TOPIC NOTES FOR BIOL2712: ANIMAL DIVERSITY

Completed in 2017 with HD

Contents

WK1: Animal Diversity – (Dr. Jeremy Robertson)

Science: it must be explanatory, testable, tentative and falsifiable.

Characteristics of animals:

- Exhibit differentiation of cell types and tissue
- Most reproduce sexually
- Heterotrophic
- Multicellular
- Eukaryotic

Metazoan (multicellular) diversity includes from 10-20 million to 100-200 million species, with only 1.3 million described. This group can be further divided into 3 main branches consisting of 31 extant phyla:

➔ Parazoa: 'besides the animals' (includes sponges)

→ Mesozoa: 'middle animals' (comprised of simple worm-like organisms)
→ Eumetazoa: 'True animals' (everything else, e.g. insects, birds, etc.)

Do kings play chess or fight? go see
Domain, kingdom, phylum, class, order, family, genus, species.

WK1: Animal Diversity Background– (Dr. Jeremy Robertson)

The theory of evolution: the progressive trait changes across generations. Or, what scientists call it when the DNA and characters of a species change during experiments and breeding to the extent that new species are created.

Darwin's theory is logically based on 3 inferences from 5 observations.

- Observation 1: All species produce so many offspring that if all survived their population would increase exponentially
- Observation 2: Yet populations tend to remain stable in size apart from seasonal fluctuations
- Observation 3: environmental resources are limited

Inference 1: the production of more offspring than the environment can support leads to a struggle for existence with only a fraction of the offspring surviving each generation.

- Observation 4: individuals of a population vary extensively; no two individuals are exactly alike (except identical siblings)
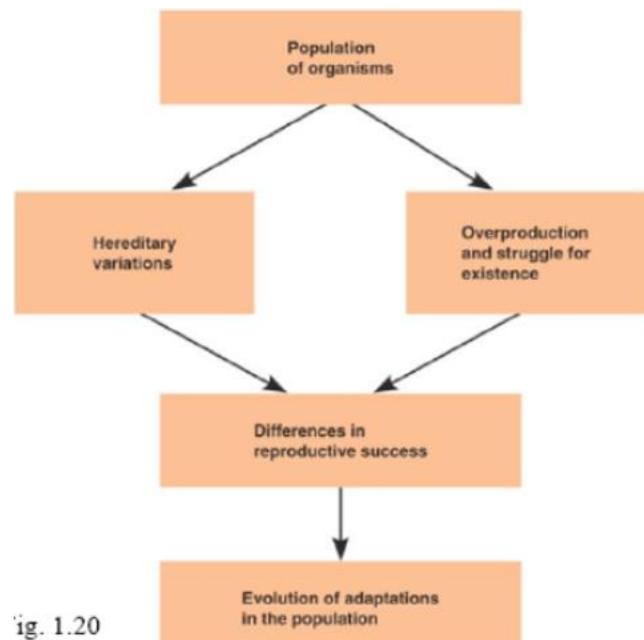- Observation 5: much of this variation is heritable.

Inference 2: the struggle for existence is not random, those individuals whose inherited traits best suited to the environment are more likely to have offspring than other (less fit) individuals.

Inference 3: this unequal ability of individuals to survive and produce will lead to a gradual change in population with favourable characterises accumulating over generations.

Natural speciation acts on individuals, with the resulting effect upon the population producing evolution. It acts only on pre-existing heritable traits which can then be expressed in the offspring.

Natural selection depends on time and place, what is adaptive in one time and place may be useless or even harmful in another.

Artificial selection is human driven selection whereby certain individuals are deliberately breed together in order for desirable traits to be expressed.

Population of organisms

Hereditary variations

Overproduction and struggle for existence

Differences in reproductive success

Evolution of adaptations in the population

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WK2: Principles of Animal Identification and Naming – (Dr. Jeremy Robertson)

Steps for discovery, description and analysis of species:

- Identify characteristic features
- Describe each species in word and drawings
- Provide a name, referring to characteristic features and relationships
- Classify relationships between species
- Collect additional information on habitat and biology of organisms (feeding, mobility, reproduction)
- Keep specimens as type material

Systematics → the science of diversity of organisms: to study the kinds and diversity of organisms and of any and all relationships among them.

- What are the unique characteristics of each species and higher taxa?
- What are the properties certain taxa have in common?
- What are the biological causes of differences or shared characteristics?
- What is the variation within taxa?

Taxonomy→ the theory and practice of classifying organisms: to sort the uniqueness and determine its nature.

Classification: the grouping of objects into classes owing to their join possession of attributes

Species identification

1. Assess characteristics
2. Compare similarities with other organisms
3. Associate specimens with the correct name for the species, through the name with other specimens of that species
4. If no prior classification available, new description and classification required.

Can do on morphological characteristics

- External, internal, special structures, coloration, embryology, karyology….

Or molecular characteristics

- DNA/RNA sequences, amino acid sequences, DNA hybridization, immunological distance, etc.

Taxonomic character: any attribute by which a member of a taxon differs from a member of another taxon i.e. diagnostic/key character.