

海洋生物学 (1 / 2)

(注意) 問題 [1] [2] [3] [4] はそれぞれ別の答案用紙に解答すること。

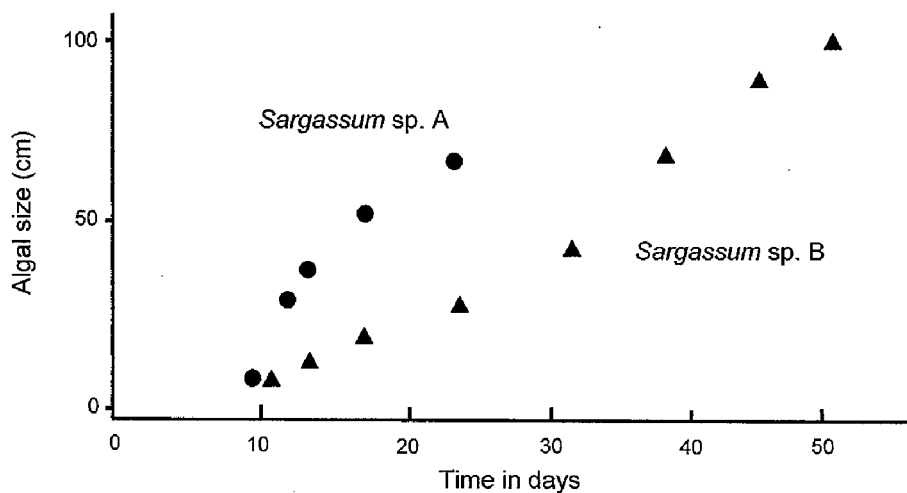
(解答は英語・日本語のどちらでもよい [英語/ラテン語と指示してある場合以外]。文法などの間違いは採点に影響しない)

[1] Choose one of the following topics and discuss. (20 points)

- (1) Seasonal patterns of phytoplankton production in temperate waters
- (2) Morphological and ecological diversity of marine fishes
- (3) Mechanisms and possible consequences of ocean acidification
- (4) Adaptation of benthos to fast flows in rivers

[2] The graph below shows the growth of two species of macroalgae, *Sargassum* sp.A (circles) and *Sargassum* sp.B (triangles), in shallow subtidal habitats, since the start of the observation until each started to produce reproductive organs. Note that both were still 'invisible' underwater when observations started. 'Algal size' on the vertical axis refers the length of the longest algal body from its substrate attachment to the tip. Answer the questions that follow (total: 40 points)

- (1) How can one compare the growth rates of the two species of algae? (10 points)
- (2) Consider the reason(s) why the two species have different patterns of growth (10 points)
- (3) Describe a field experiment to assess the hypothesis that the boundary of vertical distribution of the two species are competitively determined. Consider the possible outcomes of this experiment. (20 points)



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- [3] Aquatic organisms inhabiting intertidal habitats often demonstrate unique characteristics in terms of ecology, behaviour, morphology and physiology to cope with harsh environmental conditions. Give examples and discuss. (20 points)
- [4] Two species of molluscan grazers are known to occur in a tropical seagrass seabed dominated by two species of seagrasses. In order to clarify the interspecific relations between the two molluscan species, devise and explain a field /experimental study, paying particular attention to (a) the hypothesis that you propose to test with the experiment, (b) possible results and their interpretations. (20 points)