

What is the most successful organism?

This is an example of an open essay title, which may have lots of different answers. It gives you the chance to take the essay where you want it to go, (as long as you answer the question!).

It will be expected that a large proportion of the essay will be given to different definitions of the word 'success' (and 'organism?'). Please give your own opinions to what is most important when deciding which organism is the most successful (if any!).

Rather than a reading list, I'm expecting you to think about the question and refer to 'The Ancestor's Tale' for ideas. If you do read any information on the internet or in books, then please reference and cite them appropriately.

Reading list:

Dawkins, R., (eds), *The Ancestor's Tale*.

Tutorial guide

Success may include:

- Numbers of species e.g. beetles/insects, bacteria
- Numbers of individuals/abundance of a species e.g. nematodes, bacteria
- Biomass e.g. ants, bacteria
- Generalist or specialist?
- Distribution e.g. pests, fliers, aquatic
- Evolutionary time e.g. living fossils versus crown groups
- Plasticity within individual vs species adaptability
- Complexity?
 - Cognitive development e.g. humans, apes, Caledonian crows

Questions raised:

- What is the difference between survival and success?
- What does an organism need to survive?
 - MRS GREN (move, respire, sensitivity, grow, reproduce, excretion, nutrition.)
 - Interactions with organisms and environment
- What does an organism need to be successful?
 - Natural selection – mutate – survive – reproduce – more of mutation.
 - Survive – protect predators, gain food. ENERGY MANAGEMENT.
 - Reproduce – find a good mate, pass on genes.
 - Role of environment, dispersal and movement.
 - Adaptation to a particular niche
 - What different types of niches are there?
 - Specialist versus generalist
 - Is individual plasticity adaptation at smaller timescales?
- Is success tied in with adaptive traits?
 - Give examples of innovations that lead to evolutionary radiations
- Are all extinct organisms unsuccessful?
- Are any extant organisms unsuccessful?
- Do all individuals of a species have to be successful?
- To be successful do you have to be complicated?
 - Why be complicated?
 - Connection between evolutionary time and complexity.
- Is an organism an individual? How does this fit in with phylogenetics?
 - What is the difference between a species and a phylum?
 - What is the hierarchy in phylogenetics?
 - When individuals become part of a whole (ant colonies)
- Is biomass a fairer measure than numbers of individuals?
- What is a species?
 - How quickly do they change (bacteria)?
 - What effects how quickly they change (dispersal, arms races, environmental instability)?
 - How do we measure how different species are? (genetic mixing, hybrids)

- Is it easier to be abundant if...
 - You disperse more?
 - You've been around for longer?
 - With a niche type (generalist, specialist)
 - You're smaller?

- Introduce spider topic next week.

Activities

- Scale of individual through to kingdom to show phylogenetics, form of tree for human?
- Individuals – survival versus success
- List of success types for species level
 - Make connections
 - Any general rules?
 - Specialist versus generalist examples
- Adaptation examples and success

Self-assessment questions – success tutorial

These questions are for your own study to make sure you have the main points from the tutorial.

1. Explain the terms: taxa, plasticity, crown group, living fossil, niche, generalist, specialist
2. Is there a difference between survival and success? Does it depend on the taxonomic level?
3. How do we define a species? What are the problems facing this definition?
4. Name some factors that may influence how abundant a taxon is.
5. Is success time dependent? Why (not)?
6. Is success niche dependent? Why (not)?