

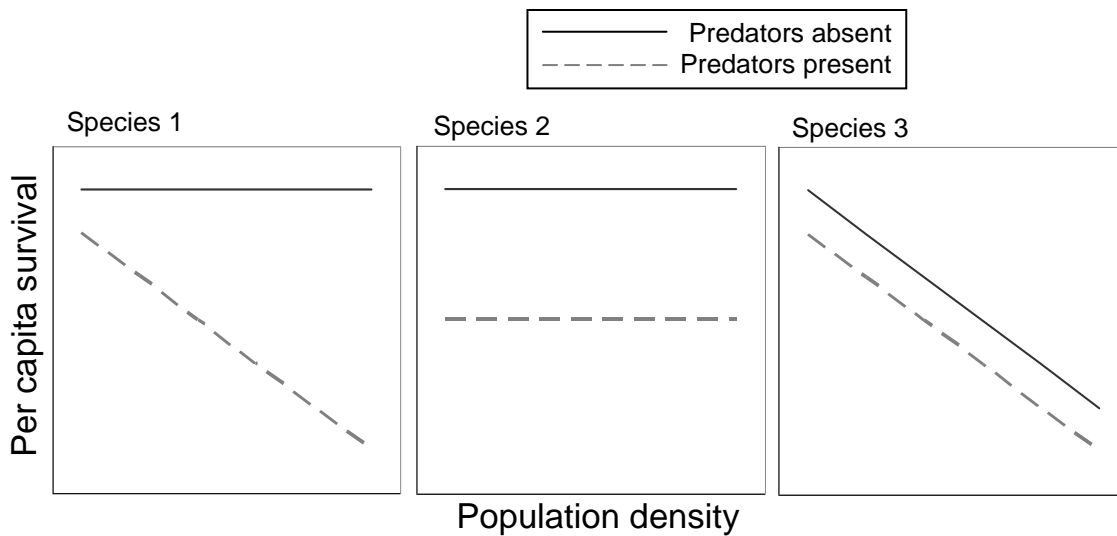
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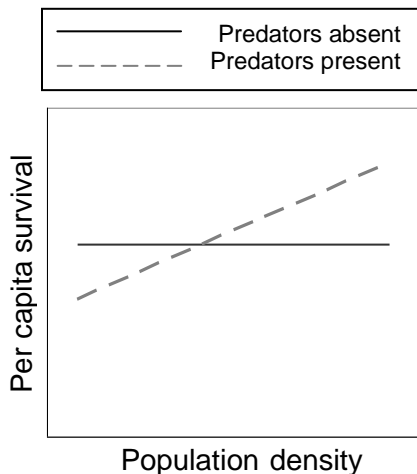
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Round: 5A



These graphs show the survival of juvenile fish settling into two areas: one with predators, and one in which predators are experimentally excluded. Each graph represents a different species of juvenile fish.

1. Which species shows density-dependent mortality in both the presence and absence of predators? *Species 3 (3 pts)*
2. In reference to Question 1, name one (1) possible cause for this non-predator dependent mortality pattern. *Accept ANY of the following, 4 pts:*
 - *A limiting resource (food, space, etc)*
 - *Cannibalism*
 - *Increased parasitism or disease in higher populations*
 - *Stress at high density leads to reduced reproduction*
3. If a juvenile fish of Species 1 is placed in a natural environment, what is the probable cause of mortality (based on the evidence provided)?
Predation (3 pts)
4. Imagine a fish species in which survival is improved with increasing school size. This survival advantage only occurs in the presence of predators. In the absence of predators, there is no density-dependent advantage or disadvantage. Using the same axes as above, re-draw a new graph below representing survival in both scenarios.



- *3 points for direction of predators absent line*
- *3 points for direction of predators present line*
- *1 point for correct labeling of axes*
(Relative position of lines to each other isn't important)
- *1 point for correct labeling of axes*

5. What is the name for the phenomenon in which increased density results in increased survival?
Allee effect (3 pts)