C4.1 Populations and communities

Checklist

What you should know

After studying this subtopic you should be able to:

- Define the term population.
- Outline reasons for estimating population samples.
- Analyse and explain the importance of using random sampling techniques in ecological studies.
- Outline how quadrat sampling is used to estimate the population size for sessile organisms.
- Outline how the capture-mark-release-recapture method and the Lincoln index are implemented to estimate the population size of a motile species.
- Define carrying capacity and explain why population growth slows down as the carrying capacity is reached.
- Distinguish between density-dependent and density-independent limiting factors.
- Compare and contrast exponential and sigmoidal population growth models.
- Evaluate the use of models as representations of natural phenomena.
- Describe the impact of intraspecific competition and cooperation on the survival and reproduction of a population.
- Define communities as diverse collections of populations that interact and contribute to the functioning of ecosystems.
- Distinguish between multiple interspecific interactions.
- Discuss the ecological significance of interactions between species.
- Outline examples of herbivory, predation, competition, parasitism, pathogenicity and mutualism.
- Evaluate the impact of invasive species on endemic species.
- Outline the role of human activities in the introduction and spread of invasive species.
- Assess the presence of interspecific competition using different testing methods.
- Apply the chi-squared test to determine an association between species.
- Interpret the results of a chi-squared test to generate accurate conclusions.

- Evaluate the validity of the chi-squared test as a statistical method for analysing associations between categorical variables.
- Evaluate the influence of predator—prey interactions on population dynamics using real case studies.
- Discuss the implications of top-down and bottom-up control in population regulation within communities.
- Compare and contrast allelopathy and antibiotic secretion mechanisms of competitive advantage in different organisms.

Practical skills

Once you have completed this subtopic, go to Practical 7: Measuring percentage cover to assess the distribution and abundance of plants in a habitat (/study/app/bio/sid-422-cid-755105/book/measuring-percentage-cover-id-46706/) in which you will use a quadrat to systematically sample for a sessile organism.