BIO1130 Keywords

Modern Theory

adaptive radiation: a cluster of closely related species that are each adaptively specialized to a specific habitat or food source. Example: finches of Galapagos

allele: one of two or more variations of a gene. Example: hair color, eye color

allele frequency: the abundance of one allele relative to others at the same gene locus in individuals of a population. percent/fraction of population with gene

allopolyploidy: the genetic condition of having two or more complete sets of chromosomes from different parent species. Example: Horse + Donkey = infertile Mule

autopolyploidy: the genetic condition of having more than two sets of chromosomes from the same parent species. Example: parent chromatids not seperating during meiosis.

beneficial mutation: mutations that cause the organism with it to be more suited to survival in its environment. Example: antibiotic-resistant bacteria.

bottleneck effect: a population's size is decreased for at least one generation due to genetic drift and causing a reduce in genetic variation. Example: Cheetas.

chromosomal inversion: chromosomal alteration that occurs if a broken segment reattaches to the same chromosome from which it was lost, but in reverse order, so the orientation of genes in the segment is reversed with respect to the other genes of the chromosome.

chromosomal mutation: a spontaneous and heritable change in DNA, could be caused by a missing, extra, or irregular portion of DNA from the number of chromosomes, and the structure.

chromosomal translocation: a chromosomal alteration that occurs if a broken segment is attatched to a different, nonhomologous chromosome. gene fusion can also occur in this process.

crossing over: the recombination process in meiosis in which chromatids exchange segments.

deleterious mutation: chromosomal alteration that occurs if a broken segment is lost from a chromosome.

diploid: an organism or cell with two copies of each type of chromosome in its nucleus.

directional selection: a type of selection in which individuals near one end of the phenotype spectrum have the highest relative fitness. Example: Peppered moths.

disruptive selection: a type of natural selection in which extreme phenotypes have higher relative fitness that intermediate phenotypes. Example: Peppered moths

female choice: sexual selection through female's choice of who to mate with based off of attractiveness of phenotypic traits. Example: birds (peacocks)

fitness: the ability to survive to reproduce with a mate and have offspring. The more offspring, the higher fitness is.

fixation: to preserve cell and tissue when a sample is taken. Example: prepping slides.

founder effect: an evolutionary phenomenon in which populations that were established by a few colonizing individuals has only a fraction of the genetic diversities seen in the population from which it derived. Example: humans - French Canadians, Amish, huntington's disease in Lake Maricaibo, Venezuela, lack of type B blood in Native Americans

frame-shift mutation: mutation in a protein-coding gene that causes the reading frame of mRNA transcribed from the gene from the gene to be altered, resulting in the production of a different, and nonfunctional, amino acid sequence in the polypeptide.

gene duplication: chromosomal alteration that occurs if a segment is broken from one chromosome and inserted into its homologue.

gene flow: the transfer of alleles or genes from one population to another. Example: bees being the catalyst for gene flow in plants by transfering one type of pollen from one plant to another.

gene pool: the stock of different genes in an interbreeding population.

genetic drift: random fluctuations in allele frequencies as a result of chance events; usually reduces genetic variation in a population.

genetic equilibrium: the point at which neither the allele frequencies nor the genotype frequencies in a population change in succeeding generations.

genotype frequencies: the percentage of individuals in a population possessing a particular genotype.

Hardy-Weinberg principle: an evolutionary rule of thumb that specifies the conditions under which a population of diploid organisms achieves genetic equilibrium.

heterozygous: The state of possessing two different alleles of a gene.

homology: the quality or condition of two organisms being genetically similar.

homoplasy: a characteristic shared by a set of species, but has no common ancestors. this is the product of convergent evolution.

homozygous: a state of possessing two copies of the same allele.

inbreeding: a special form of nonrandom mating in which genetically related individuals mate with each other.

male competition: sexual selection through males fighting and competing to the death for the chance to mate with a female. Example: giraffes.

microevolution: small-scale genetic changes within populations, often in response to shifting environmental circumstances or chance events.

migration: the predictable seasonal movement of animals from from the area where they are born to a distant and initially unfamiliar destination, returning to their birth site later.

missense mutation: a base-pair substitution in a protein-coding gene that results in a different amino acid in the encoded polypeptide than the normal one.

modern theory of evolution: the theory of evolution by Darwin with the addition of genetics and DNA. it emphasizes the physical and behavioral changes that make natural selection possible due to mutations.

mutations: a spontaneous and heritable change in DNA

natural selection: the evolutionary process by which alleles that increase the likelihood of survival and the reproductive output of the individuals that carry them become more common in subsequent generations.

neutral mutation: changes in DNA that are neither beneficial nor detrimental to to the ability of an organism to survive and reproduce.

non-random mating: mating not due to chance, has human interference. Example: breeding.

point mutations: a mutation affecting only one or very few nucleotides in a gene sequence.

polyploidy: a condition of having one or more extra copies of the entire haploid complement of chromosomes.

population: all individuals of a single species that live together in the same place and time.

population genetics: the branch of science that studies the prevalence and variation in genes among populations of individuals.

punnett square: method for determining the genotype and phenotypes of offspring and their expected proportions of traits.

qualitative trait/variation: variation that exists in two or more discrete states, with intermediate forms often being absent

quantitative trait/variation: a character that displays a continuous distribution of the phenotype involved, typically resulting from several to many contributing genes. Variation is measured on a continuum rather than discrete units or categories.

recessive allele: an allele that produces its characteristic phenotype only when paired allele is identical.

reinforcement: the enhancement of reproductive isolation that has begun to develop while populations were geographically seperated.

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sexual dimorphism: differences in the size or appearance of males and females.

sexual selection: a form of natural selection established by male competition for access to females and by the females' choice of mates.

sickle cell anemia: a severe hereditary form of anemia in which a mutated form of hemoglobin distorts the red blood cells into a cresent shape at low oxygen levels.

silent mutations: a base-pair substitution mutation in a protein-coding gene that does not alter the amino acid specified by the gene.

sperm competition: the physical competition of two seperate males to fertilize the eggs of a lone female.

stabilizing selection: a type of natural selection in which individuals expressing intermediate phenotypes have the highest relative fitness.

synthetic theory of evolution: including the fields of genetics, systematics and palaeontology in the theory of evolution.

tetraploid: a cell containing four homologous of chromosomes.

triploid: a rare chromosomal disorder in which a fetus has three copies of every chromosome instead of the normal two.