

2021年度入試

早稲田大学社会科学部

英語 大問4番

問題

次の英文を読んで下の問いに答えよ。解答はマーク解答用紙にマークせよ。

① Insects around the world are facing a serious crisis, according to a small but growing number of long-term studies showing dramatic declines in invertebrate populations. A new report published in the Proceedings of the National Academy of Sciences suggests that the problem is more widespread than scientists realize. Huge numbers of bugs have been lost in a pristine national forest in Puerto Rico, the report found, and the forest's insect-eating animals have gone missing, too. In 2014, an international team of biologists estimated that, over the past 35 years, the numbers of invertebrates such as beetles and bees have decreased by 45 percent. In places where long-term insect data are available, mainly in Europe, insect numbers are plummeting. It is also estimated that during the past few decades there has been a 76 percent decrease in flying insects in German nature preserves.

② The report issued by the Academy of Sciences shows that this startling loss of insect life extends beyond any one country. The report's authors implicate climate change in the loss of tropical invertebrates. "This report in PNAS is a real (1) that the phenomenon could be much, much bigger, and across many more ecosystems," said David Wagner, an expert in invertebrate conservation who was not directly involved with this research. One New York based biologist, who has been studying rain forest insects in Puerto Rico since the 1970s, went down in 1976 and 1977 to investigate the insects and the insectivores in the rain forest, as well as the birds, frogs, and lizards. About 40 years later, when he returned to the area with his colleague, they were in for a shock: what the scientists did not see on their return (2) them. Fewer birds flitted overhead. The butterflies, (3) abundant, had all but vanished.

③ The researchers on this recent trip measured the forest's insects and other invertebrates, a group called arthropods that includes spiders and centipedes. The researchers trapped arthropods on the ground in plates covered in a sticky glue and raised several more plates about three feet into the canopy. They also swept nets over the brush hundreds of times, collecting the critters that crawled through the vegetation. Each technique revealed the biomass had significantly decreased from 1976 to the present day and overall biomass decreased to a fourth or an eighth of what it had been. Between January 1977 and January 2013, the catch rate in the sticky ground traps fell 60-fold. The most common invertebrates in the rain forest — the moths, the butterflies, the grasshoppers, the spiders and others — are all far less abundant now than they were before. Entomologists who have studied this forest since the 1990s, but who were not involved in the recent report, claim that their own data is consistent with these findings and point out that European biomass studies come to the same conclusions.

④ The authors of the recent study also trapped anole lizards, which eat arthropods, in the rain forest. They compared these numbers with counts from the 1970s and found that the anole biomass had dropped by more than 30 percent. Some anole species have altogether disappeared from the interior forest. Insect-eating frogs and birds plummeted, too. Another research team used mist nets to capture birds in 1990, and again in 2005, finding that their captures had fallen by about 50 percent. An analysis

of the data shows that while the ruddy quail dove, which eats fruit and seeds, had no population change, a brilliant green bird called the Puerto Rican tody, which eats bugs almost exclusively, diminished by 90 percent. The food web appears to have been obliterated from the (4). The authors of the report attribute this crash to climate change and argue that during the same 40-year period as the arthropod crash, the average high temperatures in the rain forest increased by 4 degrees Fahrenheit. The temperatures in the tropics stick to a narrow band. The invertebrates that live there, likewise, are adapted to these temperatures and fare poorly outside them; bugs cannot regulate their internal heat.

⑤ A recent analysis of climate change and insects, published in the journal *Science*, predicts a decrease in tropical insect populations. In temperate regions farther from the equator, where insects can survive a wider range of temperatures, agricultural pests will devour more food as their metabolism increases, the study warned. After a certain thermal threshold is reached, however, insects will no longer lay eggs and their internal chemistry will break down. A 2017 study of vanished flying insects in Germany suggested other possible culprits, including pesticides and habitat loss, were to blame. Arthropods around the globe also have to contend with pathogens and invasive species. One of the scariest parts about it is that there is no smoking gun. A particular danger to these arthropods, in his view, was not temperature, per se, but droughts and a lack of rainfall.

⑥ The authors of the 2017 study sorted out the effects of weather like hurricanes and still saw a consistent trend suggesting that climate is a factor. Although the gravity of their findings and the ramifications of these results for other animals, especially vertebrates, is hyperalarming, the authors are not totally convinced that climate change is the global driver of insect loss. They argue that the decline of insects in northern Europe (5) the onset of climate change there and point out that in places like New England, some tangible declines began in the 1950s. No matter the reason, all of the scientists agreed that more people should pay attention to the bugpocalypse, which comes on the heels of a gloomy U.N. report that estimated the world has little more than a decade left to wrangle climate change under control. We all need to step up by using more fuel-efficient cars and turning off unused electronics. A nonprofit environmental group that promotes insect conservation recommends planting a garden with native plants that flower throughout the year.

⑦ Many are frustrated by the fact that their voices have fallen on deaf ears in Washington, but also believe that at some point those ears will listen because our food supply will be in jeopardy. Thirty-five percent of the world's plant crops require pollination by bees, wasps and other animals. And arthropods are more than just pollinators. They're the planet's miniature custodians, toiling away in unnoticed or avoided corners. They chew up rotting wood and eat carrion. Wild insects provide \$57 billion worth of six-legged (6) in the United States each year, according to a 2006 estimate. The loss of insects and arthropods could further damage the rain forest's food web, causing plant species to go extinct without pollinators. If the tropical forests go, it will be yet another catastrophic failure of the whole Earth system that will feed back on human beings in an almost unimaginable way.

(Adapted from *The Washington Post*)

1. Which one of the following words best fits (1) in the passage?

- a. bird call b. close call c. wake-up call d. roll call e. judgment call

2. Which one of the following words best fits (2) in the passage?

- a. adored b. advised c. pleased d. provoked e. troubled

3. Which one of the following words best fits (3) in the passage?

- a. how b. once c. only d. where e. too

4. Which one of the following words best fits (4) in the passage?

- a. abundance b. ecosystem c. bottom d. exterior forest e. interior forest

5. Which one of the following is closest in meaning to the phrase smoking gun?

- a. definitive cause b. inflammable spray c. identifiable disease
d. combustible compound e. identifiable ingredient

6. Which one of the following words best fits (5) in the passage?

- a. decreases b. follows c. is triggered by d. increases e. precedes

7. Which one of the following words best fits (6) in the passage?

- a. food supply b. insectivores c. labor d. pollination e. goods

8. Which one of the following best describes the main point of this passage?
- a. Policymakers should realize the importance of insects and arthropods to the natural ecology of the Earth.
 - b. Studies show that pollinators in the Americas are in jeopardy, and they will be extinct if no measures are taken to reverse the current situation.
 - c. According to long-term studies, human beings are facing an ecological catastrophe as a result of dramatic declines in vertebrate populations.
 - d. Research shows that massive insect loss, which may have a harmful effect on human beings, has been taking place over the past several decades.
 - e. Climate change has caused sharp declines in invertebrate populations, and the world has only ten years left to get climate change under control.
9. According to this passage, which TWO of the following are true?
- a. Spiders and centipedes are not usually considered to be a part of the insect group commonly referred to as arthropods.
 - b. While the number of Puerto Rican tody — which eat bugs — has decreased, the number of ruddy quail doves — which eat fruit and seeds — has increased.
 - c. The massive loss of invertebrate populations and its potential effects are referred to as the bugpocalypse.
 - d. In tropical regions of the planet, insects are able to survive and thrive across a wide range of temperatures.
 - e. The number of both insects and insect-eating animals in forests in Puerto Rico has declined.
 - f. Invertebrates are able to regulate and to control their internal heat and body temperature.
 - g. The scientific data show beyond any doubt that global warming is the reason for the loss of insects in forests on the Earth.