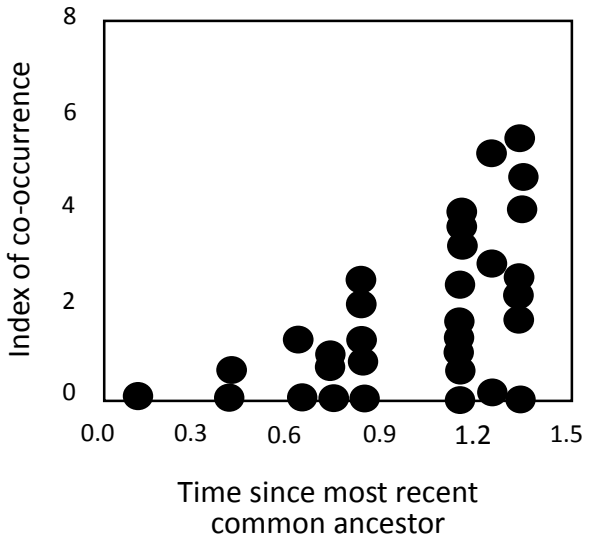
**QUESTION 1**

a) Giving an example, explain what is meant by "phylogenetic niche conservatism" and explain why it occurs. (6)

b) The figure below depicts fine-scale co-occurrence (with 5m x 5m plots) between pairs of *Erica* species in relation to their phylogenetic relatedness (each point represents a species pair). Describe the pattern and provide an explanation for it. (4)

(10 marks)




**QUESTION 3**

Explain the concept of "phylogenetic niche conservatism" and discuss its relevance to understanding patterns of local-scale species coexistence.

(8 marks)

**QUESTION 1**

Explain what is meant by an "adaptive landscape" and, giving an example, explain how interactions among traits/loci generate complexity in the adaptive landscape.

(7 marks)

## QUESTION 1

Using a diagram, explain the concept of the "adaptive landscape", and discuss two factors that may limit a population's movement over a particular adaptive landscape. (10 marks)

**QUESTION 1**

Explain the concept of "phylogenetic trait conservatism" and, using **TWO** examples, explain why it needs to be included in the explanation of biological patterns, such as trait-environment associations, community composition, and global distribution patterns.

(15 marks)

**QUESTION 3**

Explain what is meant by a “fitness interaction” (e.g. epistasis) and, with reference to adaptive landscapes, describe how such interactions may underpin phylogenetic conservatism of organismal traits and niches.

(10 marks)

**QUESTION 3**

**EITHER**

a) In the context of adaptive landscapes, explain why plant or animal species that coexist in a common selective environment are often very similar but sometimes very different in terms of structure and function.

(15 marks)

**OR**

b) Using real examples to illustrate your answer, discuss the potential utility of phylogenetic information to predict the invasiveness of alien plant or animal species.

(15 marks)