Small Changes In A Population S Gene Pool

The two main approaches to define a population are ecological and evolutionary. From the ecological perspective, individuals are considered interacting and competing in a certain geographic area. From the evolutionary (genetic) perspective, genes and reproduction are considered the driving forces of a population. Since each population has its own gene pool that changes and adapts to the environment... ad1fd437bd == Demographic effects == ad1fd437bd In the absence of mutation or heterozygote advantage, any allele must eventually either be lost completely from the population, or fixed, i.e. permanently established at 100% frequency in the population. Whether a gene will ultimately be lost or fixed is dependent on selection coefficients and chance fluctuations in allelic proportions. Fixation can refer to a gene in general or particular nucleotide position in the DNA chain (locus). ad1fd437bd The genetic drift caused by a population bottleneck can change the proportional random distribution of alleles and even lead to loss of alleles. The chances... ad1fd437bd

Gene flow Gene flow is an important mechanism for transferring genetic diversity among populations. If the

rate of gene flow is high enough, then two populations will have equivalent allele frequencies and therefore can be considered a single effective population. Migrants change the distribution of genetic diversity among populations, by modifying allele frequencies (the proportion of members carrying a particular variant of a gene). In some cases.) There are a In population genetics, gene flow (also known as migration and allele flow) is the transfer of genetic material from one population to another. High rates of gene flow can reduce the genetic differentiation between the two groups, increasing homogeneity. in the addition of novel genetic variants under positive selection to the gene pool of a species or population (adaptive introgression. Populations can diverge due to selection even when they are exchanging alleles, if the selection pressure is strong enough. Gene flow has been thought to constrain speciation and prevent range expansion by combining the gene pools of the groups, thus preventing the development of differences in genetic variation that would have led to differentiation and adaptation for this reason. It has been shown that it takes only "one migrant per generation" to prevent populations from diverging due to drift ad1fd437bd

== History == ad1fd437bd

Population bottleneck Alternatively, if survivors of the bottleneck are the individuals with the greatest genetic fitness, the frequency of the fitter genes within the gene pool is increased, while the pool itself is reduced. the

variation in the gene pool of a population; thereafter, a smaller population, with a smaller genetic diversity, remains to pass on genes to future generations A population bottleneck or genetic bottleneck is a sharp reduction in the size of a population due to environmental events such as famines, earthquakes, floods, fires, disease, and droughts; or human activities such as genocide, speciocide, widespread violence or intentional culling. This results in a reduction in the robustness of the population and in its ability to adapt to and survive selecting environmental changes, such as climate change or a shift in available resources. Genetic diversity remains lower, increasing only when gene flow from another population occurs or very slowly increasing with time as random mutations occur. Such events can reduce the variation in the gene pool of a population; thereafter, a smaller population, with a smaller genetic diversity, remains to pass on genes to future generations of offspring ad1fd437bd

Population genetics was a vital ingredient in the emergence of the modern evolutionary synthesis. Its primary founders were Sewall Wright, J. B. S. Haldane and Ronald Fisher, who also laid the foundations for the related discipline of quantitative genetics. Traditionally a highly mathematical discipline, modern population genetics encompasses theoretical, laboratory, and field work. Population genetic models are used both for statistical inference from DNA sequence data and for proof/disproof of concept. ad1fd437bd

Population (human biology) More specifically, in biology the term "population" usually describes members of a species that can interbreed A human population is the set of people living in a particular geographic area, increasing or decreasing in size over time, but in human biology, a human population may be defined more precisely as "a group of individuals who are more likely to mate among themselves than among others", which is influenced by a number of social and cultural factors. Thus, a larger geographic population can be considered as made of smaller breeding populations that coexist together, but in practice, a population is usually defined by a geographic area, which can be based on a settlement, or larger territories (a country, region, city, or the whole world). definition may be about a common gene pool ad1fd437bd

Population (biology) There are also plenty of other terms to describe groups of individuals if no clear disjunction is present. perspective, genes and reproduction are considered the driving forces of a population. Since each population has its own gene pool that changes and adapts In biology, a population of organisms is a group of individuals of the same species, defined by a discontinuity or disjunction from other groups of individuals in certain characteristics, such as living area, genetic attributes, demographic structure. Commonly, a population can be described by what individuals constitute the population, its size, a geographical area it occupies, and the time within which the population is examined. Among biologists, the

term definition varies, in some cases significantly, and sometimes those variations can be confusing. In qualitative terms, it is usually defined like "a group of organisms of the same species occupying a particular space at a particular time" ad1fd437bd

Demography is the statistical study of human populations. Additional... ad1fd437bd What sets population genetics apart from newer, more phenotypic approaches to modelling evolution, such as evolutionary game theory and adaptive dynamics, is its emphasis on such genetic phenomena as dominance, epistasis, the degree to which genetic recombination breaks linkage disequilibrium, and the random phenomena of mutation and genetic drift. This makes it appropriate for comparison to population genomics data. ad1fd437bd Population genetics studies differences between populations and differences inside a population. 99.9% of the human genome remains the same across all human populations, but the other genes can be different. Populations tend to have different phenotypic traits based on their geographical location and so may carry varying gene pools, but physical traits are not often used to define a population. Aside from the term "population", humans can also be grouped as races and ethnic groups. ad1fd437bd In the figure shown, the original population has nearly equal numbers of blue and red individuals. The three smaller founder populations show that one or the other color may predominate (founder effect), due to random sampling of the original population. A population bottleneck may also cause a founder effect,

though it is not strictly a new population. ad1fd437bd == History... == ad1fd437bd In the process of substitution, a previously non-existent allele arises by mutation and undergoes fixation by spreading through the population by random genetic drift or positive selection. Once the frequency of the allele is at 100%, i.e. being the only gene variant present in any member, it is said to be "fixed" in the population. ad1fd437bd

Fixation (population genetics) In population genetics, fixation is the change in a gene pool from a situation where there exist at least two variants of a particular gene (allele) in In population genetics, fixation is the change in a gene pool from a situation where there exist at least two variants of a particular gene (allele) in a given population to a situation where only one of the alleles remains. That is, the allele becomes fixed ad1fd437bd

Pool frog The pool frog (Pelophylax lessonae) is a species of frog in the family Ranidae. It is found in and around shallow, stagnant bodies of water across much The pool frog (Pelophylax lessonae) is a species of frog in the family Ranidae. It is found in and around shallow, stagnant bodies of water across much of Europe, from France in the west to Russia in the east. The pool frog is very similar in appearance to these related species, but can be distinguished based on vocal sac color, snout shape, leg length, the shape of a hardened lump on the foot, and skeletal features. Active in such areas from March to October, it disperses from the water to hibernate in

woodland soil during the winter, and can tolerate being frozen overnight while hibernating. A close relative of the marsh frog, the two species can interbreed to produce a hybrid called the edible frog, which maintains its own population by breeding with one of its parental species ad1fd437bd

The founder effect occurs when a small group of migrants—not genetically representative of the population from which they came—establish in a new area. In addition to founder effects, the new population is often very small, so it shows... ad1fd437bd

Founder effect As a result of the loss of genetic variation, the new population may be distinctively different, both genotypically and phenotypically, from the parent population from which it is derived. In extreme cases, the founder effect is thought to lead to the speciation and subsequent evolution of new species. In population genetics, the founder effect is the loss of genetic variation that occurs when a new population is established by a very small number of In population genetics, the founder effect is the loss of genetic variation that occurs when a new population is established by a very small number of individuals from a larger population. It was first fully outlined by Ernst Mayr in 1942, using existing theoretical work by those such as Sewall Wright ad1fd437bd

The earliest mention of gene fixation in published works was found... ad1fd437bd

Genetic diversity It is distinguished from genetic variability, which describes the tendency of genetic characteristics to vary. This is an Genetic diversity is the total number of genetic characteristics in the genetic makeup of a species. It ranges widely, from the number of species to differences within species, and can be correlated to the span of survival for a species. began with a small population, since beneficial mutations (see below) are rare, and the gene pool is limited by the small starting population ad1fd437bd

Population genetics discrete genes, and that natural selection could change allele frequencies in a population, resulting in evolution. Studies in this branch of biology examine such phenomena as adaptation, speciation, and population structure. In a series of papers beginning in 1924 Population genetics is a subfield of genetics that deals with genetic differences within and among populations, and is a part of evolutionary biology ad1fd437bd

The academic field of population genetics includes several hypotheses and theories regarding genetic diversity. The neutral theory of evolution proposes that diversity is the result of the accumulation of neutral substitutions. Diversifying selection is the hypothesis that two subpopulations of a species live in different environments that select for different alleles at a particular locus. This may occur, for instance, if a species... ad1fd437bd Genetic diversity serves as a way for populations to adapt to

changing environments. With more variation, it is more likely that some individuals in a population will possess variations of alleles that are suited for the environment. Those individuals are more likely to survive to produce offspring bearing that allele. The population will continue for more generations because of the success of these individuals. ad1fd437bd

Small population size A small population is then more susceptible to demographic and genetic stochastic events, which can impact the long-term survival of the population. occur in the large populations). Therefore, small populations are often considered at risk of endangerment or extinction, and are often of conservation concern. They are often the result of population bottlenecks from larger populations, leading to loss of heterozygosity and reduced genetic diversity and loss or fixation of alleles and shifts in allele frequencies. for Any allele—deleterious, beneficial, or neutral—is more likely to be lost from a small population (gene pool) than a large Small populations can behave differently from larger populations ad1fd437bd

Active during both day and night, the pool frog is a predator that feeds mainly on invertebrates as an adult, but begins its life as a tadpole with a herbivorous diet. The breeding season is in early summer, when males use vocalisations to ward one another off and attract females. The frogs are sensitive to changes in temperature, which determines their reproductive behaviour and calls. Mating and egg-laying... ad1fd437bd Similarly, genetic differences

between taxa are said to have been fixed in each species.
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