1 Coral reefs are massive underwater structures made from the hard limestone exoskeletons of thousands of tiny living organisms (coral polyps) produced one on top of another in warm, clear, shallow ocean waters. Living polyps extend upward and outward from the coral colony center and live on top of the old dead exoskeletons. Coral reef communities are crowded with other animals representing virtually every major animal phylum. Space is at a premium on reefs, corals, seaweeds (various forms of algae), sponges, or other organisms cover virtually every surface. Because both corals and algae require light to survive, access to light, like space, is also a resource subject to competition.

2 Fast-growing, branching corals can grow over slower-growing, encrusting, or massive corals and deny them light. In response, the slower-growing forms can extend stinging filaments from their digestive cavity and kill their competitor’s polyps. Undamaged polyps on the faster-growing, branching coral, however, may grow very long sweeper tentacles, containing powerful nematocysts (stingers) that kill polyps on the slower-growing form. The faster-growing form repairs the damage and continues to overgrow its competitor. In addition to sweeper tentacles and stinging filaments, corals have several other mechanisms available for attack or defense.

3 In general, slower-growing corals are more aggressive than fast-growing species. In cases where a competitor cannot be overcome, however, corals may survive by taking advantage of differences in local habitats. Massive corals are generally more shade tolerant and able to survive at greater depths. Therefore, on many reefs it is the fast-growing, branching corals that ultimately dominate at the upper, shallower portion of the reef, whereas more massive forms dominate in deeper areas.

4 Corals also must compete with other reef organisms, each with its own strategies for survival. Sponges, soft corals, and seaweeds (algae) can overgrow stony corals and smother them. Algae are competitively superior to corals in shallow water but less so at depth. Survival of coral in shallow water, therefore, may depend on grazing by plant-eating echinoderms (starfish and sea urchins) and fishes. In Jamaica, overfishing removed most of the plant-eating fish from coral reefs. Initially, algal growth was kept in check by grazing sea urchins, but in 1982, a pathogen reduced the population by 99 percent. Without grazers, the algae were able to completely overgrow the coral.

5 Competition may occur among other reef communities. Grazing by urchins and fishes is important in preventing seaweeds from overgrowing the reef. The dominant algae on a healthy reef are usually fast-growing filamentous forms or coralline algae, well protected by calcification (hardening) and the production of noxious chemicals. These algae are inferior competitors to larger, fleshier seaweeds, so grazing by urchins and fishes on the larger seaweeds allows these algae to persist. Grazing on plants is greatest in the shallow reef areas but decreases with depth, where lower temperatures and light reduce algal growth. The reef is, therefore, a mosaic of microhabitats with different levels of grazing and different algal communities.

6 An additional complexity arises from the activity of damselfish. Because they are territorial, many damselfish species exclude grazers and other species from certain areas of the reef. Algae grow rapidly in these territories, providing habitat for many small invertebrates but overgrowing the corals. Branching corals tend to dominate in damselfish territories because they are upright and faster growing than the more massive or encrusting forms.

7 Although less studied than on rocky shores, predation almost certainly has a significant influence on the community structure of coral reefs. Fish and other predators may preferentially prey on such competitors of corals as sponges and gorgonians, giving competitively inferior reef corals an advantage in securing space. Many species of fish, mollusks, and crustaceans also feed directly on coral polyps. Several surgeonfish and parrotfish may actually pass coral skeletons through their digestive tracts and add sediment to the reef. Both fish and invertebrate corallivores (coral-feeding organisms) seem to attack faster-growing, branching species preferentially, perhaps preventing slower-growing forms from being overgrown. Corallivores, however, rarely ever completely destroy a coral colony except in cases where tropical storms or humans have already done severe damage. The fact that almost all small invertebrates on reefs are so well hidden or highly camouflaged is another indicator of how prevalent predation is on reefs and its importance in determining reef structure.

3/5/6/8/10/12/14

### **Coral Reef Communities**

**Paragraph 1**

Coral reefs are massive underwater structures **made【语法功能？】** from the hard limestone exoskeletons of thousands of tiny living organisms (coral polyps) **produced** 【语法功能？】one on top of another in warm, clear, shallow ocean waters. Living polyps extend upward and outward【派生词？】 from the coral colony center and live on top of the old dead exoskeletons. Coral reef communities are crowded with other animals **representing** virtually every major animal phylum/ˋfaɪləm/[“门纲目科属种”的门]. Space is at a premium【非常珍贵】 on reefs, corals, seaweeds (various forms of algae), sponges, or other organisms cover virtually every surface. Because both corals and algae require light to survive, access to light, like space, is also a resource subject to competition. 【如何断句？主语是谁？】

1. According to paragraph 1, all of the following are true of coral reefs **EXCEPT**:

1. Coral reefs grow biggest in the ~~deepest~~ waters of the ocean.
2. The organisms living around coral reefs compete for limited resources.
3. There are many different organisms in coral reef communities.
4. Coral reefs consist of the outer skeletons of small living organisms.

**Paragraph 2**

Fast-growing, branching corals can grow over slower-growing, encrusting, or massive corals and deny them light. In response, the slower-growing forms can extend stinging filaments from their digestive cavity and kill their competitor’s polyps. Undamaged polyps on the faster-growing, branching coral**, however,** may grow very long sweeper tentacles, **containing** powerful nematocysts (stingers) that kill polyps on the slower-growing form. The faster-growing form repairs the damage and continues to overgrow【派生词】 its competitor. In addition to sweeper tentacles and stinging filaments, corals have several other mechanisms available for attack or defense.

2. According to paragraph 2, how do fast-growing branching corals defend themselves from attacks by slower-growing corals?

1. By producing stinging sweeper tentacles
2. By growing on top of the slower-growing corals
3. By blocking the light to the slower-growing corals
4. By destroying the stinging filament of the slower-growing corals

3. The word "mechanisms " in the passage is closest in meaning to

A. adaptations B. weapons C. parts D. means

**Paragraph 3**

In general, slower-growing corals are more aggressive than fast-growing species. In cases where a competitor cannot be overcome**, however,** corals may survive by taking advantage of differences in local habitats. Massive corals are generally more shade tolerant and able to survive at greater depths. Therefore, on many reefs it is the fast-growing, branching corals that ultimately dominate at the upper, shallower portion of the reef, **whereas** more massive forms dominate in deeper areas.

4. The word "ultimately " in the passage is closest in meaning to

A. naturally B. eventually C. quickly D. clearly

**Paragraph 4**

**Corals also must compete with other reef organisms, each with its own strategies for survival.** Sponges, soft corals, and seaweeds (algae) can overgrow stony corals and smother them. Algae are competitively superior to corals in shallow water but less so at depth. Survival of coral in shallow water**, therefore,** may depend on grazing by plant-eating echinoderms (starfish and sea urchins海胆) and fishes. In Jamaica, overfishing removed most of the plant-eating fish from coral reefs. Initially, algal growth was kept in check by grazing sea urchins, but in 1982, a pathogen reduced the population by 99 percent. Without grazers, the algae were able to completely overgrow the coral.

5. The phrase "kept in check " in the passage is closest in meaning to

A. limited B. prevented C. allowed D. stimulated

6. In paragraph 4, why does the author discuss the effects of removing plant-eating fish and sea urchins from coral reefs?

1. To identify a situation that contributes to the dominance of corals in shallow waters
2. To demonstrate the importance of grazing on seaweeds for the survival of some corals
3. To provide evidence that seaweeds are better competitors than coral at depth
4. To argue that sea urchin pathogens also attack corals

7. According to paragraph 4, all of these pairs of organisms are in competition **EXCEPT**

1. corals and sponges B. algae and corals

C. echinoderms and corals D. sea urchins and algae

**Paragraph 5**

**Competition may occur among other reef communities.** Grazing by urchins and fishes is important in preventing seaweeds from overgrowing the reef. The dominant algae on a healthy reef are usually fast-growing filamentous forms or coralline algae, well protected by calcification (hardening) and the production of noxious chemicals. These algae are inferior competitors to larger, fleshier seaweeds, so grazing by urchins and fishes on the larger seaweeds allows these algae to persist. Grazing on plants is greatest in the shallow reef areas but decreases with depth, where lower temperatures and light reduce algal growth. The reef is, therefore, a mosaic of microhabitats with different levels of grazing and different algal communities.

8. According to paragraph 5, fast-growing filamentous or coralline algae are usually the dominant algae on healthy coral reefs in part because they

1. are not affected by noxious chemicals produced by other organisms
2. are less attractive as food for sea urchins and fishes than bigger seaweeds are
3. occupy the areas of coral reefs that have lower temperatures and less light can live in a wider variety of microhabitats than their competitors can

**Paragraph 6**

**An additional complexity arises from the activity of damselfish【**雀鲷**】.** Because they are territorial, many damselfish species exclude grazers and other species from certain areas of the reef. Algae grow rapidly in these territories, **providing** habitat for many small invertebrates but overgrowing the corals. Branching corals tend to dominate in damselfish territories because they are upright and faster growing than the more massive or encrusting forms.

9. According to paragraph 6, which of the following is an effect of the activity of damselfish on the reef environment?

1. Encrusting corals dominate in damselfish territories.
2. The damselfish attract many species of grazers.
3. Algae grow rapidly.
4. Algal diversity is greater than in other parts of the reef.

**Paragraph 7**

**Although less studied than on rocky shores, predation almost certainly has a significant influence on the community structure of coral reefs.** Fish and other predators may preferentially（优先的） prey on such competitors of corals as sponges and gorgonians, **giving** competitively inferior reef corals an advantage in securing space. Many species of fish, mollusks, and crustaceans also feed directly on coral polyps. Several surgeonfish and parrotfish may actually pass coral skeletons through their digestive tracts and add sediment to the reef. Both fish and invertebrate corallivores (coral-feeding organisms) seem to attack faster-growing, branching species preferentially, perhaps preventing slower-growing forms from being overgrown. Corallivores, however, rarely ever completely destroy a coral colony except in cases where tropical storms or humans have already done severe damage. The fact that almost all small invertebrates on reefs are so well hidden or highly camouflaged is another indicator of how prevalent predation is on reefs and its importance in determining reef structure.

10. The word "securing " in the passage is closest in meaning to

A. looking for B. getting C. maximizing D. sharing

11. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

1. The presence of only very small invertebrates on a reef is an indication of widespread predation.
2. Most reefs are structured in a way which allows small invertebrates to remain hidden or camouflaged.
3. Almost all small invertebrates are hidden or camouflaged, indicating the extent and importance of predation to reef structure.
4. Almost all of the small invertebrates on reefs are difficult to find because they are so highly camouflaged.

12. Paragraph 7 mentions all of the following as effects of predation on the community structure of coral reefs **EXCEPT**:

1. Corals are advantaged when predators prefer to attack competitors ~~or~~ of corals.
2. Faster-growing corals are prevented from overgrowing slower-growing corals when faster-growing species are preferred by competitors.
3. Predation contributes to the sediment deposit of the reef.
4. Small invertebrates are exposed to competitively superior organisms.

**Paragraph 3**

In general, slower-growing corals are more aggressive than fast-growing species. ■ In cases where a competitor cannot be overcome, however, corals may survive by taking advantage of differences in local habitats. ■Massive corals are generally more shade tolerant and able to survive at greater depths. ■ Therefore, on many reefs it is the fast-growing, branching corals that ultimately dominate at the upper, shallower portion of the reef, whereas more massive forms dominate in deeper areas. ■

13. Look at the four squares [■] that indicate where the following sentence can be added to the passage. Where would the sentence best fit?

**For example, different species of corals have different needs for light.**

14. Directions: An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

|  |
| --- |
| **Coral reef communities include many different organisms that must compete for resources such as space and light.** |

**Answer Choices**

1. In order to keep from being overgrown, the different species of coral kill each other’s polyps, or live in different local habitats within the reef community.
2. Competition among the different species of corals is ~~more intense than~~ that between corals and other coral reef inhabitants.
3. Predation shapes reef structure by getting rid of competitors of corals, but coral polyps themselves are also eaten, as are many reef inhabitants. 7
4. Coral reefs are divided into a shallow upper portion and a deeper lower portion with branching corals dominating ~~in the lower portion~~.
5. Grazing by fishes and urchins prevents algae and seaweeds from overgrowing the corals, although damselfish exclude grazers from some areas.
6. Fish and invertebrate corallivores are ~~the most common cause~~ of coral colony destruction, followed by ~~tropical storms and damage by humans.~~ 7