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OBJECTIVES

Lectures 51 to 57:

1. Most powerful oxidants known _____. **Oxygen**
2. _____ deficit is calculated as the difference between the actual water vapor pressure and the saturation water vapor pressure. **Vapor Pressure**
3. The rate at which organisms can take in energy is_____. **Limited**
4. _____ explored the unity of parts and their patterns of development– skeletons in different vertebrates. **St. Hilaire**
5. Cuvier identified _____ basic body plans for animals– vertebrates, molluscs, arthropods, and radiata (jellyfish & others). **4**
6. Freshwater contain less than ___ water. **1%**
7. ……. Showed that the claims of undeniable catastrophes in the record where much exaggerated. **Lyell**
8. The relationship between photon flux density and p lant photosynthetic rate is called __. **Photosynthetic Response**
9. The first biologists to conduct thorough studies of phenotypic and genotypic variation and to incorporate experiments in their studies, focused on_____ **Plants**
10. Only_____ is a desert plant genus. **Encelia**
11. _____ cited teeth in fetal baleen whales. **Lamarck**
12. In 1997,____% of the global population was spread across oceanic island. **0.1**
13. Of the water in the biosphere, the polar ice caps and glaciers contain___ **2%**
14. Development proceeds up the tree of life. All animals begin as eggs.__ **Von Baer**
15. _____ arises from interaction b/w organism and environment. **Evolution**
16. Lamarck realized_____ could not all be ordered in a single chain. **Life**
17. Cooperative groups of females in African lions are called _____. **Prides**
18. Who worked on the developing of paleontology_ **Smith, Buckland, Cuvier, Brongniart**



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19. The most familiar relative measures of water content of air is__ **Relative Humidity**
20. The rate at which organism can take in energy is___ either by external or internal constraints **Limited**
21. Oceans contain _____ of water. **97%**
22. The turnover of water of the hydrological cycle ranges from on _____ days for the atmosphere. **9**
23. _____ form the largest continues environment on the earth. **Oceans**
24. Photosynthetic organisms restrict to _____ zone. **Euphotic or Epipelagic**
25. Oceanic temperature much more stable than _____ temperature. **Terrestrial**
26. Highest productivity occurs along _____. **Costliness**
27. _____ are found mainly at temperate latitudes. **Kelp Forests**
28. _____are limited to the trophic & subtropics. **Coral Reefs**
29. There are ____ types of coral reefs, frining reef, barrier reef, atolls. _____ **3**
30. Kelp forests limited to areas with temperature range _____. **10-20°C**
31. Reef building corals limited to areas with temperature _____**18-29°C**
32. Tidal fluctuation produces _____ due to gravitational effects of sun and moon. **Steep Gradient**
33. Salt marshes dominated by_____ vegetation. **Herbaceous**
34. _____grows in the tropic and subtropics. **Mangrove Forests**
35. _____ are extremely dynamic physically, chemically and biologically. **Estuaries**
36. _____ are much like small seas. **Lakes**
37. The salinity of lakes ranges from very dilute waters to over_____. **200%**
38. Freshwater environment is particularly vulnerable to introduction of ____**Exotic Species**
39. The nature of fish assemblage is used to assess the _____of fresh water. **Biological Integrity**
40. For the individual organism macroclimate may be _____ significant than microclimate. **Less**



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41. Most species perform best in a fairly _____ of temperature. **Narrow Range**

42. The influence of temperature on the performance of organisms begins at the_____ **Molecular Level**

43. Plants and ectothermic animals use morphology and behavior? ____**Both**

44. Birds and mammals rely heavily on _____ to regulate body temperature. **Metabolic Energy**

45. Most endothermic aquatic species are _____. **Air Breathers**

46. Flying insects & marine fish improve performance by heating parts of their ____ **Anatomy**

47. The energetic requirements of thermoregulation may influence the _____ distribution of species. **Geographic**

48. _____ is a state of low metabolic rate and low body temperature when food is scarce and night temperature cold. **Torpor**

49. Hibernation occurs in winter, if it occurs in summer then called _____. **Aestivation**

50. In _____ environment water moves from hypo osmotic to hyper osmotic solution. **Aquatic**

51. Larger osmotic difference b/w organism and environment generate_____. **High Osmotic Pressure**

52. The water potential of pure water is set at _____ **Zero**

53. The relationship b/w food density and animal feeding rate are called _____ **Functional Response**

54. Energy limitation is a assumption of _____theory. **Optimal Foraging**

55. Water potential, vapor pressure and osmotic pressure are all measured in _____ **Pascal (N/M^2)**

56. Aquatic organisms gain or lose water through _____. **Osmosis**

57. There are _____ source of energy. **3 (Light, Organic & Inorganic Molecule)**

58. Photosynthetic plants and algae use light of wavelength b/w _____. **400-700nm**

59. PAR stands for_____. **Photosynthetic Active Radiations**

60. There are_____major alternative photosynthetic pathways, C3,C4 & CAM. **3**

61. Heterotrophs use organic molecules as a source of carbon & _____**Energy**

62. ____ feed on dead plants material with lower nitrogen. **Detritivores**

63. Chemosynthetic bacteria use _____ molecules. **Inorganic**

64. Bacteria are most diverse in the_____. **Biosphere**

65. Eusociality is more complex level of social behavior, which is considered to be____ **The Pinnacle of Social Evolution**

66. Hardy-Weinberg principal conditions necessary to maintain constant allele's frequencies in a population except_____ **Immigration**

67. _____explored the extent and sources of morphological variation in plant population including both the influence of environment and genetics. **Clausen, Keck, And Hiesey**

68. Populations include _____ among individuals, which are significant aspects of population structure**. Genetic and Phenotypic Variation**

69. Evolutionary fitness is a measure of_____ **Reproductive Fitness**

70. _____ is generally accompanied by cooperative feeding, defense of the social group, and restricted reproductive opportunities. **Sociality**

71. In the logistic model, the rate of population growth _____ as population density increases. **Decreases**

72. _____ found a significant positive correlation between population size and genetic diversity in populations of chihuahua spruce. **Ledig And His Colleagues**

Lectures 58 to 64:

73. _ of terrestrial plants form mutualistic relationships with mycorrhizal fungi. **90%**

74. Higher salt and lower water concentration is termed as_____ . **Hyperosmotic**

75. Type _____ survivorship, in which there is a fairly constant probability of mortality throughout life. **II**

76. In 1997 _____ % of the global human population was concentrated in Asia. **61.4**

77. Field experiment has_____ points. **4**

78. The validity of field experiments depends upon several design features except_____ **Knowledge of Final Conditions**
79. An environment in which resources are patchy also fosters**Clumped Distribution**
80. In 1997 _____ % of the global human population was spread across Africa. **12.8**
81. Leaf hoppers are an example of _____ competition. **Intra Specific**
82. _____independently expanded the logistic model of population growth to represent interspecific competition. **Lotka And Volterra**
83. The environment Limits population growth by **Changing Birth and Death Rates**
84. The refuges that promote the persistence of hosts and prey include____ **Secure Places to Which the Exploiter Has Limited Access**
85. _____ in physical and chemical conditions across aquatic and terrestrial environment can account for significant portion of the diversity among planktonic algae and terrestrial plant. **Heterogeneity**
86. A landscape is a heterogeneous area composed of several_____. **Ecosystems**
87. _____ is an interaction between species that enhance the fitness of one individual at the expense of another. **Exploitation**
88. The pathogenic microbes such as moth larva reduced the coverage of prickly pear cactus in _____ **Australia**

Lectures 65 to 72:

89. The rate of primary production is the amount of energy____ over some interval of time. **Fixed**
90. Chinese farmers have used _____ as keystone predators to control pests in citrus orchards for over 1,700 years. **Ants**
91. _____ proposed the feeding activities of few species have inordinate influence on community structure. **Robert Paine**
92. _____ occurs on newly exposed geological substrates not significantly modified by organisms. **Primary Succession**
93. _____ are using these new tools to study large scale dynamic ecological phenomenon such as inter annual variation. **Ecologists**

94. The local population is density of the Glanville Fritillary_____Melitaeacinxia, is lowering on larger and on isolated habitat patches. **Butterfly**
95. _____ 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. **Jane Lubchenko**
96. Succession in the intertidal zone require_____**1 To 3 Years**
97. _____can be used to detect long-term ecological changes. **Repeat Photography**
98. Sonoran desert plant distribution map clearly on the soils of different ages and form a _____ mosaic that closely matches soil mosaic. **Vegetative**
99. On Island and habitat patches on continents __**Species Richness Increases With Area And Decreases With Isolation**
100. Highest rate terrestrial primary production occur under___ **Warm And Moist Conditions**
101. A resilient community or ecosystem may be _____ disrupted by disturbance but quickly return to former state. **Completely**
102. The ability to bounce back after disturbance is called_____ **Resilience**
103. Plant complete when_____ nutrients are less **More Intensively**
104. _____alters the outcome of competition by removing nutrient limitation on stress-tolerant plants. **Fertilization**
105. There Are_____ Possible Outcomes of Interspecific Competition. **4**

Lectures 73 to 86:

106. PAR, accounts for about ____ of the total energy. **45%**
107. A ___ grouping consists of various species that lack a common ancestor is called. **Polyphyletic**
108. _____uses DNA and other molecular data to determine evolutionary relationships **Molecular Systematic**
109. Crossing over occurs during the process. **Meiosis**

110. Some _____ mutations stay within a population from generation to generation, and drive the evolution of that species. **Beneficial**

111. The process of conjugation occurs in _____. **Plants**

112. _____cells are combination of proteins synthesizing system. **Eukaryotic**

113. Maximum parsimony assumes that the (appearances of shared derived characters) is the most likely. **Tree That Requires the Fewest Evolutionary Events**

114. One of the following is not example of horizontal gene transfer____ **Conjunction**

115. Conjugation is a process of_____ **Sexual Reproduction**

116. Ecology is derived from ____ word. **Greek**

117. Odum ___. **"The Structure and Function of Nature"**

Lectures 87 to 93:

118. Schistosoma, a highly pathogenic _____ parasite. **Human**

119. The behavior of Spiny-headed worms is an example of ____**Exploitation**

120. A __ like impression is present in rocks 200 m below the Ediacara Hills. **Jellyfish**

121. Protozoa reproduce except_____ **Parthenogenesis**

122. 1st multi-cellular organism found in China as carbonaceous filament were___ **1.8 Billion Years**

123. Quinine is a drug used to treat_____**Malaria**

124. The bark of this tropical tree contains a drug called quinine is used in the prevention of_____ **Malaria**

Lectures 94 to 100:

125. Specie differ from foundation species is that they are likely to belong to_____ **Higher Trophic Levels**

126. Keystone species differ from foundation specie, **(Higher Trophic Level, And Top Predator; Tend to Modify Their Environment,) ALL GIVEN ABOVE.**

127. The_____ technique has now been replaced by sequencing using a mass spectrometry. **Laborious Edman Degradation**

128. What is not true about Protein degradation____ **Sequencing Using Mass Spectrometry Is Replaced by Admen Degradation**

129. Phylogenetic Trees are evaluated in order to find the relationship among _____ **Species, Phylum, Family, (All of Given)**

130. Supporting evidence for endosymbiosis except_____ **Comes from Studies of Living. Prokaryotic Cells**

131. A food_____ summarizes the feeding relation in a community. **Web**

132. _____soon found that even these so-called simple communities included very complex feeding relations. **Charles Elton (1927)**

From MID Term:

133. Annelide have circulatory system_____. **Close**

134. In principle the transcriptome includes _____ in addition to ribosomal RNAs (rRNAs). **Messenger RNAs (mRNAs)**

135. Scientist makes different branches of science on the bases of ___ and_____ of organisms. **Habitat, Appearance**

136. Polypeptides can form complex 3-dimensional structures_____. **Proteins**

137. snRNA is a type of_____. **RNA**

138. Depending on the selective pressure, mutations can be_____. **Useful**

139. The first genome sequenced completely was that of__ **Homophilus Influenza**

140. To assemble a genome from a series of sequences requires tremendous____ **Computational Power**

141. Community structure is measured by_____ **Species Richness And Diversity**

142. Which one of the following is not one of the positive interactions on microbe_____ **Amensalism**

143. Not Positive interaction _____ **Competition**

144. Modern bread wheat is a mixture of recombined genes from _different wild species.**3**

145. _____type of natural selection which favors more than two extreme phenotypes is. **Disruptive Selection**



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146. Which one of the following is not one of the advantages of in situ conservation_____ **The Species Have Less Space**

147. Which of the following is not common extension of omics_____ **Vaccinomics**

148. Vertebrates make _____ % of total animals. **5%**

149. Number of alleles in a sample population is called _____ **Allelic Richness**

150. One of the first question that is asked when a species is considered for whole-genome sequencing is__. **What Is The Size Of Its Genome?**

151. Annelids are not_____ **Predator**

152. Gymnopserms means_____. **Naked Seeds**

153. If for genetic modification, genes of the species or of a crossable plant are used under control of their native promoter, then they are called____ plants. **Cisgenic**

154. A philosophical concept of value of something independent of its value to anything else is called_____. **Intrinsic Value**

155. The advantage of in-situ conservation except_____**The Specie Will Not Evolve In Their Environment.**

156. In 18th Century, Carolus Linnaeus published a system of taxonomy on resemblance____. **Two-Part Names of Species And Hierarchical Classification**

157. Oparin in 1924 gives_____. **Primeval Soup Theory**

158. Major technological developments of 1990s **All of The Above (Computing, Communication, Micro Technology)**

159. ____are found in more than one copy in the genome. **Paralogous Genes**

160. Krill is a major food for_____ **Whales**

161. The earth ecosystem interacting with physical environment as a whole maintained a steady state system intermediate in the flow of energy between the high energy input of the sun and thermal sink of space is called_____ **Biosphere**

162. Human is in which order___ **Primate**

163. Notochord is present throughout life or at least during embryonic stages in____ **Chordates**

164. The field of biology specially in developing hardware and software to store and analyze the huge amount of data generated by life science is called ___ **Bioinformatics**

165. Possibility of working with molecules on the scale of few micrometers is___ **Micro Technology**

166. There are so-called _____that may be used to identify ecological important genes in incompletely characterized genome. **Pre-Genomic Molecular Approaches**

167. Medicines from nature account for usage by____ of the world's population. **80%**

168. Habitat Destruction is major cause for_____ **Loss of Biodiversity**

169. Coral reefs which are biodiversity hotspots will disappear in ____year. **20-40**

170. Plant founded in particular area is_____ **Flora**

171. Gregor Mendel's Experiments with plant hybridization led to his establishing_____ **Laws of Inheritance**

172. Genetic modification of plants is achieved by adding a specific gene or genes to a plant, or by knocking down a gene with_____. **RNAI**

173. The following are major activities of plant breeding; one of the following is the correct sequence of plant breeding_____. **Collection of Variation-Selection-Evaluation-Release (CSER)**

174. One of the following is the is not the correct sequence of deforestation_____ **Decrease in The Level of Carbon Dioxide in The Atmosphere**

175. One of the following is NOT the part of maintaining balance of the ecosystem____ **Protection of Food Crops**

176. The Nobel Prize winning scientist Linus Pauling Aptly described science as the____ **Search for Truth**

177. In Genome evolution Gene number & complexity of an organism____ **Are Not Strongly Linked**

178. Gene diversity is the variation at the level of___ **Both at Individual Gene And In A Population**

179. Haldane (1929) gave the _____**Hot, Dilute Soup Theory**

180. Not an example of Ex-situ Conservation__ **Natural Park and Natural Reserves**

181. One of the following a population over subsequent generations_____ **Bad or Lethal Mutations**

182. The fossil record is relatively incomplete for several reasons, which one is not true statement_____ **Soft Tissues Are Mostly Preserved**

183. The process of synthesis of protein is called _____**Translation**

184. Animal eat other animals are called. **Predators**

185. _____Group have common ancestor. **Clade**

186. Study of transcripts that are present in an organism any time is called____. **Transcriptomics**

187. Mass spectrometry is used to determine the sequence of_____ **Amino Acids**

188. Which of the following is not part of human genome project____ **Us Department of Medicine?**

189. Comparative genomics is developing an increasing array of bioinformatics techniques. Which of the following is not done_____ **Synteny Footprinting**

190. Comparative genomics is developing an increasing array of bioinformatics techniques except. **Synteny Shadow**

191. Eukarya have been evolved form since ____ million years ago. **Two**

192. The experiment failed because the original cause ____ had not been eliminated. **Rats**

193. The notochord is a flexible, rod-like structure derived from_____. **Mesoderm**

194. Zooplankton feed on----------? **A) Bacteria B) Fungi C) Algae D) All**

SUBJECTIVES

Lectures 51 to 57:

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** 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.

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 instance of '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

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

in the downward flow of water through the soil. ... Another loss of nutrients from ecosystems is due to denitrification.

15.Difference Between Genotype and Phenotypes

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."

Lectures 58 to 64:

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.

OR

In the presence of abundant resources, populations can grow at geometric or exponential rates, Population growth by organisms with nonoverlapping generations can be described by the geometric model of population growth, Population growth that occurs as a continuous process, as in human or bacterial populations, can be described by the exponential model of population growth.

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. 10 Marks

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 assesses the costs of the mutualism to the plant in 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.

Lectures 65 to 72:

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 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.

24.Landscape ELEMENT

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.

Lectures 73 to 86:

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

Lectures 87 to 93:

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 predator.

❖ 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.

Lectures 94 to 100:

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. 10 Marks

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 community.

- 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)**.

NONSENSE CODEN: 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.

From MID Term:

52.Nutrition and Nutrition Cycle?

A nutrient cycle refers to the movement and exchange of organic and inorganic matter back into the production of living matter. The process is regulated by the food web pathways previously presented, which decompose organic matter into inorganic nutrients. Nutrient cycles occur within ecosystems.

53.Define Eco-Line?

A sequence of inter-ranking structure formed within a group between two distinct environments wherein the border line takes gradual and dynamic changes nurturing varied stable communities in a geographical area. **(Internet)**

54.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.

55.Species Richness and Species Diversity?

Species richness is the number of different species in a particular community. Species diversity is a measure of community complexity.

56.Phylogenetic Tree

Phylogenetic Tree of Life (3 Domains)

Bacteria, Archaea and Eukarya

OR

Explore genome evolution based on large data sets of DNA or protein sequences. Using entire genomes to infer a species tree (Eisen and Fraser 2003). Based on maximum genetic information and average out the anomalies. Has become the standard for reconstructing reliable phylogenies (Ciccarelli et al, 2006; Daubin et al. 2002).

57.Nutrient Influence by Human and Terrestrial Ecosystem?

Human activities are significantly and rapidly altering the form and function of terrestrial ecosystems. For example, we are changing the chemical composition of the atmosphere, converting natural landscapes to urban areas, and transporting floral and faunal species far beyond their natural boundaries. **(Internet)**

58.Importance of Bacteria and Fungi?

Fungi and bacteria are essential to many of the most basic ecosystem processes: saprobic fungi break down fallen wood and litter returning nutrients to the soil; nitrogen-fixing bacteria and mycorrhizal fungi assist plants to obtain nutrients from the soil; and many groups of fungi and bacteria cause diseases of plants.

OR

Many bacteria and fungi are important as producers of valuable products,

For Example

- Antibiotics,
- Medicines,
- Vitamins,
- Soy sauce,
- Cheese,
- Yoghurt,
- And other foods made from milk.

59.Landscape Ecology

"Landscape ecology is concerned with spatial patterns in the landscape and how they develop, with an emphasis on the role of disturbance, including human impacts" (Smith and Smith). It is a relatively new branch of ecology that employs Global Information Systems. The goal is to predict the responses of different organisms to changes in landscape, to ultimately facilitate ecosystem management

60.Importance of Bacteria? OR Role of Bacteria in Environment?

The ecosystem, both on land and in the water, depends heavily upon the activity of **bacteria**. The cycling of nutrients such as carbon, nitrogen, and sulfur is completed by their ceaseless labor. Decomposition is the breakdown of these organisms, and the release of nutrients back into the environment, and is one of the most important roles of the bacteria.

61.Traits That Breeders Have Tried to Incorporate into Crop Plants?

- Improved quality, such as increased nutrition, improved flavor, or greater beauty
- Increased yield of the crop
- Increased tolerance of environmental pressures (salinity, extreme temperature, drought)
- Resistance to viruses, fungi and bacteria
- Increased tolerance to insect pests
- Increased tolerance of herbicides
- Longer storage period for the harvested crop

62.What Are the Processes of The Ecosystem Influenced by Landscape Structure? 2

Landscape structure influences processes such as the flow of energy, materials, and species between the ecosystems within a landscape.

63.Define Community Structure?

Community structure is essentially the composition of a community, including the number of species in that community and their relative numbers. It can also be interpreted more broadly, to include all of the patterns of interaction between these different Species.

64.History of Plant Breeding.

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

65.Protozoan Characters?

- All are unicellular eukaryotes
- Many species are both heterotrophic and autotrophic simultaneously or at different stages of the lifecycle
- Protozoans are ecologically important primary producers, consumers and as vital links in the food chain
- Humans are greatly affected by parasitic protozoans either directly or indirectly
- Effects range from irritating - fatal
- Malaria (Plasmodium spp.) worldwide epidemic

66.Incomplete Fossil Record of Soft Bodies?

The fossil record is relatively incomplete for several reasons:

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

67.Advantage to Being Multicell

For something on the order of 1.5 billion years all organisms were single-celled and life seems to have thrived. In fact, single-celled organisms are quite good at what they do but what they do is very limited. Single celled organisms cannot grow very large, because as size increases proportionately less of a cell is exposed to the external environment in relation to its volume and the proportion of surface area decreases. Transferring materials from the exterior to the interior becomes less efficient. Multicell organisms live longer, since cells can be replaced and more offspring can be produced. Cells have increased functional efficiency when they are specialized into organs with specific capabilities.

68.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.

69.How to Documented Genetic History in Genome?

- Comparing nucleic acids or other molecules to infer relatedness is a valuable tool for tracing organisms' evolutionary history
- DNA that codes for rRNA changes relatively slowly and is useful for investigating branching points hundreds of millions of years ago
- mtDNA evolves rapidly and can be used to explore recent evolutionary events

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