

A Level Biology A
H420/02 Biological Diversity

Question Set 8

1

Penguins are flightless birds that eat fish. Most species of penguin live near the coast of Antarctica or on the many islands that surround Antarctica.

Fig. 17 shows the populations of three penguin species on an island off the coast of Antarctica.

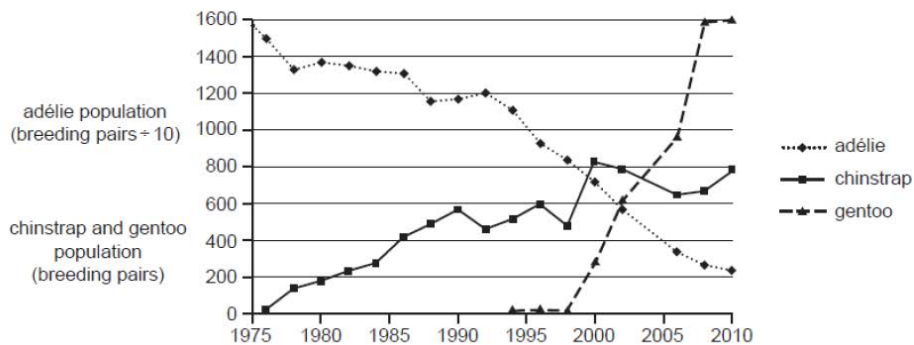


Fig. 17

- (a) (i) Before 1975 the only penguin species on the island was the Adélie penguin. Chinstrap penguins were first recorded on the island in 1976.

The changes in the chinstrap penguin population are not directly related to abiotic factors.

Suggest explanations for the changes in the population of chinstrap penguins between 1976 and 2010.

[3]

The population increases due to food and nesting sites are available with little or no competition. Then the number of chinstrap penguin plateaus due to increase in competition as gentoos arrive.

- (ii) Calculate the mean annual decrease in the Adélie penguin population between 1988 and 2010.

Show your working. Give your answer to three significant figures.

$$\frac{(1150 - 205) \times 10 \times 2}{2010 - 1988} = \frac{18900}{22} = 859 \text{ /year} \quad \text{Answer } \dots\dots\dots 859 \text{ per year} \quad [2]$$

- (b) (i) Adélie penguins need a habitat that contains sea-ice. Gentoo and chinstrap penguins can survive without access to sea-ice.

Scientists have claimed that the population changes in the three penguin species on this island suggests that the Antarctic temperature is increasing.

Discuss whether the information in Fig. 17 supports the scientists' claim.

You should refer to the data in Fig. 17 in your answer.

[3]

Fig 17 doesn't support the scientist's claim because the change in different penguin species population could be due to the arrival of gentoo/ chinstrap which increases the competition. For example, as gentoos outcompete chinstraps the population of gentoos increases whilst the

population of chinstrap decreases. Furthermore, the change in population could be due to a different factor other than temperature. The correlation we see between 3 different penguin species does not mean causation.

- (ii) Scientists working in the local area monitored water temperatures and populations of other water animals around the island between 1976 and 2010.

Suggest two further pieces of evidence that the scientists might have found to support their claim.

[2]

Reduction in extent of ice
New animal species present on land

Total Marks for Question Set 8: 10

OCR

Oxford Cambridge and RSA

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge