

Population Growth Questions

Below are some practice questions so that you can gain experience using the concepts and equations I talked about in the Population Growth lecture. These questions are for your own practice so do not hand them; they will not be graded. However, I would strongly urge you to take the time to work through these questions. An answer key is posted on the Bio 270 web site next week. These questions are straight forward so make every attempt to solve them before going to the answer key. If you have questions or problems, please call or e-mail me so we can book a time to discuss your difficulties.

1. Distinguish between exponential and logistic population growth. Give the equations for each.
2. What is carrying capacity? Why do populations fluctuate around some estimated value of K ?
3. As of 1995, the human population was expected to double within 50 years. Calculate r for the human population.
4. If the human population size in 1993 was 5.4 billion, what was the projected population size in the year 2000 (use info from previous question)?
5. A population of *Nicotiana*, an annual plant, increases by 12% every year. Calculate the doubling time for this population.
6. In your research on population dynamics of June beetles, you estimate that the population size is 3,000. Over the course of a month, you record 400 births and 150 deaths in the population. Estimate r and calculate what the population size is predicted to be in 6 months.
7. A population of Spotted Fritillary butterflies exhibits logistic growth. If the carrying capacity is 500 butterflies and $r = 0.1$ individuals/(individuals x month), what is the maximum population growth rate for the population? (Hint: maximum population growth rate occurs when $N = K/2$).
8. What are the effects of environmental and demographic stochasticity on population growth?
9. A sample of single celled marine algae from the Giant Stairs site provided an estimate of 100,000 cells on the initial sampling date. Ten days later, the population size was estimated to be 500,000 cells. Calculate the intrinsic rate of increase (r) for the population.
10. For the algal population described in question 9 above, use the exponential model of population growth to predict the size of the population after another 10 days.