30. Population Growth and Regulation *(Chapter 51, 52)*

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I. Introduction to Ecology *(1193-1195, 1222-1225)*

# A. Definition

-Ecology is the study of all the relationships between organisms and their environments

-Abiotic (physical)

-Biotic (other organisms)

B. Four Perspectives on Ecology

-Biossphere:

-Ecosystems

-ecological communities and environment

-Community Enology

-Groups of populations that live together

-Have emergent properties that individual properties do not have

-Population Ecology

-Interactions between populations/interbreeding

-Physiological Ecology

C. Central Questions in Ecology

-What limits the sizes and geographical distribution of species?

-Why are there so many species and how are they organized into communities?

-How do human activities disrupt…

-How do we preserve what’s left

II. Unlimited Population Growth *(1232-2333)*

A. Reproduction

B. Geometric Population Growth

1. Simplest case: bacterial division

2. Graphical representation

3. Mathematical representation

C. Exponential Population Growth

1. Births and deaths

2. Per capita birth and death rates

D. Examples from Human Population Studies

E. Per Capita Growth Rate (*r*) as a Population Characteristic

1. Variations in *r*

2. The intrinsic rate of increase (*r*max)

F. Effects of r on N

III. Limited Population Growth *(1234-1240)*

A. Resource Limitation

1. Resources that can be depleted

2. Crowding

B. Density‑Dependent Responses

C. Logistic Population Growth

1. Sigmoid (= logistic) growth curve

2. Carrying capacity and population regulation

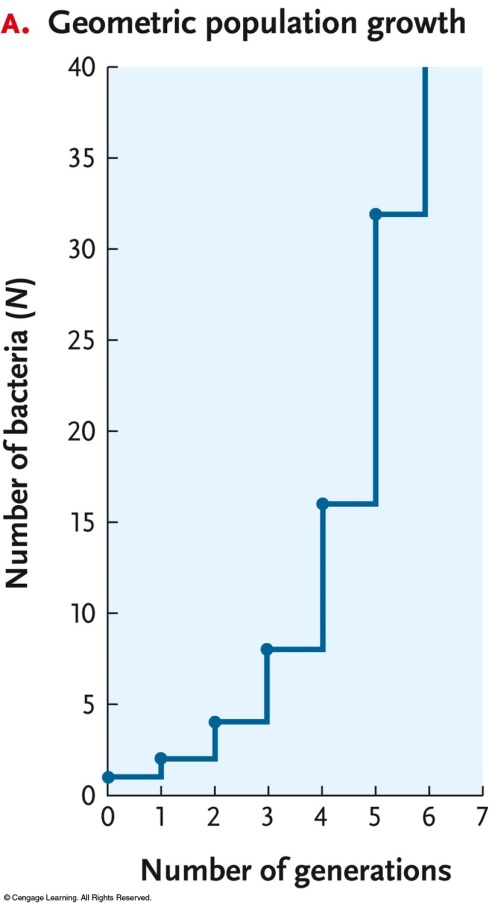
3. Growth of introduced populations

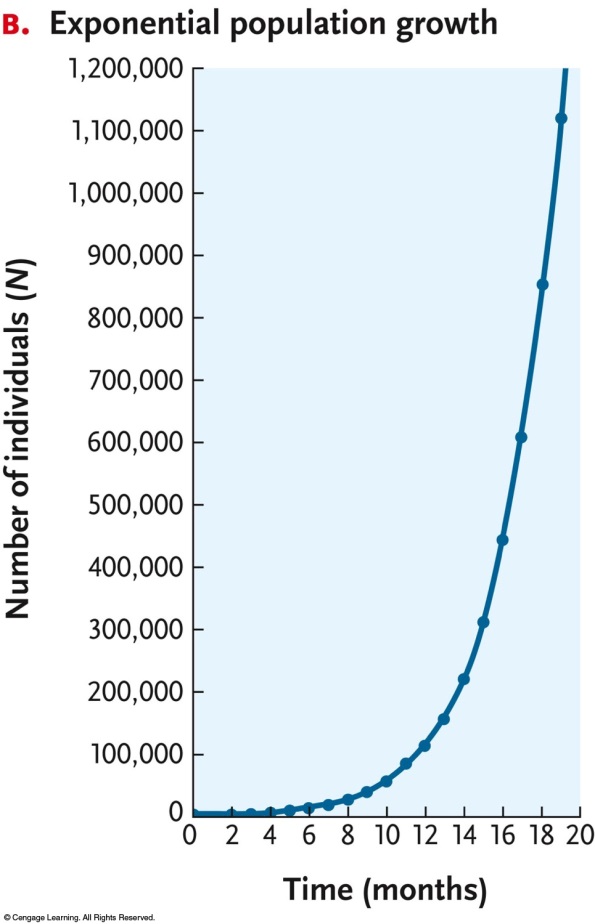
D. Interactions Causing Density‑Dependent Population Regulation

1. Predation

2. Competition

30-1





30-2

