BT401 Mid Term Solve

Subjective No.2

Enlist major sources of genetic diversity. 2

Mutations Speciation Errors in Meiosis

White moth and brown moth wala . 2 A

population of moths that are white in color

migrate to a population of brown colored

moths and successfully mate to give rise

to viable offspring. Here, we can say that

there is a change in the allele frequency.

Over time, the number of

these white moths will increase.

Objective of GSPC. 3

Objectives

Plant diversity is well understood, documented and recognized

Plant diversity is urgently and effectively conserved

Plant diversity is used in a sustainable and equitable manner

The capacities and public engagement necessary to implement the Strategy have been developed

3 CHARACTERISTICS OF genepool. 3

It includes all the variants or alleles of every gene. • It includes all the genes present in the population. • In most cases, the population includes individuals of the same species. • A gene pool includes even those genes whose effects are not visible in an individual.

Threats to AnGR 5

Despite the importance of animal genetic resources and their diversity, their diversity has been continually decreasing over time.

One of the greatest threats to livestock diversity is pressure from large-scale commercial production systems to maintain only high-output breeds.

Changes in climate will have an impact on livestock and food production in many ways.

Some major disease threats that livestock currently face include, rinderpest, foot and mouth disease, and Peste des petits ruminants (PPR), also known as sheep and goat plague

Reproduction isolation 5

The mechanisms of reproductive isolation are a collection of evolutionary

mechanisms, behaviors and physiological processes critical for speciation.

They prevent members of different species from producing offspring, or

ensure that any offspring are sterile. These barriers maintain the integrity of

a species by reducing gene flow between related species

Mcqs easy thay. Slides ko aik bar ghor se parh lain bs bt401

1=type of wild plant 2

Some of the common wild plant genetic resources are as follow;

• Prickly Acacia/Keekar • Coral Tree • Deodar Cedar • Dalbergia Sissoo /Sheesham Tree • Calotropis procera/Giant milkweed • Alovera • Marijuana

2=when founder effect accurs?2

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.

3=type of genetic stocks(3) Genetic stocks,:

broadly defined as plants or populations generated and/or selected for genetic studies, represent a unique and growing class of extremely valuable germplasm which, depending on crop, type of genetic stock and user community may represent genetic resources of either transient or long-lasting value

Genetic stocks:

Genetic stocks can be divided into three general groups
cytological stocks mutants

stock

Germplasm set

4=reason for grading up(3)

Grading up Breeding of animals of two different breeds where the animals of an indigenous breed/genetic group is mated by an improved pure breed for several generations towards attaining the superior traits of the improved breed

Grading up is continuous use of purebred sires of the same breed in a grade herd. By fifth generation, the graded animals may reach almost purebred levels.

5=how animals figire out that where they arw going(5)

Scientists aren't really sure exactly how some animals figure out how to get to where they are going. They think that: •Some animals use landmarks like rivers and streams to find their way. • Some animals may navigate by the position of the sun and stars. • Some animals use smell to figure out where they are going. • Some species that may use the Earth's magnetic field to navigate.

mcqs k lye sab kuch prhna h ..

paper easy tha
Bt401

Short q

What is outbreeding

Out-breeding:

Out-breeding is the mating of animals of the same breed but which have no closer relationship than at least 4 to 6 generations. Out breeding is the recommended breeding practice for most purebred sheep breeders.

What is horizontal gene transfer

Causes of migration

Why do we need to conserve plant genetic resources

- Conservation of plant genetic resources is necessary for food security and agrobiodiversity
- Biodiversity provides a valuable source of compounds to the medical, food and crop protection industries. Maintenance of ecosystem Genetic resources need to be conserved so that they may be used in crop research and be used as sources of genes for crop improvement.

Long q

Effect of bottleneck effect on alleles frequency

- Allele frequencies in a group may be very different from those of the population prior to the event,.
- Even some alleles may be missing entirely.
- The smaller population will also be more susceptible to the effects of genetic drift for generations (until its numbers return to normal).
- Effect potentially causing even more alleles to be lost. In human evolution

It is theorized, based on genetic evidence, that a few tens of thousands of years ago the population of Homo sapiens was reduced for a period to a few thousand or tens of thousands of people. Such a bottleneck would explain the extremely low level of genetic diversity found within our species, when contrasted with others, such as Chimps

Cheetah

All Cheetah shared a small number of alleles. Less then 1% diversity As if all cheetahs are identical twins

Bottleneck effect

10,000 years ago Ice age Last 100 years Poaching and loss of habitat

Types of ex situ conservation

Gene Bank

Gene bank refers to a place or organization where germplasm can be conserved in living state. Gene banks are also known as germplasm banks.

Seed Gene Bank

A place where germplasm is conserved in the form of seeds is called seed gene bank. Seeds are very convenient for storage because they occupy smaller space than whole plants.

Field Gene Bank

Field gene banks also called plant gene banks are areas of land in which germplasm collections of growing plants are assembled.

Botanical Garden

A botanical garden or botanic garden is a garden dedicated to the collection, cultivation and display of a wide range of plants labeled with their botanical names

Difference between gene flow and genetic Draft 5

Gene flow "The introduction of genetic material (by interbreeding) from one population of a species to another
Genetic drift is the phenomenon of change in the frequency of alleles (variants of a gene) in a population of organisms due to chance or random events

Write uses of sheesham tree 3

It gives a dry fruit that is a thin and papery pale brown pod. The tree mainly offers timber

What is Threathend of species 3

Threatened species are any species (including animals, plants, fungi, etc.) which are vulnerable to endangerment in the near future. Species that are threatened are sometimes characterized by the population dynamics measure of critical dispensation, a mathematical measure of biomass related to population growth rate.

What is demosticate plant 2

Some domesticated plant resources in Pakistan are as follow; • Fruit Trees • Citrus Fruits • Nut Trees • Legumes • Cereals • Vegetables • Herbs and Shurbs etc

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Difference between close breeding and linear breeding

Close Inbreeding Animals are very closely related and can be traced back to more than one common ancestor. Closest form of inbreeding in domestic animals involves mating between full brothers and sisters (full siblings) Second closest form of inbreeding involves mating between grand-parents and grand-offspring, half brothers and sisters (half siblings)

Line Breeding Mating animals that are more distantly related which can be traced back to one common ancestor.

- e.g. Cousins Grandparents to grand offspring, Half-brother to half-sister.
- Line breeding increases genetic purity amongst the animals of progeny generations.

Types

Write a note on any five genetic resource

What is mild breeding

Mild Inbreeding

Mating of relatives beyond 2nd generation and upto 6th generation.

What is demosticate plant

"Plant domestication is the process whereby wild plants have been evolved into crop plants through artificial selection."

Short q
What is outbreeding
What is horizontal gene transfer
Causes of migration
Why do we need to conserve plant genetic resources
Long q
Effect of bottleneck effect on alleles frequency
Types of ex situ conservation

Bt401
What are endangered species. (2)

When bubal hartebess are extinct (2)

The animals were hunted to extinction and the last known Bubal hartebeest was killed in Algeria sometime between 1945 and 1954, according to the International Union for Conservation of Nature

Why most species in pakistan are in great threat (3)

What are the reason of migration to be tiggered (3)

The trigger for the migration may be:

1. local climate

2. local availability of food

3. The season of the year

4. For mating reasons

Give one example of gene environment interaction in plant (5)

In Drosophila

Mean bristle number on Drosophila could vary with changing temperatures.

In plants

Seven genetically distinct yarrow plants were collected and three cuttings taken from each plant. One cutting of each genotype was planted at low, medium, and high elevations, respectively. When the plants matured, no one genotype grew best at all altitudes, and at each altitude the seven genotypes fared differently. For example, one genotype grew the tallest at the medium elevation but attained only middling height at the other two elevations. The best growers at low and high elevation grew poorly at medium elevation. The medium altitude produced the worst overall results, but still yielded one tall and two medium-tall samples. Altitude had an effect on each genotype, but not to the same degree nor in the same way

Phenylketonuria (PKU)

It is a human genetic condition caused by mutations to a gene coding for a particular liver enzyme. In the absence of this enzyme, an amino acid known as phenylalanine does not get converted into the next amino acid in a biochemical pathway, and therefore too much phenylalanine passes into the blood and other tissues. Change in environment (lowering Phenylalanine consumption) can affect the phenotype of a particular trait, demonstrating a gene-environment interaction.

Differentiate between genetic drift and and gene flow

Solved

By Areha maham

Bt401

Gene sanctuary:

- A gene sanctuary is an area where plants are conserved. It includes both biosphere reserves as well as national parks. India has set up its first gene sanctuary in the Garo Hills of Meghalaya for wild relatives of citrus. Efforts are also being made to set up gene sanctuaries for banana, sugarcane, rice and mango.

Nut tree

Hungton disorder

Huntington's disease (aka Huntington's chorea) is a genetic disorder which results in slowly progressing brain cell death. there are two distinct populations in which the disorder occurs much more often.

1. The first group is the Afrikaner population of South Africa.
2. The second group is the residents of the Lake Maracaibo region of Venezuela.

Sympatric speciation

Sympatric speciation is speciation that occurs when two groups of the same species live in the same geographic location, but they evolve differently until they can no longer interbreed and are considered different species. This is often result of Reproductive isolation

One example gene interaction in plants?

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Differ b/w outbreed and inbreed?

"The intentional breeding of distantly related or unrelated individuals for th e purpose of producing offspring of superior quality."

There are three types of out breeding

- Cross breeding
- Grading up
- Species cross

"Inbreeding, the mating of individuals or organisms that are closely related through common ancestry."

- Inbreeding is useful in the retention of desirable characteristics or the elimination of undesirable one's

It also results in decreased vigour, size, and fertility of the offspring due to combined effect of harmful genes that were recessive in both parents

- There are 3 types of Inbreeding;

- Close inbreeding
- Mild inbreeding
- Line inbreeding

Plant Genetic Resources for Food and Agriculture (PGRFA) are the raw material that farmers and plant breeders use to improve the quality and productivity of crops.

They can be defined as any genetic material of plant origin of actual or potential value for food and agriculture, e.g. seeds, tubers, mature plants etc.

2. What happen when population of moths of white coloure migrate to another population

A population of moths that are white in color migrate to a population of browncolored moths and successfully mate to give rise to viable offspring. Here, we can say that there is a change in the allele frequency. Over time, the number of these white moths will increase.

brown colored moths and mate? (2)

A population of moths that are white in color migrate to a population of browncolored moths and successfully mate to give rise to viable offspring. Here, we can say that there is a change in the allele frequency. Over time, the number of these white moths will increase.

3. Why Hart's Tongue Frens threanteded? 3 marks

Appearance

Hart's Tongue Fern is a rare treat for the eyes; it is so green, glossy, and large that it defies reality.

Habitat

This fern is found in close association with outcrops of dolomitic limestone, in coulees, gorges and in cool limestone sinkholes in mature hardwood forests.

Why It's Threatened?

Quarrying, recreation and residential development have all destroyed these plants and their habitat. Canadian populations are threatened by lumbering and the development of land for ski resorts and country estates, among other activities.

4. Write demerits o in sito and ex sito conservation? 3 marks

In situ Conservation:

Demerits

- Genetic diversity may have already been dramatically decreased
- Conditions that threatened the organisms in the area may still be present, e.g. disease or interspecific competition
- Poachers and Eco tourists may see the thriving area as an opportunity and may cause damage

Ex situ conservation:

Demerits

- Usually only a small number of individuals can be cared for.
- It can be difficult and expensive to create and sustain the right environment.
- The animals that are habituated (used to) human contact may be less likely to exhibit natural behaviors and may be more likely to catch a disease from humans.
- This type of conservation is usually less successful as many species can't breed successfully in captivity or don't adapt to their new environment when moved to a new location.

Long Q (5 marks)

1. Write any five types of genetic resources?

Different types of genetic resources

Types of Genetic Resources

Plant Genetic Resources

Animal Genetic Resources

Forest Genetic Resources

Aquatic Genetic Resources

Genetic Resources of Microorganism

Invertebrates Genetic Resources

1. Plant genetic resources

Plant Genetic Resources for Food and Agriculture (PGRFA) are the raw material that farmers and plant breeders use to improve the quality and productivity of crops.

They can be defined as any genetic material of plant origin of actual or potential value for food and agriculture, e.g.

seeds, tubers, mature plants etc.

2. Animal genetic resources

Animal genetic resources (AnGR) is used to include all animal species, breeds and strains that are of economic, scientific and cultural interest to humankind in terms of food and agricultural production for the present or the future.

3. Forest genetic resources

Forest genetic resources (FGR) are the heritable materials maintained within and among

tree and other woody plant species that are of actual or potential economic, environmental, scientific or societal value.

4. Aquatic genetic resources

Aquatic genetic resources also comprise all water-dwelling **genetic resources**.

5. **Genetic resources of micro-organisms**

Genetic resources of micro-organisms means genetic material of actual or potential value from micro-organisms.

6. Invertebrates Genetic Resources

Invertebrates include a great number of species that perform valuable functions in agro-ecosystems.

2. How a species figure out how they get of any place?

Finding way:

- Scientists aren't really sure exactly how some animals figure out how to get to where they are going.

They think that:

Some animals use landmarks like rivers and streams to find their way.

Some animals may navigate by the position of the sun and stars.

Some animals use smell to figure out where they are going. Some species that may use the Earth's magnetic field to navigate.

Migration is the relatively long-distance movement of individuals, usually on a seasonal basis.

- It is found in all major animal groups, including birds, mammals, fish, reptiles, amphibians, insects, and crustaceans.
- Migration is a behavioral adaptation that helps animals survive.
- The Atlantic Salmon
  - Begins its life in a river
  - Migrates downstream to the ocean.
  - After several years, it heads back upstream to lay eggs and begin the cycle all over again.

When west african black rhinoscances were be extinct?

West African Black Rhinoceros :

The West African black rhinoceros (*Diceros bicornis longipes*) was a subspecies of the black rhino that was declared extinct in 2011.

What is 6 artical of agriculture genetic resources?

Article 6: Sustainable Use of Plant Genetic Resources:

The Contracting parties shall develop and maintain appropriate policy and legal measures that promote the sustainable use of plant genetic resources for food and agriculture.

What is cryopreservation?

Cryopreservation:

Cryo is Greek word. (krayos – frost).

It literally means preservation in "frozen state."

It is a process where tissues, organelles, cells, extracellular matrix, organs or any other biological constructs susceptible to damage caused by unregulated chemical kinetics are preserved by cooling to very low temp (typically-80degree Celsius using solid carbon dioxide or -196 degree Celsius using liquid nitrogen).

Write note on the indus dolphin?

The Indus River dolphin is one of the world's rarest mammals It is second most endangered freshwater river dolphin Approximately 1,100 specimens of this species exist today in a small fraction of their former range Population of this species has gradually declined due to various factors e.g. water pollution, poaching, fragmentation of habitat due to barrages and dolphin stranding in the irrigation canals

How may ways bacteria have transfer their DNA horizontally?

"Horizontal gene transfer is known to occur between different species, such as between prokaryotes and eukaryotes, between the three DNAcontaining organelles of eukaryotes, the nucleus, the mitochondrion and the chloroplast."

- Horizontal gene transfer is basically the transfer of genes between organisms via methods other than asexual or sexual reproduction.
- Genes and the characteristics code for are passed down from parent to progeny.
- There are three ways for bacteria to transfer their DNA horizontally
- **Conjugation**
- The transfer of DNA directly from one cell to another through cell-cell contact often involving **plasmids**
- **Transformation**
- Bacteria are capable of taking up DNA directly from their environment and incorporating it into their genomes known as **natural transformation**
- **Transduction**
- Transduction is the transfer of DNA from one cell to another by a virus
-

BT401 migration with example?

Migration

"**Migration** is the relatively long-distance movement of individuals, usually on a seasonal basis."

e.g. Some crustaceans migrate for breeding

steps of alloptic speciation?

Allopatric speciation:

"Gene flow blocked by physical barriers results in Allopatric speciation"

- It is geographical isolation that doesn't allow population of the same species to exchange genetic material
- Physical barriers to gene flow both "natural" and "artificial"
- Natural physical barriers include mountain ranges, oceans or vast deserts
- Artificial physical barriers are man-made barriers such as "The Great Chine Wall", barrages or dams etc

Steps of Allopatric Speciation:

1 . A geographic change separates members of a population into more than one group.

2. Different gene mutations occur and build up in the different populations over time.

3. The populations become so different that members of the different populations can no longer breed with each other anymore if were they to be in the same habitat in the same time. If this is the case, allopatric speciation has occurred.

Founder effect with example?

Founder Effect :

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. **The Amish People**

Around 200 German immigrants settled in Pennsylvania

Within community marriages

Developed syndrome named Ellis-van Creveld syndrome

Common symptoms are;

Haemophilia
Dwarfism (1/14 carry the gene)

Still births/infant deaths

Physical deformities

Quarantine regulation?

Quarantine regulations

Plant quarantine regulations are promulgated by the national and the state governments to prevent the introduction and spread of harmful pests and pathogens. Plant quarantine will be justified only when the pest has no natural

means of spread and when they are based on biological considerations only, i.e., pest/pathogen introduction risks and the available safeguards.

In general, risks are more with the introduction of vegetative propagules than with true seed. In case of true seed, risks are more with deep-seated infections than with the surface borne contamination of pests/pathogens. Again, risks are far greater with pathogens like viruses, downy mildews, smuts and many bacteria carried inside the seed without any external symptoms. When vegetative propagules are introduced, rooted plants, and other underground plant parts like rhizomes, suckers, runners, etc. carry higher risks than budwood, scions and unrooted cuttings. In any case, bulk introductions are always risky as thorough examination and treatment in such cases is very difficult and planting area is far too large to prevent the establishment and spread of the introduced pest/disease.

Bt401:-

1. What is Genetic Resources?

Genetic resources are sometimes called the "first resource" of the natural resources on this planet - the others being land, air, and water.

The diversity of genetic resources for food and agriculture (i.e. plants/crops, animals, aquatic resources, forests, micro-organisms and invertebrates) plays a crucial role in meeting basic human food and nutritional needs

2. What is Gene Pool?

The combination of all the genes present in a given population is called the gene pool of that population."

It includes all the variants or alleles of every gene.

It includes all the genes present in the population.

In most cases, the population includes individuals of the same species.

- A gene pool includes even those genes whose effects are not visible in an individual. A number of animal species, such as mountain lions in the Americas, and leopards in South Africa, are threatened by human activities.
- Their habitat has been divided into fragments, surrounded by towns and farmlands.
- This results in interbreeding among smaller populations,
- The small gene pool makes them susceptible to diseases.

3. What is importance of domestic animal Resources?

"Animals that are not wild and is kept as a pet or to produce food"

For example;

- Dog
- Buffalo
- Goat
- Sheep
- Cattle
- Cat

Importance of Domestic Animal Resources:

Domesticated animal resources are important as follow;

- Animals provide milk
- Hair from goat and sheep is used for making woolen clothing, shawls and blankets