BT201 - FINALTERM SUBJECTIVE MEGA FILE

ALL DATA FROM PAST PAPERS

GROUP: BIOTECH BRAINY BUNCH

ADMINS: MEHWISH MUGHAL & BELLA

CONTACT: mehwishshabirhussain07@gmail.com

BT 201 (Current and Past Papers)

1. Lamarck Contribution?

Lamarck is best known for his contributions to evolution, or Lamarckism, which suggests organisms acquire or lose traits based on how much they use them in their lives.

2. Five Scientists Citing Reteach?

- **Kerner:** He showed that the differences in growth observed by him and Bonnier were the result of temporary adjustments to environmental variation and not hereditary changes in the experimental plants.
- **Turesson's:** He studies provided evidence for genetic differences among populations.
- **Clausen, Keck, and Hiesey:** They explored the extent and sources of morphological variation in plant populations, including both the influences of environment and genetics.
- **Case:** He determined that the best predictor of chuckwalla, Sauromalus, body length was average winter rainfall.

- **Tracy's:** His laboratory growth experiments indicated that variation in body size among chuckwalla populations is at least partly determined by genetic differences among populations.

3. Troper?

A state of low metabolic rate and lowered body temperature, when food is scarce and night temperatures cold. Other animals can go into a state of reduced metabolism that may last several months.

4. Lyell's Mistake On Natural Selection?

As a part of his general resistance to direction/ substantial change in geology, Lyell maintained there was no real direction of change in the fossil record either. This was greeted with pretty general astonishment, but Lyell claimed the apparent changes were just due to our having bad (misleading) samples…more mammals would soon appear in older formations, etc., as we extend our fossil collections. Within ten years (1840) it was clear that this was completely untenable.

5. Cuvier's Advantage?

Cuvier's anatomical and classificational work was impeccable. He identified four basic body plans for animals– vertebrates, molluscs, arthropods, and radiata (jellyfish & others). With these groups clearly distinguished, the chain of being was no longer part of biology. But links between distinct groups were still striking– Lamarck cited teeth in fetal baleen whales, for instance, which St. Hilaire took as an 'unity of plan'. A broader sort of unity could restore the chain to some respectability

6. Eusocialistic Characters?

This more complex level of social behavior, which is considered to be the pinnacle of social evolution, is called eusociality. Eusociality is generally thought to include three major characteristics:

- Individuals of more than one generation living together,
- Cooperative care of young,
- Division of individuals into sterile, or nonreproductive, and reproductive castes.

7. How Birds and Mammals / Animals Regulate Body Temperature?

Birds and mammals rely heavily on metabolic energy to regulate body temperature. The physical nature of the aquatic environment reduces the possibilities for temperature regulation by aquatic organisms. Most endothermic aquatic species are air breathers. Some organisms, mainly flying insects and some large marine fish, improve performance by selectively heating parts of their anatomy. The energetic requirements of thermoregulation may influence the geographic distribution of species.

8. Optimal Foraging Theory?

Optimal foraging theory attempts to model how organisms feed as an optimizing process. Evolutionary ecologists predict that if organisms have limited access to energy, natural selection is likely to favor individuals that are more effective at acquiring energy and nutrients. Many animals select food in a way that appears to maximize the rate at which they capture energy.

9. Work of Clausen, Keck, And Heisley?

Clausen, Keck, and Hiesey explored the extent and sources of morphological variation in plant populations, including both the influences of environment and genetics.

10. Factor of Environment?

Environmental Factor:

An environmental factor, ecological factor or eco factor is any factor, abiotic or biotic, that influences living organisms. Abiotic factors include ambient temperature, amount of sunlight, and pH of the water soil in which an organism lives.

11. Hibernation?

Animals can go into a state of reduced metabolism that may last several months. If this state occurs mainly in winter, it is called hibernation.

Example:

Examples of true hibernators are **bats, hedgehogs, dormice, marsupials, and snakes**. Among birds, some nightjars such as the common poorwill may enter true hibernation. In autumn, before they go into winter hibernation, bats may use temporary torpor as a preparation for hibernation.

12. Effects of Habitat Destruction and Climatic Warming?

Long-term studies of populations of land snails around Basel, Switzerland, have documented local extinctions of these land snails. These extinctions are attributable to habitat destruction and climatic warming. The results of these studies suggest that climatic warming can lead to the local extinction of species. As we face the prospect of climatic warming at a global scale, studies of temperature relations will assume greater importance.

13. Genetic Drift?

Genetic drift can change gene frequencies in populations, especially in small populations. Genetic drift is theoretically most effective at changing gene frequencies in small populations such as those that inhabit island

14. Nutrient Loss from Ecosystem?

Major pathways in which these nutrients are lost include: soil erosion, leaching and gaseous losses. Leaching is a physical process where nutrients exit terrestrial ecosystems soil. ... Another loss of nutrients from ecosystems is due to denitrification. downward flow of water through the The phenotype is the physical appearance of an organism, while the Genotype is the genetic composition of an organism. The genotype is the set of genes in our DNA which is responsible for a particular trait. Phenotype is observable and is the expression of the genes of an individual.

Populations include genetic and phenotypic variation among individuals, which are significant aspects of population structure. The first biologists to conduct thorough studies of phenotypic and genotypic variation and to incorporate experiments in their studies, focused on plants. By using plants cloned from the same parent, Bonnier was able to control for the effects of genotype on plant form and observe the effects of climate.

16. Hardy-Weinberg Principle?

One of the most fundamental concepts in population genetics, the Hardy-Weinberg principle, states that "in a population mating at random in the absence of evolutionary forces, allele frequencies will remain constant."

17. Population Growth?

Population growth is the increase in the number of individuals in a population. Global human population growth amounts to around 83 million annually, or 1.1% per year.

18. Logistic Population Growth?

As resources are depleted, population growth rate slows and eventually stops; this is known as logistic population growth. As population size increases, population growth eventually slows and then ceases, producing a sigmoidal, or S-shaped, population growth curve. Population growth stops when populations reach a maximum size called the carrying capacity, the number of individuals of a particular population that the environment can support.

19. Sigmoidal Population Growth?

Sigmoidal population growth can be modelled by the logistic growth equation, a modification of the exponential growth equation that includes a term for environmental resistance. In the logistic

model, the rate of population growth decreases as population density increases. Research on laboratory populations indicates that zero population growth at carrying capacity may be attained by many combinations of reduced birthrates and increased death rates.

20. Mistake In Natural Selection?

A major driving force of evolution comes from mistakes made by cells and how organisms cope with the consequences, UA biologists have found. Charles Darwin based his groundbreaking theory of natural selection on the realization that genetic variation among organisms is the key to evolution.

21. How Evolution of Mutualism Took Place, How Humans developed Relationship with Other Species?

Evolution of Mutualism:

Theory predicts that mutualism will evolve where the benefits of mutualism exceed the costs. Keeler built a cost-benefit model for the evolution and persistence of facultative plant-ant protection mutualisms in which the benefits of the mutualism to the plant are represented in terms of the proportion of the plant's energy budget that ants protect from damage by herbivores. The model terms of the proportion of the plant's energy budget invested in extrafloral nectaries and the water, carbohydrates, and amino acids contained in the nectar. The model predicts that the mutualism will be favored where there are high densities of ants and potential herbivores and where the effectiveness of alternative defenses is low.

Humans in Mutualism:

Humans have developed a variety of mutualistic relationships with other species, but one of the most spectacular is that between the greater honey guide and the traditional honey gatherers of Africa. In this apparently ancient mutualism, humans and honey guides engage in elaborate communication and cooperation with clear benefit to both partners. The mutualism offers the human side a higher rate of discovery of bees' nests, while the honey guide gains access to nests that it could not raid without human help. Careful observations have documented that the honey guide informs the honey gatherers of the direction and distance to bees' nests as well as of their arrival at the nest.

22. Work and Contributions of Robert Paine?

Robert Paine (1966) proposed that the feeding activities of a few species have inordinate influences on community structure. He predicted that some predators may increase species diversity by reducing the probability of competitive exclusion. Manipulative studies of predaceous species have identified many keystone species, including starfish and snails in the marine intertidal zone and fish in rivers. On land, birds exert substantial influences on communities of their arthropod prey.

23. Explain with Example How Exotic Predators Disturb the Structure Of Food Web?

Exotic predators can collapse and simplify the structure of food webs. Introduced fishes have devastated the native fishes of Lake Atitlan and Gatun Lake in Central America.

Examples:

- The influence of the Nile perch on the fish community.
- Victoria is enmeshed with massive changes in the lake's ecosystem. Introduction of the Nile perch is rapidly reducing the species-rich fish fauna of Lake Victoria to a community dominated by a handful of species.

24. What are landscape elements?

A landscape is a heterogeneous area composed of several ecosystems. The ecosystems making up a landscape generally form a mosaic of visually distinctive patches. These patches are called landscape elements.

25. Food Web? / Food Web and Structure of Communities?

A food web summarizes the feeding relations in a community.

- The earliest work on food webs concentrated on simplified communities in areas such as the Arctic islands. However, researchers such as Charles Elton (1927) soon found that even these so-called simple communities included very complex feeding relations.
- The level of food web complexity increased substantially, however, as researchers began to study complex communities. Studies of the food webs of tropical freshwater fish communities revealed highly complex networks of trophic interaction that persisted even in the face of various simplifications.
- A focus on strong interactions can simplify food web structure and identify those interactions responsible for most of the energy flow in communities.

26. Factor Affecting Decomposition of Environment?

Decomposition Rate:

Decomposition rate is influenced by temperature, moisture, and chemical composition of litter and the environment. The rate of decomposition affects the rate at which nutrients, such as nitrogen and phosphorus, are made available to primary producers. Rates of decomposition in terrestrial ecosystems are higher under warm, moist conditions. The rate of decomposition in terrestrial ecosystems increases with nitrogen content and decreases with the lignin content of litter. The chemical composition of litter and the availability of nutrients in the surrounding environment also influence rates of decomposition in aquatic ecosystems

27. What Is the Difference Between Clade, Cladistic, Monophyletic and Paraphyletic?

- Cladistics groups organisms by common descent.
- A **clade** is a group of species that includes an ancestral species and all its descendants
- A valid clade is **monophyletic**, signifying that it consists of the ancestor species and all its descendants
- A **paraphyletic** grouping consists of an ancestral species and some, but not all, of the descendants

28. Detritivores?

Detritivores feed on dead plant material, which is even lower in nitrogen than living plant tissues.

29. Explain Functional Response?

The relationship between food density and animal feeding rate is called the functional response. Functional response shapes are typically categorized as linear (type I), hyperbolic (type II), or sigmoidal (type III).

The shape of the functional response is generally one of three types. The forms of photosynthetic response curves and type 2 animal functional responses are remarkably similar

30. Shared Ancestral and Shared Derived Characters?

- In comparison with its ancestor, an organism has both shared and different characteristics
- A **shared ancestral** character is a character that originated in an ancestor of the taxon.
- A **shared derived** character is an evolutionary novelty unique to a particular clade.
- A character can be both **ancestral and derived**, depending on the context; it is useful to know in which clade a shared derived character first appeared.
- An out group is a species or group of species that is closely related to the in group , the various species being studied.
- Systematics compare each in group species with the out group to differentiate between shared derived and shared ancestral characteristics.

31. Photosynthetic Response?

The relationship between photon flux density and plant photosynthetic rate is called Photosynthetic response.

32. Mode of Gene Transfer?

Horizontal Gene Transfer (lateral gene exchange):

- Conjugation
- Transformation
- Transduction

33. Differentiate between Ecology, Ecological Engineering and Industrial Ecology?

Ecology:

Ecology is the scientific study of the processes regulating the distribution and abundance of organisms and the interactions among them, and the study of how these organisms in turn mediate the transport and transformation of energy and matter in the biosphere (i.e., the study of the design of ecosystem structure and function).

Industrial ecology:

- The design of the industrial infrastructure such that it consists of a series of interlocking "technological ecosystems" interfacing with global natural ecosystems.
- Industrial ecology takes the pattern and processes ecosystems as a design for sustainability. It represents a shift in model from conquering nature to becoming nature.

Ecological engineering:

- Unlike industrial ecology, the focus of Ecological Engineering is on the manipulation of natural ecosystems by humans for our purposes, using small amounts of supplemental energy to control systems in which the main energy drives are still coming from non-human sources.
- It is the design of new ecosystems for human purposes, using the self-organizing principles of natural ecosystems.

34. Crossing Over?

Two DNA molecules may recombine segments of their molecule in a process called crossing over. This is a relatively common event between chromosome copies in eukaryotes during meiosis.

35. Maximum Parsimony and Maximum Likelihood?

Maximum parsimony:

It assumes that the tree that requires the fewest evolutionary events (appearances of shared derived characters) is the most likely.

Maximum Likelihood:

The principle of maximum likelihood states that, given certain rules about how DNA changes over time, a tree can be found that reflects the most likely sequence of evolutionary events.

36. Symbiosis Example?

There are three different types of symbiotic relationships: mutualism, commensalism, and parasitism. Mutualism: both partner's benefit.

An example of mutualism is the relationship between the Egyptian plover and the crocodile. Commensalism: only one species benefits while the other is neither helped nor harmed. (Internet)

37. Endosymbionts and Evolution of Eukaryotes?

Formed from several prokaryotic cells . In a symbiotic relationship Symbiosis involving a prolonged association of two or more dissimilar organisms, is quite common today. In many cases both symbionts benefit from the association as occurs in lichens, once thought to be plants but actually symbiotic fungi and algae.

Evidence for Endosymbiosis:

Supporting evidence for endosymbiosis comes from studies of living eukaryotic cells containing internal structures called organelles, such as mitochondria and plastids which contain their own genetic material. In addition, prokaryotic cells synthesize proteins as a single system, whereas eukaryotic cells are a combination of protein synthesizing systems.

38. Proterozoic Animal Fossils?

- Although scarce, a few animal fossils older than those of the Ediacaran fauna are known.
- A jellyfish-like impression is present in rocks 2000 m below the Ediacara Hills Pound Quartzite.
- Burrows in many areas presumably made by worms, occur in rocks at least 700 million years old.
- Wormlike and algae fossils come from 700- to 900-million-year-old rocks in China but the identity and age of these "fossils" has been questioned.

39. Examples of Symbiosis?

Toxoplasma: It is a parasitic protist that may infect a range of animals including mice, rats, and people. To reproduce sexually, the protist must infect a cat. The cat is not directly affected, but when a mouse is infected it brings harm. Mice infected with toxoplasma lose their fear of cats, which of course may bring them in close contact with a predators.

Microbes: Microbes are important for human health. For example, human breast milk contains oligosaccharides, which are short chains of sugar molecules. There is no nutritional value to babies, but the microbes are important for developing a baby's immune system.

Cattle and Egrets: Cattle do not benefit but are unaffected as egrets eat the insects that have been disturbed as the cattle forage for food.

40. Organelles Capable of Protein Synthesis?

That is, some of the organelles within eukaryotic cells are capable of protein synthesis

These organelles:

- with their own genetic material
- and protein-synthesizing capabilities
- are thought to have been free-living bacteria
- that entered into a symbiotic relationship,
- eventually giving rise to eukaryotic cells

41. Mode of Feeding of Amoeba?

Feeding structures:

- Food vacuole
- Digestive enzymes
- Diffusion

OR

Amoeba feeds on microscopic organisms such as single-celled algae and bacteria. When the amoeba encounters a suitable organism, the cytoplasm flows round the prey and engulfs it, with a drop of water, in a food vacuole. The cytoplasm secretes enzymes into the food vacuole. (Internet)

42. Protozoan Characteristics?

- No cell wall
- Free-living or parasitic
- Consumers
- Habitat – aquatic (ponds,lakes, oceans)
- Examples: amoeba, paramecium, dinoflagellates

43. Reproduction of Amoeba?

- Asexual reproduction
- Binary fission

OR

Amoeba reproduces by the common asexual reproduction method called binary fission. After replicating its genetic material through mitotic division, the cell divides into two equal sized daughter cells.

44. Traits of Green Algae?

Green Algae:

- Most freshwater
- Food Source – called Plankton

Some are:

- Free-living
- Colony
- Filament

45. Importance of Protists?

Importance of:

- Green algae - oxygen source
- Food source –
- Plankton
- Zooplankton
- Phytoplankton

46. Characters of Euglenoids and Diatoms?

Euglenoids:

- Contain chlorophyll
- Move by flagella
- Euglena (unique)
- Eyespot
- Chloroplast
- Flagellum

Diatoms:

- Float In Water
- Photosynthesis
- Unicellular
- Silica Shells
- Commercial value: Insulating materials, Abrasives, Ceramics, Filtering

47. Foundation Species?

A foundation species plays a unique, essential role in creating and defining a community. Often, foundation species act by modifying the environment so that it can support the other organisms that form the community, Foundation species are sometimes referred to as **'Ecosystem Engineers'.**

Examples of Foundation Species are Corals, Earthworms, Beavers and many more.

- Kelp (brown algae) is a foundation species that forms the basis of the kelp forests off the coast of california. Kelps create environments that allow the survival of other organisms that make up the kelp forest common.
- The **corals** of a coral reef are another foundation species.

48. Keystone Species?

A keystone species is a species that has a disproportionately large effect on community structure relative to its biomass or abundance. Keystone species differ from foundation species in two main ways: they are more likely to belong to higher trophic levels (to be top predators), and they act in more diverse ways than foundation species, which tend to modify their environment.

49. Gene and Characteristics of Genes?

Genes are functional units of heredity as they are made of DNA. The chromosome is made of DNA containing many genes. Every gene comprises of the particular set of instructions for a particular function or protein coding. Speaking in usual terms, genes are responsible for heredity

The human cell contains 23 pairs of chromosomes. The trait is one of the characteristics determined by one or more genes. Abnormal genes and genes that are formed due to new mutations also result in certain traits. Genes vary in size depending on the code or the protein they produce. All cells in the human body contain the same DNA. The difference between the cells occurs due to the different type of genes that are turned on and therefore produce a variety of proteins.

50. Define Codon, Nonsense Codon?

Codon:

A codon (three bases or triplet) encodes an amino acid. Genetic code is read contineouly from a fixed starting point. There is a start codon **(AUG)**.

Non-sense codons:

There are three stop(termination) codons. They atre often called nonsense codons. Genetic code is degenerate. Some amino acids are encoded by more than one codon.

51. Define Translation and Transcription?

Transcription is the synthesis of RNA from a DNA template where the code in the DNA is converted into a complementary RNA code. **Translation** is the synthesis of a protein from an mRNA template where the code in the mRNA is converted into an amino acid sequence in a protein.

52. Phylogeny?

Phylogeny is the evolutionary history of a species or group of related species. The discipline of systematics classifies organisms and determines their evolutionary relationships.

53. Sequencing?

DNA sequencing is the process of determining the nucleic acid sequence – the order of nucleotides in DNA. It includes any method or technology that is used to determine the order of the four bases: adenine, guanine, cytosine, and thymine.

54. Biodiversity importance in terms of food and humans?

Biodiversity creates resilience and is a key to mitigate the risks in agriculture particularly farming, from where we get most of our food. It ensures the world gets nutrients which are critical for good health and are also critical for conserving the ecosystem that produces the food. (Internet)

55. Why do we use phylogenetic trees? Reasons to use phylogenetic trees?

Phylogenetics is important because it enriches our understanding of how genes, genomes, species (and molecular sequences more generally) evolve. Phylogenetics is important because it enriches our understanding of how genes, genomes, species (and molecular sequences more generally) evolve. (Internet)

56. Systematics?

Systematics (cladistics) is a method of taxonomic classification based on their evolutionary history. It was developed by Willi Hennig, a German entomologist, in 1950.

57. Species diversity? Species Richness?

Species diversity is defined as the number of species and abundance of each species that live in a particular location. The number of species that live in a certain location is called species richness.

58. Plants breeding?

Plant breeding is the art and science of changing the traits of plants in order to produce desired characteristics. Plant breeding can be accomplished through many different techniques ranging from simply selecting plants with desirable characteristics for propagation, to methods that make use of knowledge of genetics and chromosomes, to more complex molecular techniques.

59. What does the intermediate disturbance hypothesis suggest?

The intermediate disturbance hypothesis suggests that communities with a medium (intermediate) level of disturbance may have greater species diversity than communities with very frequent or very rare disturbances.

At the time of Darwin, the fossil record was VERY scanty. A great deal of progress has been made since, but it is far from finished.The fossil record is relatively incomplete for several reasons.

60. Causes of incomplete fossil record?

- Soft tissues are rarely preserved.
- Movement of the earth's crust has obliterated and/or covered many fossils.
- Fossilization takes place only in certain types of habitats and favorable environments.
- Paleontologists have not dug up every place on earth.

61. The geography of the community's location?

Geographical features of the area in which the community is found can affect community structure. For instance, island communities that are further away from a mainland tend to have smaller numbers of species than those that are closer to the mainland. This reflects that the chance event of a species arriving from the mainland is less likely when the island is more distant.

62. What is Binomial nomenclature? Linnaeus system?

In the 18th century, Carolus Linnaeus published a system of taxonomy based on resemblances. Two key features of his system remain useful today: two-part names for species and hierarchical classification. The two-part scientific name of a species is called a binomial. The first part of the name is the genus. The second part, called the specific epithet, is unique for each species within the genus. The first letter of the genus is capitalized, and the entire species name is italicized or underlined. Both parts together name the species. (PPTS)

Binomial nomenclature, also called binomial nomenclature or binary nomenclature, is a formal system of naming species of living things by giving each a name composed of two parts, both of which use Latin grammatical forms, although they can be based on words from other languages. (Internet)

63. Five scientists citing reteach?

- Kerner showed that the differences in growth form observed by him and Bonnier were the result of temporary adjustments to environmental variation and not hereditary changes in the experimental plants.
- Turesson's studies provided evidence for genetic differences among populations.
- Clausen, Keck, and Hiesey explored the extent and sources of morphological variation in plant populations, including both the influences of environment and genetics.
- Case determined that the best predictor of chuckwalla, Sauromalus, body length was average winter rainfall Tracy's laboratory growth experiments indicated that variation in body size among chuckwalla populations is at least partly determined by genetic differences among populations.

64. Ecology?

Ecology is a branch of biology that studies the interactions among organisms and their biophysical environment, which includes both biotic and abiotic components.

OR

Ecology is the scientific study of the processes regulating the distribution and abundance of organisms and the interactions among them, and the study of how these organisms in turn mediate the transport and transformation of energy and matter in the biosphere (i.e., the study of the design of ecosystem structure and function).

65. What phyla include amoeboid protozoan. Write their mode of locomotion?

Amoebozoa:

It is a crawling-like type of movement accomplished by protrusion of cytoplasm of the cell involving the formation of pseudopodia.

66. Applied Ecology?

Applied Ecology: Using ecological principles to maintain conditions necessary for the continuation of present day life on earth.

67. Industrial Ecology?

The design of the industrial infrastructure such that it consists of a series of interlocking "technological ecosystems" interfacing with global natural ecosystems. Industrial ecology takes the pattern and processes of natural ecosystems as a design for sustainability. It represents a shift in paradigm from conquering nature to becoming nature.

68. Why is breeding crops important?

Crop breeding is the art and science of improving important agricultural plants for the benefit of humankind. Crop breeders work to make our food, fiber, forage, and industrial crops more productive and nutritious. Crops provide for an expanding global population with increasing dietary expectations. (Internet)

69. Species diversity?

Species diversity is a measure of community complexity. It is a function of both the number of different species in the community (species richness) and their relative abundances (species evenness). Larger numbers of species and more even abundances of species lead to higher species diversity. For example: • A forest community with 20 different kinds of trees would have greater species diversity than a forest community with only 5 kinds of trees (assuming that the tree species were even in abundance in both cases).

70. Ecosystem Ecology?

Ecosystem ecology is the integrated study of living (biotic) and non-living (abiotic) components of ecosystems and their interactions within an ecosystem framework. This science examines how ecosystems work and relates this to their components such as chemicals, bedrock, soil, plants, and animals.

71. Plants Breeding?

Plant breeding is the art and science of changing the traits of plants in order to produce desired characteristics. Plant breeding can be accomplished through many different techniques ranging from simply selecting plants with desirable characteristics for propagation, to methods that make use of knowledge of genetics and chromosomes, to more complex molecular techniques.

72. Law of succession?

General correspondence between fossil and living forms in same geographical area • Darwin used this observation to predict that fossils of ancient humans should be found in Africa.

73. The heterogeneity (Patchiness) of the community environment?

If there is more variation, or heterogeneity, in a community's environment, this may allow for greater species richness because there are more distinct habitats to be occupied.

For example:

Imagine a community occupying a field, and another occupying a field that is dotted with piles of rock. The second community may have greater species richness because species that can live in the rocks (but not in the open field) will be present, in addition to those species that can live in the field.

74. Phylogenetics and name of scientists?

Evolutionary theory states that groups of similar organisms are descended from a common ancestor. Phylogenetic systematics (cladistics) is a method of taxonomic classification based on their evolutionary history. It was developed by Willi Hennig, a German entomologist, in 1950.

75. Life cycle of protozoans?

Protozoa have two-phase life cycles, alternating between proliferative stages (e.g., trophozoites) and dormant cysts. As cysts, protozoa can survive harsh conditions, such as exposure to extreme temperatures or harmful chemicals, or long periods without access to nutrients, water, or oxygen for periods of time. (Internet)

76. Gene product and example?

A gene product is the biochemical material, either RNA or protein, resulting from expression of a gene. Gene products function in particular cellular compartments. For example, histones, tubulin, glycosyltransferases, peptide hormone receptors.

77. What is taxonomy?

Taxonomy is the science of naming, describing and classifying organisms and includes all plants, animals and microorganisms of the world.

78. Name phyla in amoeboid protozoa and their locomotion?

Protozoa can be divided into four phyla based on their locomotion: Mastigophora, Sarcodina, Ciliophora, and Sporozoa.

79. Parasitism?

Parasitism, relationship between two species of plants or animals in which one benefits at the expense of the other, sometimes without killing the host organism. ... Intracellular parasites—such as bacteria or viruses—often rely on a third organism, known as the carrier, or vector, to transmit them to the host.

80. What is "Sustainability"?

There are many definitions of this one, depending on your perspective. Here's ours: Sustainability is a property of a human society in which ecosystems (including humans) are managed such that the conditions supporting present day life on Earth can continue.

81. Enlist some models?

Some models are:

- Dynamic programming
- Hidden Markov Models (HMMs)
- Conditional random field (CRF)
- Support vector machines (SVMs)

82. What is an ecotype in ecology?

An ecotype is a population (or subspecies or race) that is adapted to local environmental conditions. The implication is that those individuals which were best adapted to the prevailing conditions left the most offspring.

83. Difference between homology and analogy?

- Homology is similarity due to shared ancestry like between a wolf and coyote.
- Analogy is similarity due to convergent evolution, similar conditions/adaptations.
- E.g australian mole and NorthAmerican mole looks alike but but evolved independently from each other • Analogies are also known as homoplasies ("to mold the same way").
- Homology can be distinguished from analogy by comparing fossil evidence and the degree of complexity.
- The more complex two similar structures are, the more likely it is that they are homologous.

84. How evolutionary significance help in ecology?

It will be clear that ecological arguments have only played a minor role in the selection of species for whole-genome sequencing, but we expect them to become more important in the future.

The new range of models should embrace diverse phylogenetic lineages, varying in their physiology and life-history strategy.

For example, the model plants arabidopsis and rice both employ the C3 photosynthetic pathway. To complement our genomic knowledge of primary production, new models should be chosen among plants utilizing C4 photosynthesis or crassulacean acid metabolism (CAM). Considering the diversity of life histories, species differing in their mode of reproduction and dispersal capacity should be chosen; for example, hermaphoditism versus gonochorism, parthenogenesis versus bisexual reproduction, etc.

85. How to study whole-genome?

Whole-genome analysis of organisms at crucial or disputed positions in the tree of life can be expected to contribute significantly to our knowledge of evolution.

The sea squirt, ci. Intestinalis was chosen as a model because it belongs to a group, the Urochordata, with properties similar to the ancestors of vertebrates.

The study of this species should provide valuable information about the early evolution of the phylum to which we belong ourselves.

Many other organisms, although not on the list for a genome project to date, have a strong case for being declared as model species for evolutionary arguments. These include the velvet worm, Peripatus, traditionally seen as a missing link between the arthropods and annelids, but now

classified as a separate phylum in the panarthropoda lineage (nielsen 1995), and the springtail, folsomia candida, formerly regarded as a primitive insect, but now sug-gested to have developed the hexapod body plan before the insects separated from the crustaceans (nardi et al. 2003).

86. Factors affecting community structure?

- The climate patterns of the community's location.
- The geography of the community's location.
- The heterogeneity (patchiness) of the environment.
- The frequency of disturbances, or disruptive events.
- Interactions between organisms.

87. Landscape ecology in details?

Landscape:

A landscape is a heterogeneous area composed of several ecosystems. The ecosystems making up a landscape generally form a mosaic of visually distinctive patches. These patches are called landscape elements. Landscape ecology is the study of landscape structure and processes.

Landscape structure:

Landscape structure includes the size, shape, composition, number, and position of different ecosystems within a landscape. Most questions in landscape ecology require that ecologists quantify landscape structure. Until recently, however, geometry, which means "earth measurement," could offer only rough approximations of complex landscape structure.

Structure of complex natural shapes:

Today, an area of mathematics called fractal geometry can be used to quantify the structure of complex natural shapes. One of the findings of fractal geometry is that the length of the perimeter of complex shapes depends upon the size of the device used to measure the perimeter. One implication of this result is that organisms of different sizes may use the environment in very different ways.

Landscape structure influences Ecological processes:

Landscape structure influences processes such as the flow of energy, materials, and species between the ecosystems within a landscape. Landscape ecologists have proposed that landscape structure, especially the size, number, and isolation of habitat patches, can

influence the movement of organisms between potentially suitable habitats. The group of subpopulations living on such habitat patches make up a metapopulation.

Examples:

Studies of the movements of small mammals in a prairie landscape show that a smaller proportion of individuals moves in a more fragmented landscape but that the individuals that do move will move farther. The local population density of the Glanville fritillary butterfly, Melitaea cinxia, is lower on larger and isolated habitat patches. Small populations of this butterfly and desert bighorn sheep are more vulnerable to local extinction.

88. History of plant breeding?

Plant breeding started with sedentary agriculture and particularly the domestication of the first agricultural plants, a practice which is estimated to date back 9,000 to 11,000 years. Initially early farmers simply selected food plants with particular desirable characteristics, and employed these as progenitors for subsequent generations, resulting in an accumulation of valuable traits over time. Modern bread wheat is a mixture of recombined genes from three different wild species.

Gregor Mendel's experiments with plant hybridization led to his establishing laws of inheritance. Once this work became well known, it formed the basis of the new science of genetics, which stimulated research by many plant scientists dedicated to improving crop production through plant breeding • Modern plant breeding is applied genetics, but its scientific basis is broader, covering molecular biology, cytology, systematics, physiology, pathology, entomology, chemistry, and statistics (biometrics). It has also developed its own technology.

89. Explain the importance of biodiversity?

These are as follows:

- Maintaining Balance of The Ecosystem.
- Recycling And Storage of Nutrients.
- Combating Pollution, And Stabilizing Climate, Protecting Water Resources.
- Forming And Protecting Soil And Maintaining Eco-Balance. e. Intrinsic Value.
- A Philosophical Concept of The Value of Something Independent of Its Value To Anyone or Anything

90. Hierarchical classification of Linnaeus?

- Linnaeus introduced a system for grouping species in increasingly broad categories.
- The taxonomic groups from broad to narrow are domain, kingdom, phylum, class, order, family, genus, and species.
- A taxonomic unit at any level of hierarchy is called a taxon

Linking Classification and Phylogeny:

- Systematists depict evolutionary relationships in branching phylogenetic trees.
- Linnaean classification and phylogeny can differ from each other.
- Systematists have proposed the PhyloCode, which recognizes only groups that include a common ancestor and all its descendents.

91. Phylogenetics tree?

Phylogenetic s tree or evolutionary tree is a diagram or branching tree Which shows the evolutionary relationship between the different species depending upon their phylogeny based upon similarities and differences in their physical and genetic characteristics. All the life on earth is part of the single phylogenic three showing only one common ancestor and all species have been evolved from that common ancestor.

Reasons for using the phylogenetic trees:

- Understanding the linage of the different species.
- Understanding how the various functions evolved among different species.
- Perform multiple sequences alignment
- Predict gene functions (phylogenetic footprints)

How gene are related:

- Gene tree contains no. of genes from a single species.
- Every node of the gene tree shows the specifications or gene duplication events.
- Gene families are groups of related genes that share a common ancestor.
- Paralogs are genes with sequences from within the same species.
- Orthologs are genes with similar sequences in different species.

92. Process involved in landscape structure?

Landscape structure influences Ecological processes:

Landscape structure influences processes such as the flow of energy, materials, and species between the ecosystems within a landscape. Landscape ecologists have proposed that landscape structure, especially the size, number, and isolation of habitat patches, can influence the movement of organisms between potentially suitable habitats. The group of subpopulations living on such habitat patches make up a metapopulation.

93. How gene is identified?

In a fully sequenced genome, genes are found by scanning the sequence using gene-predicting computer programmes and assigning putative functions by searching for similarities in already existing databases. For many organisms under investigation in ecological genomics, no genomic database is available and genes must be identified in other ways. There are some so-called pregenomic molecular approaches that may be used to identify ecologically important genes in incompletely characterized genomes.

94. Who proposed the terms ecotype and ecospecie first time?

The evolutionary botanist Göte Turesson (Malmö, Sweden 6 April 1892 – Uppsala, Sweden 30 December 1970) introduced the concept of ecotype (based on his research of 20 species from 13 genera) while finishing his PhD education at Lund.

In evolutionary ecology, an ecotype, sometimes called ecospecies, describes a genetically distinct geographic variety, population, or race within a species, which is genotypically adapted to specific environmental conditions. (Internet)

95. Sequence of start codon?

A stop codon is a sequence of three nucleotides (a trinucleotide) in DNA or messenger RNA (mRNA) that signals a halt to protein synthesis in the cell. There are 64 different trinucleotide codons: 61 specify amino acids and 3 are stop codons (i.e., **UAA, UAG and UGA**).

96. How humans are altering aquatic and terrestrial ecosystem?

Impacts from human activity on land and in the water can influence ecosystems profoundly. Climate change, ocean acidification, permafrost melting, habitat loss, eutrophication, stormwater runoff, air pollution, contaminants, and invasive species are among many problems facing ecosystems.

Canals, dammed reservoirs, irrigation ditches, and pollution are changing species diversity, microbial communities, and nutrient levels in aquatic zones across the planet.

97. Endosymbiotic Theory?

Symbiogenesis, endosymbiotic theory, or serial endosymbiotic theory, is the leading evolutionary theory of the origin of eukaryotic cells from prokaryotic organisms.

The endosymbiotic theory posits that some eukaryotic cell organelles, such as mitochondria and plastids, evolved from free-living prokaryotes. Available data indicate that the mitochondrial endosymbiosis initiated the evolution of the eukaryotic cell, as suggested by Margulis.

Examples:

The most significant examples of endosymbiosis are represented by the endosymbiotic acquisition of plastids and mitochondria, introducing photosynthesis and respiration to eukaryotes.

98. What is the causes and effect of Dysentery?

- Inflammation of the large intestine
- Diarreha and vomiting
- Caused by an amoeba

99. Africa sleeping sickness?

- Trypanosoma - causes African Sleeping Sickness
- spread by tsetse fly

100. Plasmodium?

- Plasmodium - Causes Malaria
- Spread by mosquito
- Quinine – drug used to treat malaria

101. phylum echinoderms?

A complex series of fluid filled canals with numerous flexible feeding and locomotory appendages. 5 pointed radial symmetry in adult

Echinoderms Skeleton:

Have an internal skeleton of calcium carbonate. Ossicles vary in size and structure and are manufactured by specialized cells

Water vascular system:

A separate coelom is used with interconnecting fluid filled tubes and canals. A ring canal circles the mouth and gives off 5 radial canals. The radial canal is exposed and runs along the ambulacral groove.

102. PAR quantification?

PAR can be quantified as photosynthetic photon flux density, generally reported as µmol per square meter per second. Among plants, there are three major alternative photosynthetic pathways, C3, C4, and CAM. C4 and CAM plants are more efficient in their use of water than are C3plants.

103. Synecology?

Synecology is a branch of ecology that deals with the structure, development, and distribution of ecological communities.

104. Wavelength of PAR?

Photosynthetic plants and algae CO2 as a source of carbon and light, of wavelengths between 400 and 700 nm, as a source of energy. Light within this band, which is called photosynthetically active radiation, or PAR, accounts for about 45% of the total energy content of the solar spectrum at sea level.

105. Bacteria importance in environment?

The activities of bacteria keep these cycles moving. For example, the chemosynthetic bacteria oxidize many essential elements in the process of getting the energy required to reduce CO2. Certain anaerobic bacteria in turn reduce these compounds in the process of anaerobic respiration. They use them as an electron acceptor in the absence of oxygen. This keeps the element cycles cycling maintaining balanced amounts of oxidants and reductants necessary for diverse metabolic processes. This keeps the system from “running down” energetically. Stay tuned for section on Biogeochemical Cycles.

106. How animal like protists get rid from excess water?

Getting Rid of Waste:

- Contracting vacole – collect excess water from inside the cell and gets rid of it.

107. Transduction?

Transduction is the process by which a virus transfers genetic material from one bacterium to another. Viruses called bacteriophages are able to infect bacterial cells and use them as hosts to make more viruses.

108. Role of bacteria in ecosystem?

The activities of bacteria keep these cycles moving. For example, the chemosynthetic bacteria oxidize many essential elements in the process of getting the energy required to reduce CO2. Certain anaerobic bacteria in turn reduce these compounds in the process of anaerobic respiration. They use them as an electron acceptor in the absence of oxygen. This keeps the element cycles cycling maintaining balanced amounts of oxidants and reductants necessary for diverse metabolic processes. This keeps the system from "running down" energetically. Stay tuned for section on Biogeochemical Cycles.

109. Sources of energy?

Organisms use one of three main sources of energy:

- light,
- inorganic molecules, or
- organic molecules.

Photosynthetic plants and algae CO2 as a source of carbon and light, of wavelengths between 400 and 700 nm, as a source of energy. Light within this band, which is called photosynthetically active radiation, or PAR, accounts for about 45% of the total energy content of the solar spectrum at sea level.

110. Names of groups of organisms?

- Flagellates
- Protozoans
- Sporozoans
- Ciliates

111. Shapelss protozoa?

Protozoans:

- Animal like protists
- Protozoans - Animal like Grouped by movement
- pseudopods
- cilia
- flagella
- parastites - no movement

Protozoan Characteristics:

- No cell wall
- Free-living or parasitic
- Consumers
- Habitat – aquatic (ponds,lakes, oceans)
- Examples: amoeba, paramecium, dinoflagellates

Example 1:

Protozoans – amoebas:

- Amoebas
- shapeless, aquatic
- Pseudopods in Amoebas

How Amoebas Eat?

- feeding structures-
- food vacuole
- digestive enzymes
- diffusion

Getting Rid of Waste:

- Contracting vacole – collect excess water from inside the cell and gets rid of it.

Reproduction of Amoeba:

- asexual reproduction
- Binary fission

Dysentery (an illness):

- Inflammation of the large intestine
- Diarreha and vomiting
- Caused by an amoeba

Example 2:

Protozoans-Ciliates:

- Locomotion – Cilia

Paracmecium:

- fresh water ciliate

How do Paramecium eat?

- Feed on bacteria
- Food enters oral groove,
- moves to the food vacoule,
- anal pore

Paramecium Reproduction:

- Asexual- create identical organisms
- Conjucation - sexual reproduction
- exchange of genetic information
- Not identical - adds diversity

Example 3:

Protozoans - Flagellates

- Locomotion - use flagella

112. How parasites and predators use in population control?

Predators and parasites have been used to control populations of insects that attack crops or to control invasive weeds. Recent research in Kenya has shown that a crayfish, Procambarus clarkii, controls the snails that act as intermediate hosts for Schistosoma. ahighly pathogenic human parasite. Preliminary results indicate that crayfish successfully control host snails in the artificial impoundments used for livestock watering and domestic water, important sources of infection by Schistosoma.

113. Role of contractile vacuole in amoeba?

The contractile vacuole (CV) complex is an osmoregulatory organelle of free-living amoebae and protozoa, which controls the intracellular water balance by accumulating and expelling excess water out of the cell, allowing cells to survive under hypotonic stress as in pond water.

114. What processes are influenced by landscape?

Landscape structure influences processes such as the flow of energy, materials, and species between the ecosystems within a landscape. Landscape ecologists have proposed that landscape structure, especially the size, number, and isolation of habitat patches, can influence the movement of organisms between potentially suitable habitats. The group of subpopulations living on such habitat patches make up a metapopulation.

115. Statistics?

Statistics is the discipline that concerns the collection, organization, analysis, interpretation, and presentation of data. In applying statistics to a scientific, industrial, or social problem, it is conventional to begin with a statistical population or a statistical model to be studied.

116. Factors responsible for destruction of environment?

Causes of Environmental Degradation:

- Land Disturbance. A more basic cause of environmental degradation is land damage.
- Pollution.
- Overpopulation.
- Landfills.
- Natural Causes.
- Loss of Biodiversity.
- Loss For the Tourism Industry.
- Economic Impact

117. Wrtie photo synthetic response/ effect?

The process of photosynthesis is commonly written as: $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$. This means that the reactants, six carbon dioxide molecules and six water molecules, are converted by light energy captured by chlorophyll (implied by the arrow) into a sugar molecule and six oxygen molecules, the products. (Internet)

118. Which type of reproduction is present in spider (Araneae)?

Spiders reproduce sexually and fertilization is internal but indirect, in other words the sperm is not inserted into the female's body by the male's genitals but by an intermediate stage.

119. How exotic predator disturbs food web?

Exotic predators and the structure of food webs:

Exotic predators can collapse and simplify the structure of food webs. Introduced fishes have devastated the native fishes of Lake Atitlan and Gatun Lake in Central America.

Examples:

The influence of the Nile perch on the fish community of Lake Victoria is enmeshed with massive changes in the lake's ecosystem.Introduction of the Nile perch is rapidly reducing the species-rich fish fauna of Lake Victoria to a community dominated by a handful of species.

120. Define transformation and conjugation?

Transformation:

A transformation is **a dramatic change in form or appearance**. An important event like getting your driver's license, going to college, or getting married can cause a transformation in your life. A transformation is an extreme, radical change.

Conjugation:

In conjugation, DNA is transferred from one bacterium to another. After the donor cell pulls itself close to the recipient using a structure called a pilus, DNA is transferred between cells. In most cases, this DNA is in the form of a plasmid.

121. How humans can become keystone species?

Humans have acted as keystone species in communities. People have long manipulated food webs both as a consequence of their own feeding activities and by introducing or deleting species from existing food webs. In addition, many of these manipulations have been focused on keystone species. Hunters in tropical rain forests have been responsible for removing keystone animal species from large areas of the rain forests of Central and South America. Chinese farmers have used ants as keystone predators to control pests in citrus orchards for over 1,700 years.

122. Describe food web in detail?

Food Web:

A food web summarizes the feeding relations in a community. The earliest work on food webs concentrated on simplified communities in areas such as the Arctic islands. However, researchers such as Charles Elton (1927) soon found that even these so-called simple communities included very complex feeding relations. The level of food web complexity increased substantially, however, as researchers began to study complex communities. Studies of the food webs of tropical freshwater fish communities revealed highly complex networks of trophic interaction that persisted even in the face of various simplifications. A focus on strong interactions can simplify food web structure and identify those interactions responsible for most of the energy flow in communities.

Food web and structure of communities:

The feeding activities of a few keystone species may control the structure of communities. Robert Paine (1966) proposed that the feeding activities of a few species have inordinate influences on community structure. He predicted that some predators may increase species diversity by reducing the probability of competitive exclusion. Manipulative studies of predaceous species have identified many keystone species, including starfish and snails in the marine intertidal zone and fish in rivers. On land, birds exert substantial influences on communities of their arthropod prey.

Jane Lubchenko (1978):

Jane Lubchenko (1978) demonstrated that the influence of consumers on community structure depends upon their feeding preferences, their local population density, and the relative competitive abilities of prey species. Keystone species are those that, despite low biomass, exert strong effects on the structure of the communities they inhabit.

Exotic predators and the structure of food webs:

Exotic predators can collapse and simplify the structure of food webs. Introduced fishes have devastated the native fishes of Lake Atitlan and Gatun Lake in Central America.

Examples:

The influence of the Nile perch on the fish community of Lake Victoria is enmeshed with massive changes in the lake's ecosystem.Introduction of the Nile perch is rapidly reducing the species-rich fish fauna of Lake Victoria to a community dominated by a handful of species.

Humans:

Humans have acted as keystone species in communities. People have long manipulated food webs both as a consequence of their own feeding activities and by introducing or deleting species from existing food webs. In addition, many of these manipulations have been focused on keystone species. Hunters in tropical rain forests have been responsible for removing keystone animal species from large areas of the rain forests of Central and South America. Chinese farmers have used ants as keystone predators to control pests in citrus orchards for over 1,700 years.

123. Ecology genomics?

In aiming to investigate many genes at the same time genomics differs from ecology, which although investigating many phenotypes, usually deals with only a few genes at a time.

The playing field of ecological genomics:

In between genomics, with its focus on the single genome of a model organism, studying all the genes that it contains, and ecology, studying a few genes in many species.

The genomics revolution:

Three major technological developments of 1990s

- microtechnology
- computing communication.

Microecology:

The possibility of working with molecules on the scale of a few micrometers, given by advances in laser technology, has been very important for one of genomics' most conspicuous achievements, the development of the gene chip.

OR

Ecology Genomics:

Researchers in the field of ecological genomics aim to determine how a genome or a population of genomes interacts with its environment across ecological and evolutionary timescales. Ecological genomics is trans-disciplinary by nature. Ecological genetics is the study of genetics in natural field populations. It focuses on traits involved in interactions between and within species, and between an organism and its environment, particularly those that determine fitness. (Internet)

124. Life cycle of protozoa?

Some protozoa have complex life cycles requiring two different host species; others require only a single host to complete the life cycle. A single infective protozoan entering a susceptible host has the potential to produce an immense population.

Some protozoa have two-phase life cycles, alternating between proliferative stages (e.g., trophozoites) and resting cysts. As cysts, some protozoa can survive harsh conditions, such as exposure to extreme temperatures or harmful chemicals, or long periods without access to nutrients, water, or oxygen.

125. Importance of Biodiversity?

Biodiversity has a number of functions on the Earth.

These are as follows:

- Maintaining balance of the ecosystem:
- Recycling and storage of nutrients,
- combating pollution, and stabilizing climate, protecting water resources,
- forming and protecting soil and maintaining Eco-balance.
- Intrinsic value
- A philosophical concept of the value of something independent of its value to anyone or anything

126. Exoskeleton of arthropods?

Arthropods are covered with a tough, resilient integument or exoskeleton of chitin. Generally the exoskeleton will have thickened areas in which the chitin is reinforced or stiffened by materials

such as minerals or hardened proteins. This happens in parts of the body where there is a need for rigidity or elasticity.

The bodies of arthropods are supported, not by internal bones, but by a hardened exoskeleton made of chitin, a substance produced by many non-arthropods as well. In arthropods, the nonliving exoskeleton is like a form-fitting suit of armor. It is produced by the "skin" and then hardens into a protective outer-covering.

Function of exoskeleton of arthropods:

The exoskeleton (shared with other arthropods) provides protection against predation and desiccation or water-logging (necessary for small organisms) and innumerable points of muscle attachment (for flexibility). However, the exoskeleton also limits the size that can be attained by arthropods.

Exoskeleton Helps arthropods:

An exoskeleton helps arthropods live on land by giving them structural support for their bodies. On arthropods, the exoskeleton is connected to the muscles of the body similarly to how muscles attach to bones in animals with endoskeletons.