令和 3 年度

神戸大学理学部生物学科

第 3 年次編入学者

選抜試験問題

英語

（2020 年 7 月 4 日実施）

注意事項

１）これは問題冊子です。試験監督の指示があるまで、2 枚目以降を見ないでください。

２）問題は 4-6 頁目にあり、全部で 2 問です。全問題について解答しなさい。7 頁目以降は下書き用紙です。

３）答案用紙（別紙）は、各問題に対して 1 枚ずつ、全部で 2 枚です。

４）すべての答案用紙の上部の所定の欄に、受験番号と氏名を必ず記入しなさい。未記入の場合は採点できません。

５）解答欄が不足する場合は、続けて各答案用紙の裏面に記入して構いません。

６）試験時間は 1 時間です。試験監督の指示に従って受験しなさい。

７）試験終了後、問題毎に答案用紙を集めます。試験監督の指示に従ってください。

英語問題１

マイクロプラスチックに関する以下の英文を読み、問いに日本語で答えなさい。なお、＊印が付された語句は文章末に説明が示されています。

Plastic pollution (whether at the macro or the micro scale) is one of today's environmental issues of highest concern among scientists, policy makers and the general public. (1)One aspect of plastic pollution that has received increasing attention in recent years is that of microplastics, defined as any plastic particles smaller than 5 mm, which are either manufactured as small particles or originated from the fragmentation of larger plastic items. These particles may be subjected to a range of complex processes in the environment (weathering, embrittlement*, aggregation), producing a variety of particles with different characteristics (shape, size and density). (2)Additionally, they can leach out chemical additives and adsorb organic chemicals that are found in the environment, and some such compounds can bioaccumulate, posing a potential detriment* to species and ecosystems.

Microplastics are present in most habitats including rivers, lakes, oceans, soil and air and are bioavailable to ingestion by a variety of aquatic biota (from zooplankton to megafauna*). Despite their widespread occurrence, their effects on wild organisms have yet to be quantified. These particles have been detected in remote areas such as the Arctic and the Antarctic regions. (3)These polar ecosystems have recently received heightened attention regarding microplastic pollution, and there are several studies that have reported evidence of these particles in Arctic surface waters, in high concentrations in the sea ice across the Arctic Ocean and in benthic organisms*.

Less is known about the occurrence of microplastic in the Southern Ocean, where they have only been detected in seawater and sediments. However, it has been shown that Antarctic krill* *Euphausia superba* can ingest microplastics in laboratory experiments, but less is known regarding the levels of microplastics in wild Antarctic marine organisms. Despite its remoteness, the Antarctic environment may be subject to local plastic pollution sources from fishing activities, tourism or research stations. Microplastics could therefore reach Antarctica via three distinct routes: from local human activities, from outside Antarctica in atmosphere/ocean circulation or bio-transport by organisms that migrate to Antarctica from waters further north and induced by storm-driven dispersal and global warming. However, the data available regarding these processes in the Antarctic are still so limited that the Scientific Committee on Antarctic Research has recently created an action group on plastic pollution.

Within Antarctic marine organisms, seabirds are considered as one of the most convenient bioindicators of environmental change and have been also proposed as indicators for plastic pollution in many marine environments. Antarctic penguins, such as gentoo penguins *Pygoscelis papua*, have been considered a standard organism for monitoring contamination in Antarctic marine ecosystems. Gentoo penguins are also an appropriate species in this context due to their limited movements outside their home range throughout the year, as shown by tracking data, diet and genetic studies, which exclude the possibility of ingesting plastic debris from waters outside Antarctica.

（Filipa Bessa et al., Scientific Reports, October 2, 2019 より抜粋・改変）

（語句説明）

embrittlement: 脆(もろ)くなること

detriment: 損害
megafauna: 大型動物類
krill: オキアミ
benthic organisms: 底生生物

問１．下線部（1），（2），（3）をそれぞれ日本語に訳しなさい。

問２．南極海生態系におけるプラスチック汚染の指標生物として、海鳥の一種であるペンギン、その中でもジェンツーペンギンが適していると考えられる理由について、200 字以内で説明しなさい。

英語問題２

以下の文章 (1)～(3) を英訳しなさい。

(1)　（著作権保護の観点から問題文は掲載いたしません）

(2)　（著作権保護の観点から問題文は掲載いたしません）

細胞分裂：cell division

(3)　（著作権保護の観点から問題文は掲載いたしません）

娘細胞：daughter cell
染色体：chromosome
ゲノム：genome

（「細胞の分子生物学 第５版」より、一部改変）