Copy of Exam 3 for printing - Results

Exit Preview

Attempt 1 of 3

Written Feb 28, 2024 9:56 AM - Feb 28, 2024 9:56 AM

Your quiz has been submitted successfully.

Attempt Score **0 / 28 - 0 %**

Question 1

0 / 1 point

A common measure of species diversity in a community is the

- ➡ ◯ Shannon index
- ◯ Wilson index
- ◯ Lotka-Volterra ratio
- ◯ Gause value
- ◯ MacArthur number

Question 2

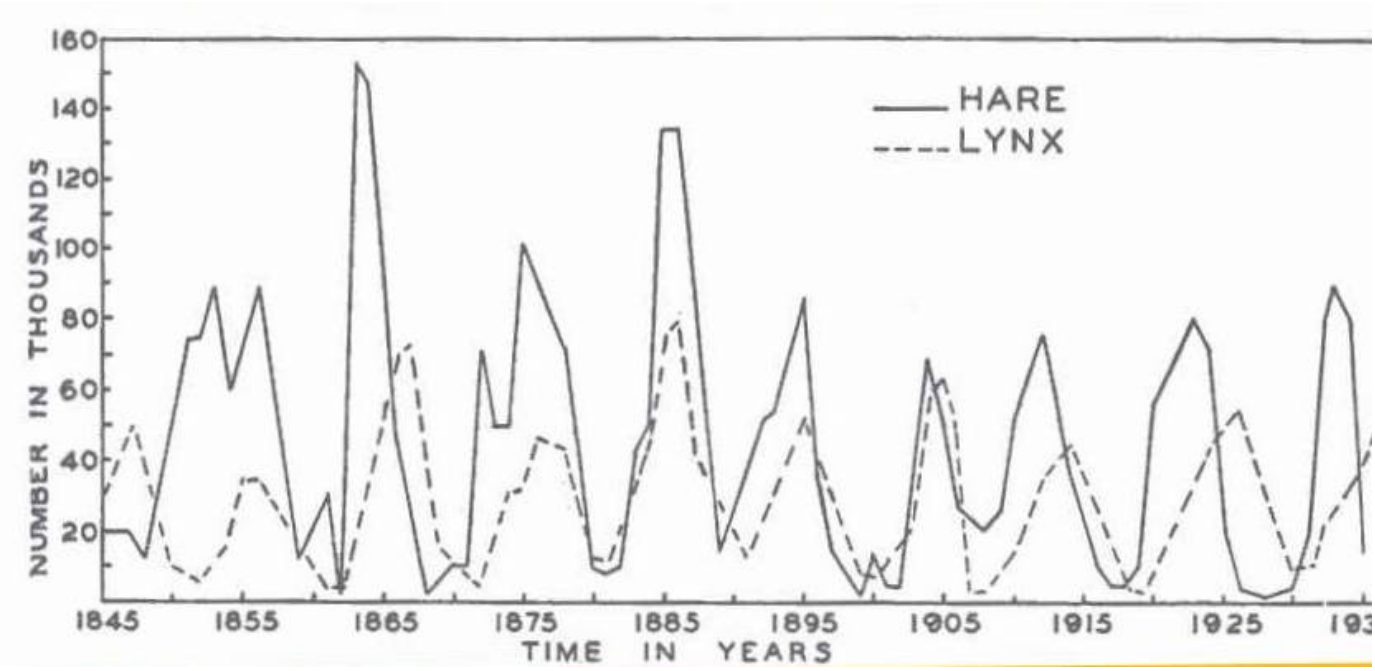
0 / 1 point

Which community has the highest species diversity?

(the numbers are the counts of each species)

- 250 250 250 250
- ➡ 200 200 200 200 200
- 333 333 333
- 1000
- 500 500

Question 3 0 / 1 point



We can model population cycles due to predator-prey dynamics using the equation

$$\frac{\Delta N}{\Delta T} = rN - aNP$$

$$\frac{\Delta P}{\Delta T} = baNP - mP$$

what is *aNP*?

- ◯ number of births of lynx
- ➡ ◯ number of deaths of hare due to lynx
- ◯ number of deaths of hare
- ◯ number of births of hare
- ◯ number of deaths of lynx

Question 4 **0 / 1 point**

$$1) \quad N_{t+1} = N_t + rN_t$$

$$2) \quad N_{t+1} = N_t + rN_t(1 - \frac{N_t}{K})$$

If we simulate population growth using equation 2 and we use the parameters

- r = 0.2
- K = 1000
- N_1 = 50

the maximum population size will be

- ◯ 200
- ◯ 500
- ◯ 10

- 1000
- 50000

Question 5 0 / 1 point

The Paradox of the Plankton asks

- how can so many ecologically similar species coexist in a community?
- why does density of prey populations and their predators cycle?
- why are there plankton blooms?
- how can primary consumers not go extinct?
- why is the world green?

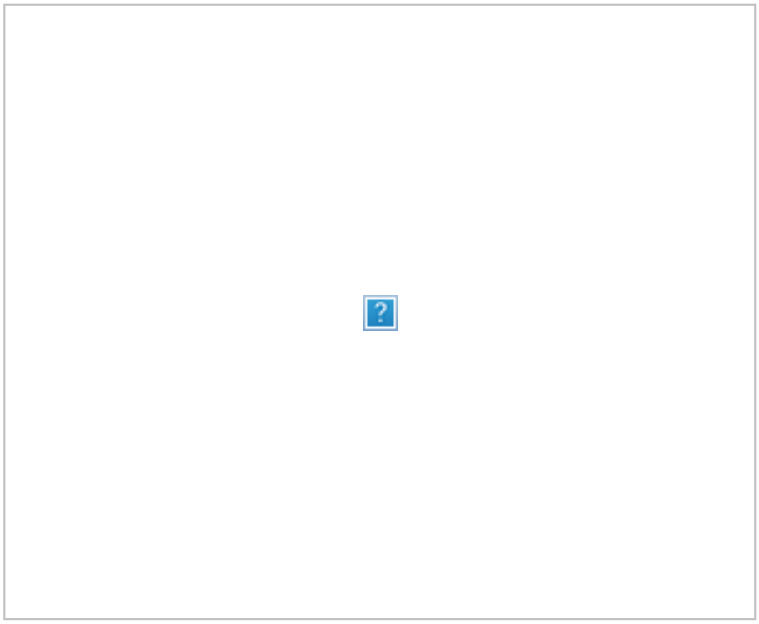
Question 6 0 / 1 point

In this image, a cleaner wrasse is feeding on ectoparasites living on mouth tissue of a pufferfish.

This relationship between the cleaner wrasse and pufferfish is a classic example of

- ➡ ◯ mutualism
- ◯ keystone species
- ◯ bottom-up control
- ◯ commensalism
- ◯ parasitism

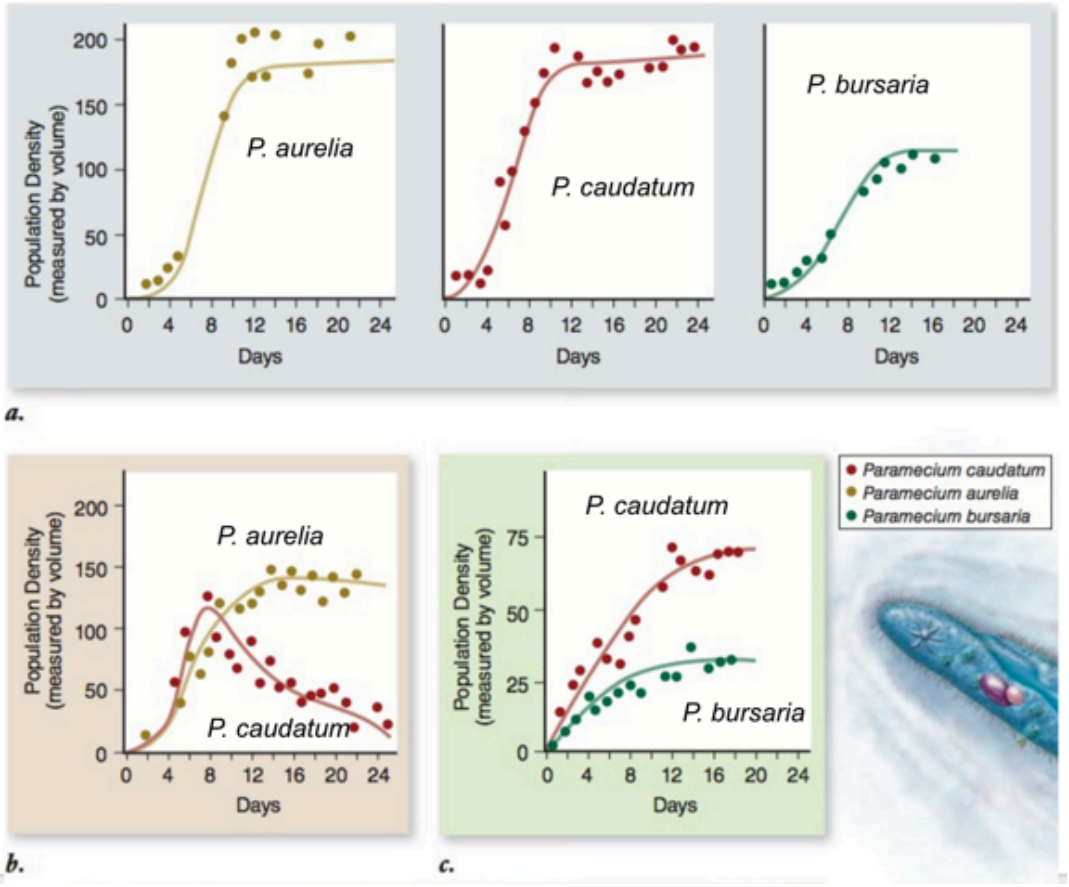
Question 7 **0 / 1 point**



The top-down control system to the right is a recent expansion of the pioneering research originally conducted by Robert Paine (video is in the trophic cascade lecture with a starfish). In the Robert Paine experiment, what was the top predator?

- sea otters
- starfish
- ➡ Bob Paine
- orcas
- echinoderms

Question 8 **0 / 1 point**



The top panel shows growth in single-species microcosms (flasks). The bottom panel shows growth in two-species microscosms.

If the pattern of growth of *P. caudatum* in panel b, when compared to the pattern in panel a, replicates, this pattern is a good example of

- logistic growth
- exponential growth
- competitive exclusion
- damped oscillation
- predator prey dynamics

Question 9 **0 / 1 point**

The Portland Museum of Art owns a beautiful landscape painting of the Presumpscot River Falls in Falmouth by Harrison Bird Brown that is remarkable because all the land is deforested for farming. Now the land is heavily forested. The changing composition of the community in these forests is an example of

- top-down control
- the consequences of global climate change
- the realized niche
- secondary production
- ➡ secondary succession

Question 10 **0 / 1 point**

Which of the following organisms is incorrectly paired with its trophic level?

- maple tree - primary producer
- mouse - secondary consumer
- soil bacteria - decomposer
- earthworm - detritivore
- ➡ eagle - primary consumer

Question 11 **0 / 1 point**

Mill Brook below

Wait for it...This is video was shot May 26, 2022 at Mill Brook in

Westbrook. The fish in this video are

- striped bass (*Morone saxatillis*)
- chain pickerel (*Esox niger*)
- brook trout (*Salvelinus fontinalis*)
- ➡ alewife (*Alosa pseudoharengus*)
- atlantic salmon (*Salmo salar*)

Question 12 **0 / 1 point**

$$H = -\sum p_i ln(p_i)$$

The equation above is the

- Lotka-Volterra competition model
- ➡ Shannon diversity index
- Evenness index
- Island equilibrium model
- Resource partitioning index

Question 13 **0 / 1 point**

The Gulf of Maine

- is highly resistant to warming because of the strengthening of the cold labrador current

- is highly resistant to warming because of the weakening of the warm gulf stream
- is warming at a faster rate than most areas of ocean around the world due increased runoff of warm freshwater
- ➡ is warming at a faster rate than most areas of ocean around the world due to a weakening, cold labrador current and northward shift of the warm gulf stream
- is warming at a faster rate than most areas of ocean around the world due increased nutrient enrichment from agriculture

Question 14 **0 / 1 point**

A caterpillar ingests a 200 J of chemical energy from a leaf. 100 J is converted to chemical energy in feces. 67 J is converted to heat due to respiration. 33 J is converted to caterpillar tissue.

How much energy is assimilated?

- 167 J
- 133 J
- 67 J
- 33 J
- ➡ 100 J

Question 15 **0 / 1 point**

Primary producers in most ecosystems

- use ingested energy and carbon from photosynthesizing organisms to maintain life

- use photosynthesis to fix CO_2 and synthesize all necessary organic compounds to maintain life
- use ingested energy from photosynthesizing organisms to synthesize all necessary organic compounds to maintain life
- use ingested energy from the ecosytem's carnivores to synthesize all necessary organic compounds to maintain life
- use ingested energy from the ecosytem's herbivores to synthesize all necessary organic compounds to maintain life

Question 16 **0 / 1 point**

$$\frac{\Delta N}{\Delta T} = rN(1 - \frac{N}{K})$$

The equation above is known as

- the Lotka-Volterra model
- the Michaelis-Menton model
- the Predator-Prey model
- the logistic growth model
- the exponential growth model

Question 17 **0 / 1 point**

HOW EFFICIENT IS ENERGY TRANSFER IN A SALT MARSH ECOSYSTEM? In a classic experiment, John Teal studied the flow of energy through the producers, consumers, and decomposers in a salt marsh. In this exercise, you will use the data from this study to calculate some measures of energy transfer between trophic levels in this ecosystem.

HOW THE STUDY WAS DONE Teal measured the amount of solar radiation entering a salt marsh in Georgia over a year. He also measured the aboveground biomass of the dominant primary producers, which were grasses, as well as the biomass of the dominant consumers, including insects, spiders, and crabs, and of the detritus that flowed out of the marsh to the surrounding coastal waters. To determine the amount of energy in each unit of biomass, he dried the biomass, burned it in a calorimeter, and measured the amount of heat produced.

What is the estimated trophic efficiency in the transfer from primary producer to primary consumer if

net grass production is 6499 kcal per m^2 per year

net insect production is 82 kcal per m^2 per year

- ➡ ◯ 1.26 %
- ◯ .0126 %
- ◯ 79.3 %
- ◯ 64.2 %
- ◯ .0793 %

Question 18 **0 / 1 point**

$$\frac{\Delta N}{\Delta T} = rN$$

The equation above models

- ➡ ◯ exponential growth
- ◯ the risk of extinction
- ◯ predator-prey dynamics
- ◯ chaos
- ◯ logistic growth

Question 19 **0 / 1 point**

The Mississippi River carries nitrogen pollution to the Gulf of Mexico,

fueling a phytoplankton bloom each summer. When the phytoplankton die, their decomposition by oxygen-using organisms results in an extensive "dead zone" of low oxygen levels along the coast. When this occurs, fish and other marine animals disappear from some of the most economically important waters in the United States.

This increase in nitrogen run-off and subsequent phytoblankton bloom is known as

- fragmentation
- fixation
- disturbance
- acidification
- ➡ eutrophication

Question 20 **0 / 1 point**

A USM biology graduate student is designing a lab experiment to measure the effects of increased ocean water temperature on growth rate in the mummichog (*Fundulus heteroclitus*). The student randomly assigns 5 fish to each of 15 tanks. Five of the tanks are randomly assigned to the baseline temperature (the average water temperature measured last summer). Five of the tanks are randomly assigned to baseline + 3 degrees Celsius. Five of the tanks are randomly assigned to baseline + 6 degrees Celsius. The growth rate in all five fish in each tank is measured.

The response variable is

- one fish in one tank
- temperature

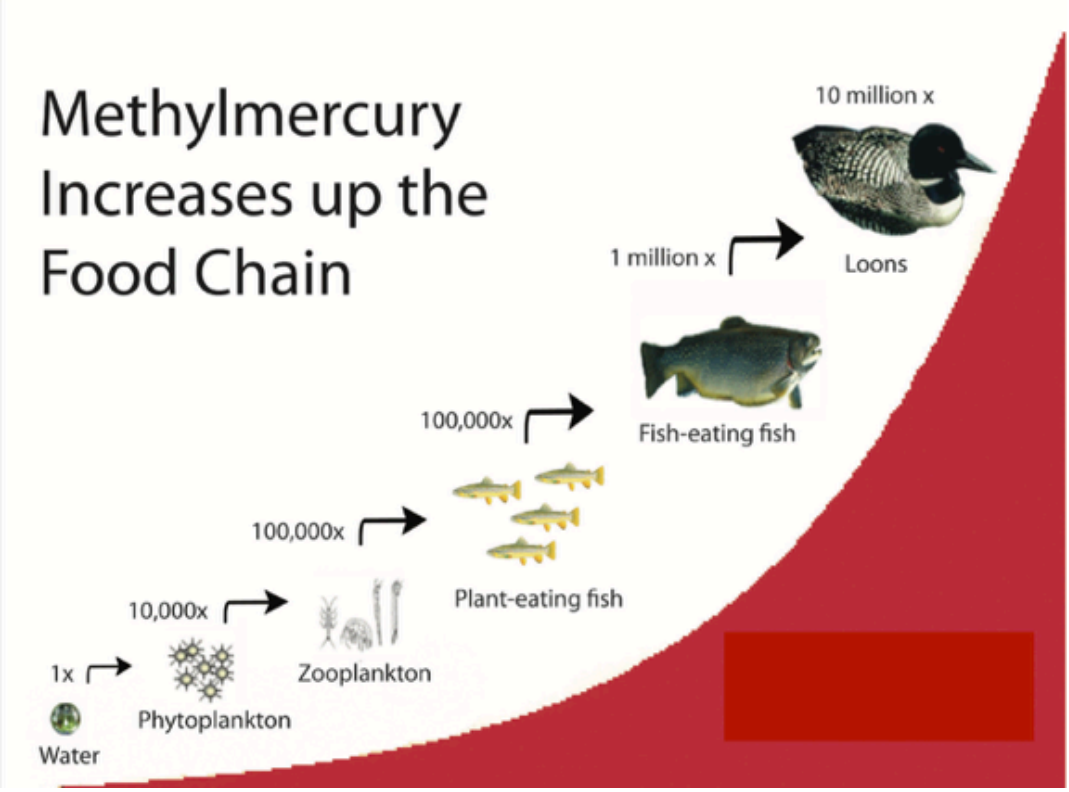
- one tank
- ➡ growth rate
- +3 degrees

Question 21 **0 / 1 point**

Habitat fragmentation of a forest

- has no effect on the relative abundance of edge and interior species because there is no "edge community" there is only a forest community and a field community.
- decreases the abundance of species that thrive on the forest edge relative to forest interior
- has no effect on the relative abundance of edge and interior species because these habitats have the same physical attributes
- ➡ increases the abundance of species that thrive on the forest edge relative to forest interior
- has no effect on the relative abundance of edge and interior species as long as the total area of forest is preserved

Question 22 **0 / 1 point**



A local, Portland-based organization that researches the impacts of the above process and assess the levels of methyl-Hg in esosystems regionally, nationally, and globally is

- Gulf of Maine Research Institute
- Maine Health Research Institute
- Bigelow Laboratories
- Idexx
- ➡ Biodiversity Research Institute

Question 23 **0 / 1 point**

The amount of energy from light converted to the chemical energy of organic molecules per unit time in an ecosystem is

- Net Primary Production

- Gross Secondary Production
- Assimilation Rate
- ➡ Gross Primary Production
- Net Secondary Production

Question 24 **0 / 1 point**

Here is a landlocked salmon (*Salmo salar*) caught in Mooselookmeguntic lake, part of the Rangeley lake system. This species was introduced to the lake system in the late 1800s, but was not in the system prior to this. The species is self-sustaining in this system. Given this information, which statement is correct?

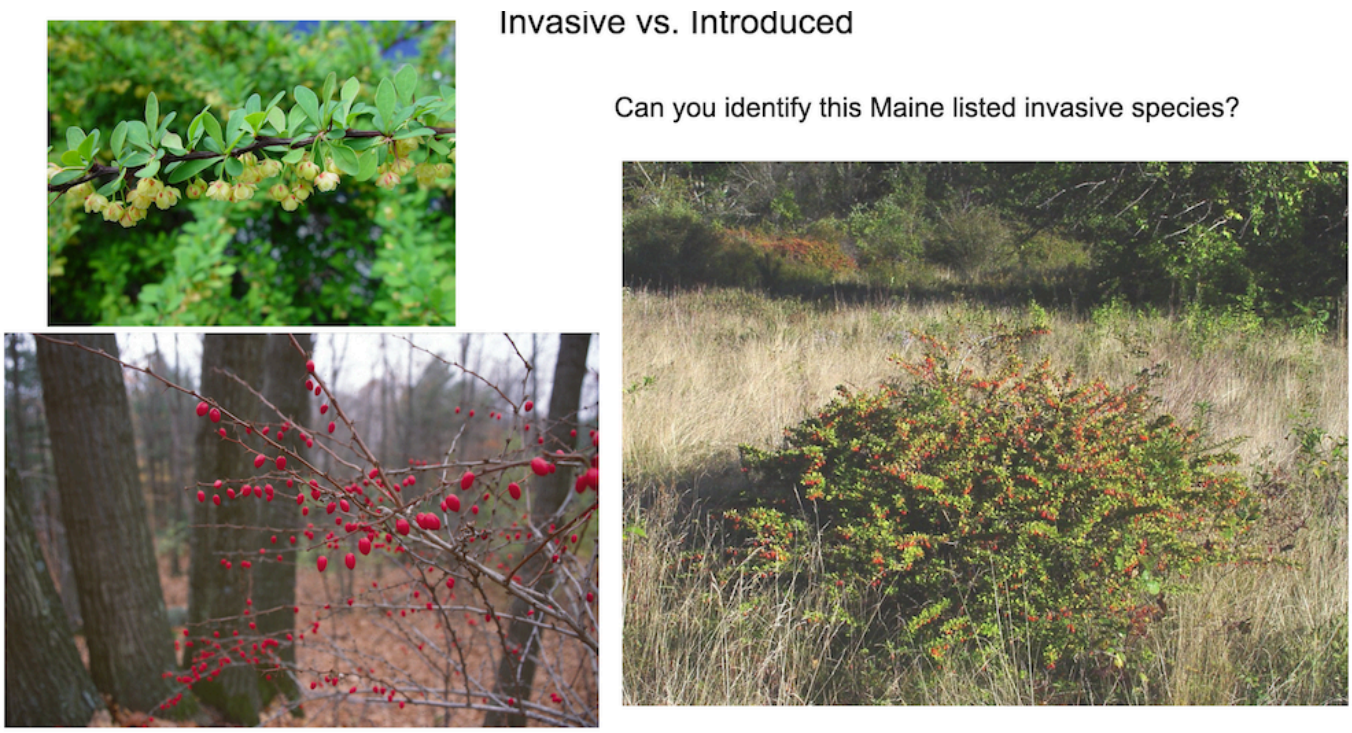
- landlock salmon in Mooselookmeguntic are introduced but are native, because *Salmo salar* does naturally colonize freshwater lakes
- ➡ landlock salmon in Mooselookmeguntic are introduced but not

native, because native implies the species was present prior to any kind of human intervention.

- landlock salmon in Mooselookmeguntic are introduced but are native, because native implies a self-sustaining population that does not require stocking to maintain.
- landlock salmon in Mooselookmeguntic are introduced but are native, because native implies the presence of landlocked salmon in the state
- landlock salmon in Mooselookmeguntic are introduced but not native, because *Salmo salar* does not naturally colonize freshwater lakes

Question 25

0 / 1 point



- purple loosestrife
- Japanese knotweed
- asian bittersweet

- Japanese barberry
- Japanese honeysuckle
- Rosa rugosa

Question 26

0 / 1 point

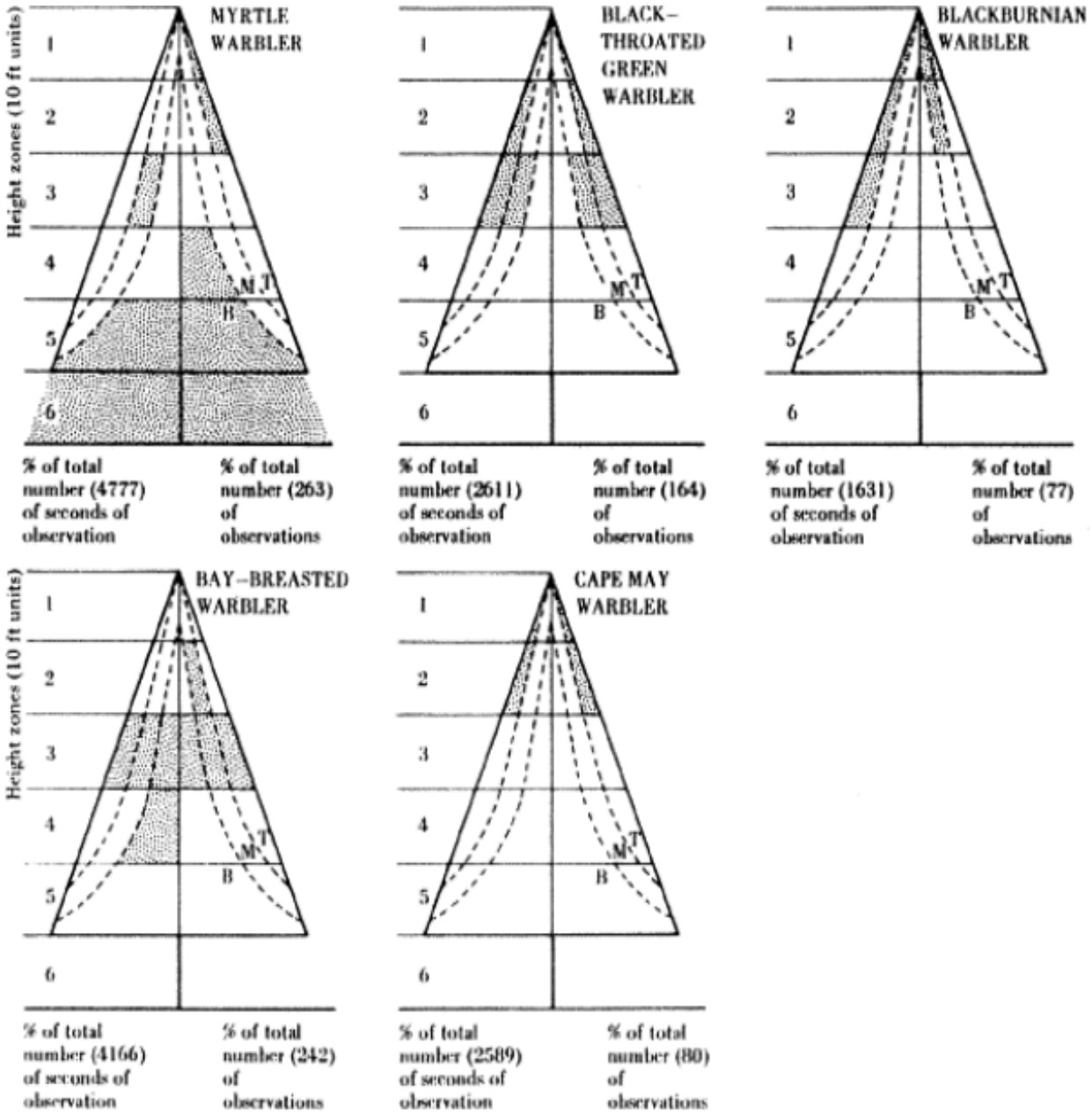


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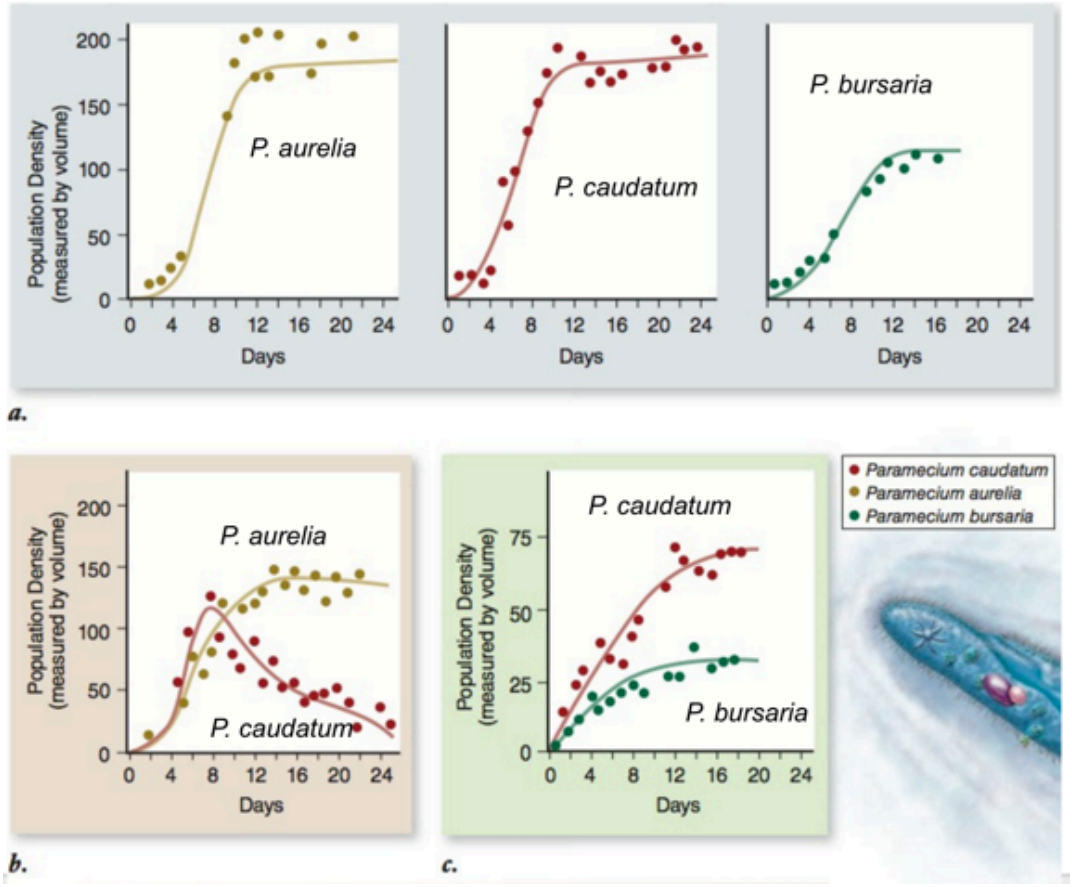
Figure 14. Foraging positions of five species of warbler in the coniferous forests of the northeastern United States. Shaded zones represent 50% of recorded time.

The myrtle warbler feeds mostly in

- the base of the branches halfway up the tree
- the outer tips of the branches at the base of the tree

- the base of the top branches of the tree
- the outer tips of the top branches of the tree
- ➡ the entire base of the tree

Question 27 0 / 1 point



The top panel shows growth in single-species microcosms (flasks). The bottom panel shows growth in two-species microscosms. A pretty good model to understand the population dynamics in the two-species microcosms is

- $$\frac{\Delta N}{\Delta T} = rN - aNP$$
$$\frac{\Delta P}{\Delta T} = baNP - mP$$

- ➡ $\frac{\Delta N_1}{\Delta T} = r_1 N_1 (\frac{K_1 - N_1 - a_{12} N_2}{K_1})$
  $\frac{\Delta N_2}{\Delta T} = r_2 N_2 (\frac{K_2 - N_2 - a_{21} N_1}{K_2})$

- $H = -\sum p_i \ln(p_i)$

- $N_{t+1} = N_t + r N_t$

- $N_{t+1} = N_t + r N_t (\frac{K - N_t}{K})$

Question 28 **0 / 1 point**

The amount of chemical energy in consumers' food that is converted to their own new biomass during a given time period is known as

- production efficiency
- trophic efficiency
- primary production
- resource partitioning
- ➡ secondary production

Done