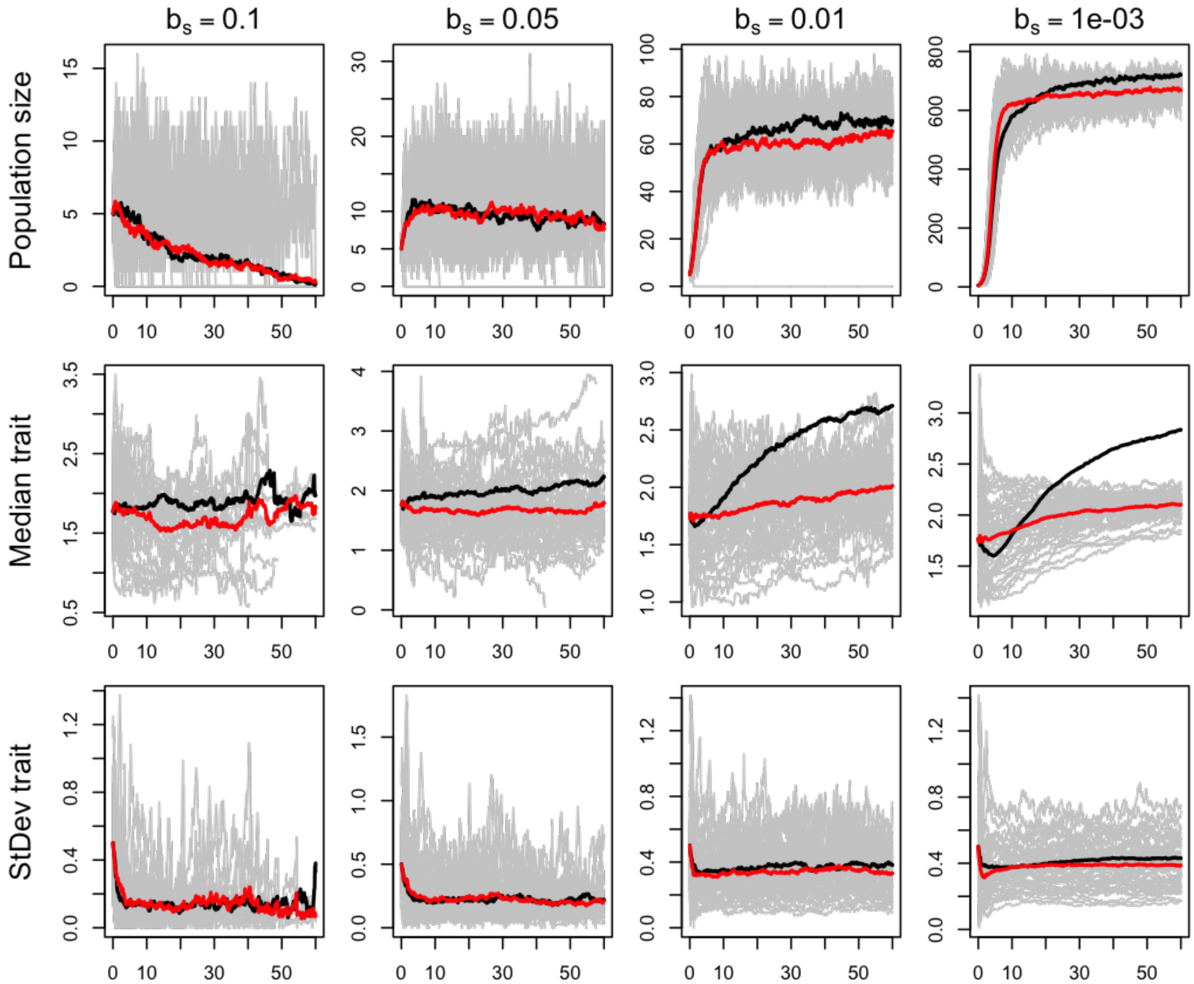

FIGURE 2. Population and trait dynamics for the many-slice GEM. The black line shows the mean dynamics from the original GEM simulations above.