



EXAMINATION PAPER

Examination Session:
May/June

Year:
2018

Exam Code:
BIOL3541-WE01

Title:

Ecology in the Anthropocene

Time Allowed: 3 hours

Additional Material provided: None

Materials Permitted: None

Calculators Permitted: Yes Models Permitted:
Casio fx-83 GTPLUS or Casio fx-85 GTPLUS calculator.

Visiting Students may use dictionaries: No

Instructions to Candidates:

Answer **two** questions.

Please use separate books for each answer. **Do not** attach your booklets together with treasury tags unless you have used more than one booklet to answer the same question.

Answers should be illustrated with labelled diagrams wherever these are useful.

Revision:

Answer TWO questions

- 1) You are a biosecurity officer tasked with assessing the risk of invasion by plants that are proposed for introduction to the United Kingdom. The time period of invasion risk you have to cover is from the present until the year 2050, assuming an increase in average UK temperatures of 2°C by 2050. The following species has been proposed for introduction as an ornamental garden plant, and is commonly grown on the European continent:

“Aster dawsonii is an herbaceous perennial plant, which can reproduce and spread clonally from the roots. The inflorescences are yellow, numerous, and more or less daisy-like, produced from late Spring (May) until the Autumn (October). The species is not known to require a specialist pollinator, and can self-fertilise, though selfed offspring tend to have lower seed output and less vigorous growth than outcrossed offspring. Seeds easily germinate in autumn, and overwinter as seedlings, but will be killed by severe frost. Seeds are small and produced in large numbers, wind-dispersed by a pappus. Needs open ground without many competitors to establish. Resistant to being eaten by many common herbivores. Adult plants can survive short periods of a few days at temperatures <0°C, but prolonged periods of cold and frost are fatal.”

Based on the information given and on your knowledge of what determines invasiveness in introduced plants, would you permit the species to be introduced? Please explain your answer, and indicate any additional information you would need in order to assess invasion risk more accurately.

- 2) “Differences in phenological responses to climate change among species can desynchronise ecological interactions and thereby threaten ecosystem function”. Explain, using specific examples, how such desynchronization may occur and the nature of such threats to ecosystem function.

- 3) A recent journal article claimed that: “artificial lighting at night should be a focus for global change research in the 21st Century”. Explain why this should be the case, and describe the key questions this research needs to answer.
- 4) You are a professional research biologist employed to investigate the impacts of climate change upon a landscape and potential feedbacks from that landscape to the atmosphere. For a landscape of your choice, describe how you would assess climate impacts upon the native vegetation as well as feedbacks from the land surface to the atmosphere. Explain the underlying rationale for each of these approaches.
- 5) Islands around the world often harbour large numbers of invasive species that can have major impacts on the biodiversity and ecosystems of those islands. With examples, explain why islands are vulnerable to invasions, and why invasive species on islands can have strong impacts.

END