Contents

1   Evolutionary Thinking

Introduction

▷ Essential questions of evolutionary biology:

- Why do organisms look so different?

- Why develop elaborate sexual traits?

- Why do organisms senesce?

▷ Evolution is mainly an historical science and thus must relay on other methods of reconstructing the past or making inferences about evolutionary forces.

▷ **Proximate**: a question about a mechanistic cause; provides an immediate explanation about how a mechanistic cause functions.

▷ **Ultimate**: why, or the reason, a trait or organism is the way it is; an evolutionary explanation.

▷ Example of proximate vs ultimate in Galapagos finches:

- Proxmate: developmental growth factor is increased/decreased in some birds.

- Ultimate: different habits are selected on breaks that maxmize food gathering ability.

▷ Evolutionary biology's approach to answering questions:

- **Empirical data**: observation studies, experiments; the *comparative method*.

- **Theory**: predictions that use models and mathematical reasoning which can be be tested with empirical data.

▷ Overview of the components of evolution by natural selection:

- Genetic variation exists, via mutations.

- Mutations are heritable.

- The is an advantage to survival and/or reproduction from the mutation.

- Individuals with the advantage in survival/reproduction are selected for.

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10   Form and Function

4   Evolutionary Trees

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3   Natural Selection

6   Mendelian Genetics

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