Evolution and Biodiversity

Lec.(5).Factors that alter allele frequency العوامل التي توءثر في تكرار الاليلات.

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(1). Mutation الطفره

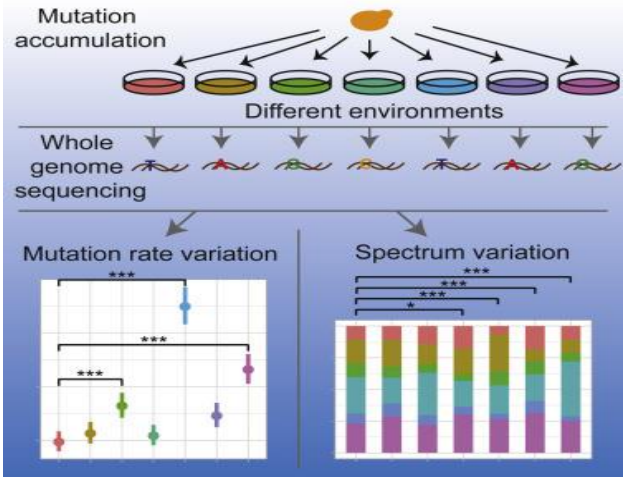
---- A mutation is an error in replication of neucleotide sequence in DNA.

---- Mutation rates are generally too low that few populations are around long enough to accumulate significant numbers تراكم عددي معنوي of mutation.

---- Mutation must affect the DNA of the germ cells (eggs and sperms) or the mutation will not be passed on to offspring.

---- Some mutations are harmful موءذيه , while other are neutral متعادله التاءثير or even rare beneficial نادرا مفيده.

Mutation is source of variation in a population.



(2).Migration الهجره

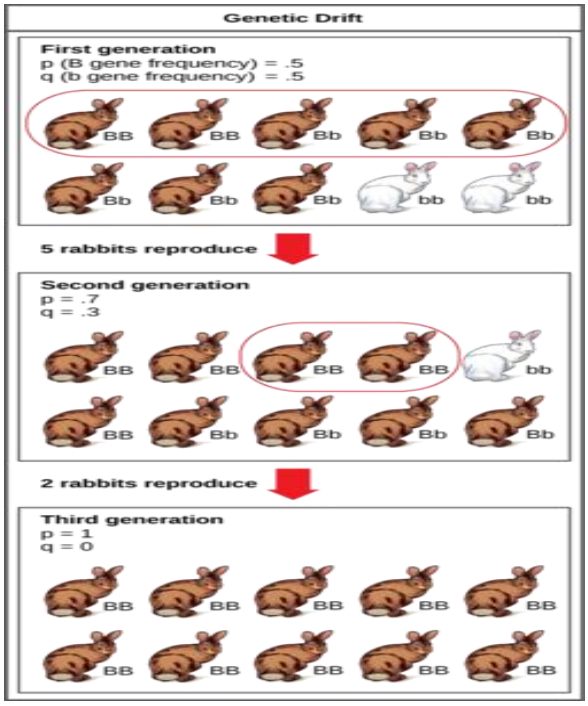
---- Migration defined in genetic terms, as the movement of individuals from one population into another.

---- Migration includes:

a. Immigration هجره داخليه : Movement of individuals into population.

b. Emigration هجره خارجيه: Movement of individuals out of a population.

(3). Genetic drift الانجراف الوراثي

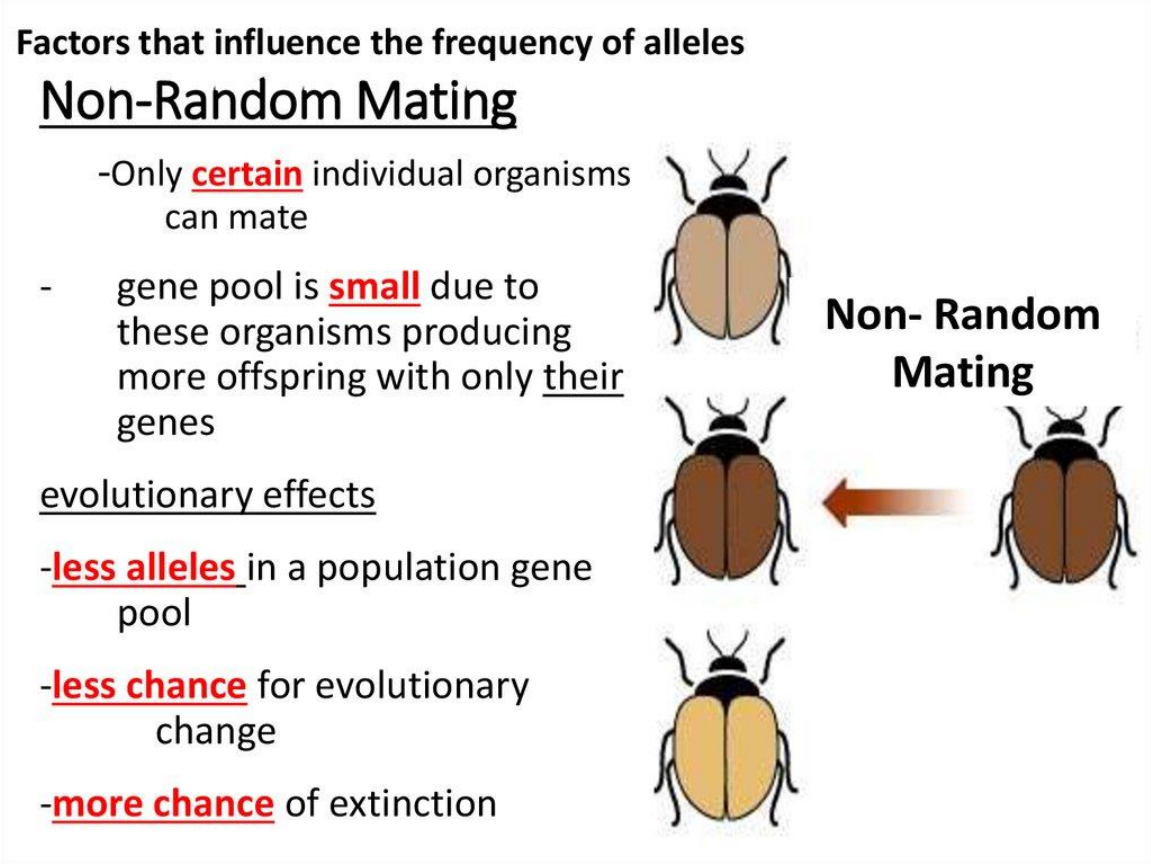


---- In small population, the frequencies of particular alleles may be changed by chance alone.

Random loss of alleles is known as genetic drift الفقدان العشوائي للاليلات يعرف بالانجراف الوراثي.

----When one of few individuals migrate and become the founders موءسس او منشيء of a new isolated population مجموعه سكانيه معزوله at some distance from their place of origin.

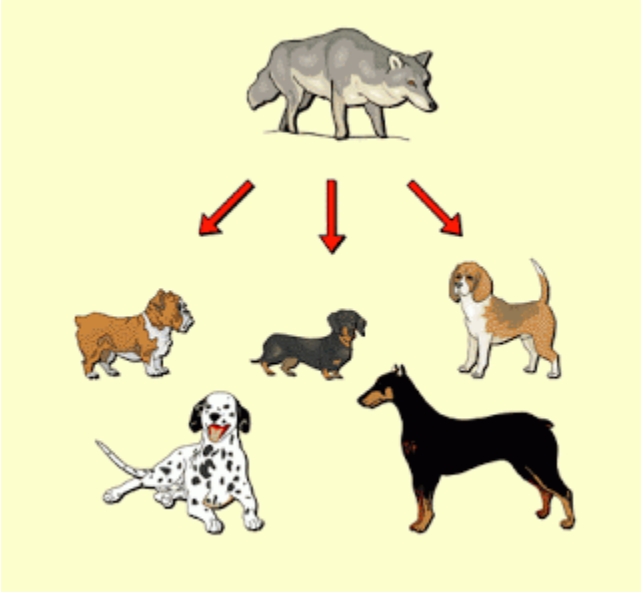
(4). Nonrandom mating التزاوج اللاعشوائي



---- Individuals with certain genotypes sometimes mate with one another either more or less commonly than would be expected on random basis, a phenomenon ظاهره known as nonrandom mating.

---- One type of nonrandom mating characteristic of many groups of organisms is breeding, mating with relatives الاقارب .

(5). Selection الانتخاب



---- Some individuals leave behind more progeny than others, and the likelihood ترجح او ارجحيه they will do so is affected by their inherited characteristics(the result of the process is called selection).

----*Artificial selection الانتخاب الصنعي : the breeder select for the desired characteristics الصفات المرغوبه .

Example: Mating larger animals with each other produces offspring that are larger.

----*Natural selection الانتخاب الطبيعي : Darwin suggested the environment plays this role with conditions in nature determining which kinds of individuals in population are the most fit and so affecting the proportions of genes among individuals of future populations .

Species Diversity (الانتواع) تنوع الانواع

----Species is composed of populations whose members mate with each other and produce fertile خصب offspring or would do so if they came into contact. (تعريف النوع)

----Conversely ,population whose members do not mate with each other or who cannot produce fertile offspring are said to be reproductively isolated and thus, members of different species.

What cause of reproductive isolation الانعزال التكاثري?

(1). Pre-zygotic isolating mechanism ميكانيكية العزل قبل تكوين الزيجه.

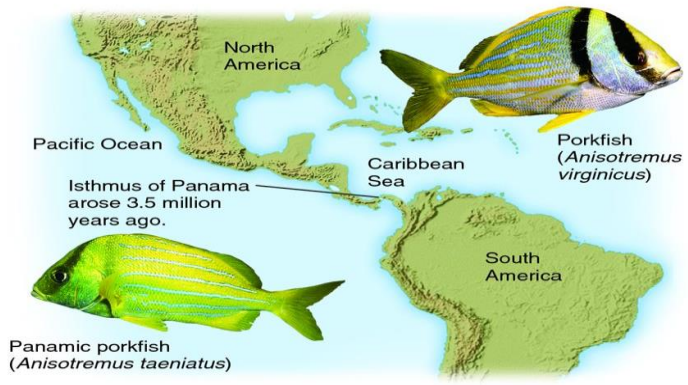
(2). Post-zygotic isolation mechanism ميكانيكية العزل بعد تكوين الزيجه.

(1).Pre-zygotic isolating mechanisms.

(Prevent the formation of zygotes).

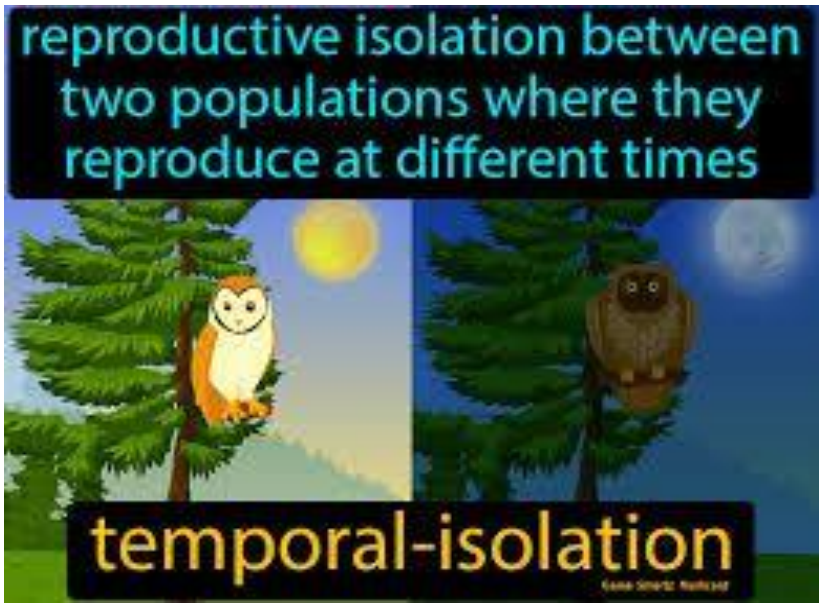
This mechanism include:

1. Geographical isolation العزل الجغرافي: Species occur in different areas which are often separated by a physical barrier such as river or mountain rang.



2.Ecological isolation العزل البيئي : Species occur in the same area but they occupy different habitats. Survival of hybrids is low because they are not adapted to either environment of their parents.

(3). Temporal isolation العزل الوقتي: Species reproduce in different seasons or at different times of the day.



(4). Behavioral isolationالعزل السلوكي: Species differ in their mating rituals.

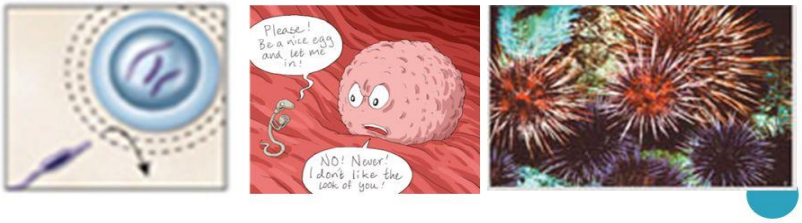
(5). Mechanical isolation العزل الميكانيكي: Structural differences between species prevent mating.

(6). Preventing of gamete fusion منع اندماج الكميتات : Gamete of one species function poorly with the gametes of another species or within the reproductive tract of another species.

A) Prezygotic Barriers

A5) Gamete Isolation

- Prevention of Gamete Fusion
- Sperm can only fertilize correct egg
  - Usually chemically-based (protein receptors on cell membranes)



(2). Post-zygotic isolation

---- Hybrid in viability or in fertility, hybrid embryos do not develop properly, hybrid adult do not survive in nature, or hybrid adults are sterile or have reduced fertility.

الجنين المتكون لاينمو بصوره سليمه والبالغات في هذا التكوين قد لاتعيش طبيعيا وقد تكون عقيمه او ضعيفه الخصوبه.

Postzygotic reproductive isolation

- - for example via hybrid sterility, e.g. in horse and donkey
- - mother horse, father donkey: offspring is a mule (sterile)
- - mother donkey, father horse: offspring is a hinny (sterile)
- - Hybrid inviability eg. sheep-goat embryos

*Species diversity measurement قياسات تنوع الانواع

----The relationship between the number of species and the area (habitat) where they found is represented on of the most important relationship in the environmental science.

ان العلاقه بين عدد النواع والمساحه التي توجد فيها هي من اهم العلاقات في علم البيئه.

*Species diversity measurement include:

(1). Measurement of environmental system s functions قياس او حساب وظائف النظام البيئي.

----This type of measurement used to describe the stability ثبات of the environment and include:

a. Productivity الانتاجيه .
b. Carbon cycle دورة الكاربون.
c. Decomposing rate معدل التحلل.
d. Respiratory rate المعدل التنفسي .

(2).Measurement of community structure قياس تركيب المجتمعات

----This type of measurement used to study the effect of the different human activity, and include:

a. Number of species عدد الانواع.
b. Species richness غزارة الانواع.
c. Food web الشبكه الغذائيه .

(3). Measurement of biological detection حساب او قياسات الكواشف الاحيائيه.

----This type used to measure the individuals and the population, depending on the particular species quickly response to the ecological effects (direct and indirect effect).

Examples:

*Density and relative abundance index (Ra) موءشر الكثافه والوفره النسبيه.

*Constancy index (S) (ثباتية الانواع)موءشر الثباتيه.

*Species richness index (D) موءشر غزارة الانواع.

*Shanon-Weiner diversity index (H) موءشر شانون- وينرللتنوع.

*Simpson diversity index (D) موءشر سمبسون للتنوع.

*Species uniformity index (E) موءشر تماثل او تجانس الانواع.

THANKS.